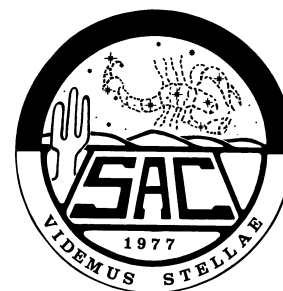


Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



November 1994 — Issue #214

v10.24

...Update...

Lunar Grazing Occultation

by Gerry Rattley

Saturday, Nov. 26, 1994 at 4:28 AM

Note the time difference from that given in the last newsletter. It is a minute earlier. This is because the location I have chosen to set up observing stations for this graze is on the far west side of town. We will use Cotton Lane centered on Bell Road. This is just west of Sun City and east of McMicken Dam. We did a graze in this area back in 1983 (this area probably hasn't changed much).

The other information given in the October newsletter is still correct, except the Moon's elevation is now 48 degrees (still up for our needs). The star is 6.7 mag-

Meeting Time and Place:

Saturday, Nov. 26 at 3:30 AM

Bell Road & Cotton Lane

About 5 miles west of Grand Avenue

nitide RX Sextantis, a Delta Scuti variable with a very small amplitude. The Moon's limb at the graze will be dark. The only bad thing about this graze is the ungodly hour of the morning (it may also be a bit chilly in late November).

There are many new faces in SAC since we did our last graze several years ago. Only about half of those who did grazes with us in the past are still present. The following is a general overview of what a lunar grazing occultation is and how you can participate in timing one with us.

An occultation occurs when the Moon passes in front of a star. If an occultation occurs at the northern or southern edge, or limb of the Moon's disk, it is called a grazing occultation (or graze, for short).

As the Moon passes by during the graze, the star will blink off and on as it goes behind lunar mountains and

Quick Calendar

SAC Star Party
Buckeye Hills Recreation Area
Saturday, October 29

SAC Meeting
Speaker: Ralph Aecheliman from Flagstaff
7:30, Friday, November 18

Lunar Grazing Occultation
Just West of Sun City
4:28 AM, Saturday, November 26

SAC Star Party
Buckeye Hills Recreation Area
Saturday, November 26

SAC Deep Sky Meeting
17 more of 110 Best NGC
7:30, Thursday, December 1

Officer Elections

peeks out through lunar valleys. Timing these off and on blinks precisely provides us with extremely useful scientific data. The main thing it does is help us locate the Moon in the north-south axis. The Moon's location in turn is the basis of our time system (setting our clock). There are many other uses for this information too numerous and involved to go into here.

Because the star's position and the Moon's orbital path are pretty much known, the graze path (only a couple of miles wide) is traced out over the Earth's surface such that as an observer of the graze you must travel in order

SAC Officers

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Public Events	Rich Walker	997-0711

to position yourself in the preset path. If you are too far away you will either see the star miss the Moon or you will time a very long total occultation (still useful data, but not as exciting as a graze).

Professional astronomers do not have the portable equipment or the funding for this kind of field activity, so it is up to the amateur to provide this data. IOTA, the International Occultation Timing Association, provides the graze path predictions and the basic limb profile charts to people interested in leading teams to observe, time, and report these events. These people, called graze leaders, take care of the fine details of setting up the graze expedition. The graze leader informs the members of their graze team of when and where to be for the graze and answers

questions about how it is to be done.

In order to make useful timings of a graze, the team member should have three items of equipment (other than a pair of eyeballs). A telescope, a time signal, and a recording device.

A 4" refractors would probably work OK, but at least a 6" reflector is recommended. Somewhere between 60X and 100X is best, you'll need a fairly large image but a comfortably large field as well—you'll want as little eyestrain as possible. Having a working clock drive is almost a necessity. The observer must have a means of getting a time signal; i.e. a WWV time cube or a short-wave receiver. And third, a means of recording the events and time signals at the same time. A portable cassette

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.

1994 SAC Meetings

Jul. 22
 Aug. 19
 Sep. 16
 Oct. 21
 Nov. 18
 Dec. 17 Party

— 1995 —

Jan. 13
 Feb. 10
 Mar. 17
 Apr. 14
 May 12
 Jun. 9

1994 SAC Star Parties

Date	Sunset	Moonrise
Jul. 2	7:42pm	1:27am
Aug. 6	7:24pm	6:09am
Sep. 3	6:51pm	4:56am
Oct. 1	6:14pm	3:40am
Oct. 29	5:40pm	2:24am
Nov. 26	5:22pm	1:12am

— 1995 —

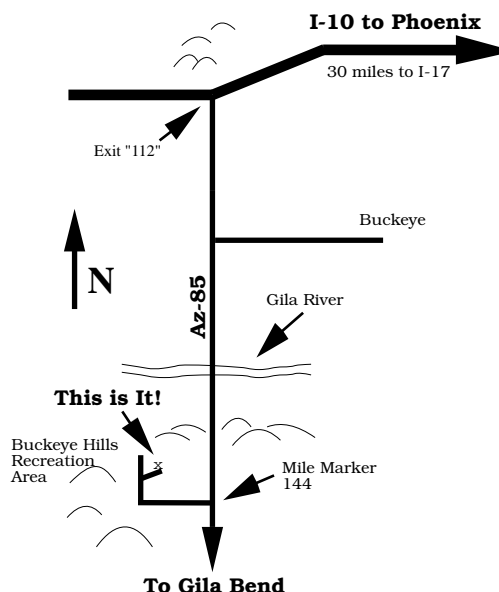
Jan. 28	5:56pm	5:15am
Feb. 25	6:22pm	4:00am
Mar. 25	6:41pm	2:50am
Apr. 22	7:05pm	1:30am
May 20	7:26pm	12:10am
Jun. 24	7:42pm	3:00am

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 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.

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.



tape recorder would work nicely.

There are many methods of recording data on grazes, the most common will be described later. Another, commonly used in the past, is with portable video gear. I will not attempt to relate this one here, I am not an expert at it anyway, but I can put you in touch with someone who can help you if you need it. Call me if you want to discuss other equipment, methods or ideas. My number is at the end of this article.

On the day of the graze each team member is responsible for showing up at the graze site a least an hour before the predicted central graze time. At least an hour is needed to get your station assignment on the graze line, to locate that station, and to set up your equipment. The graze leader (and assistants) arrived at the site many hours in advance and preselected these graze stations according to the graze predictions received from IOTA. Being on the station selected is important if your data is to be of any use. We must know exactly where

you are, longitude and latitude, to within a few feet.

The graze stations are strung out as perpendicularly as possible to the predicted limit, usually in a north-south direction, a few hundred feet apart in order to cover the limb profile from mountain peaks to valley bottoms. Each team member's data will supply a different line, or cord, along the limb and all of the cords plotted together will show a "shadow" of exactly what the Moon's limb looks like at that location.

The graze itself is the essence of the entire expedition. As you sit at the eyepiece of your telescope, you watch the edge of the Moon slowly close in on the star at a tangent. the star gets closer and closer (is it going to "miss"?), then, just when you're convinced it **IS** going to miss, OOPS! Wow! It went out! Oh, it's back again, out, in, out, it flashed, in...etc. The usual is about four of six events (two or three pairs) with a wink or a flash thrown in, maybe. Sometimes the star is double (known or unknown) making for a real panic scene.

Comet Comments

by Don Machholz

(916) 346-8963 CC195.TXT October 6, 1994

One returning comet has been recovered recently. Meanwhile, Periodic Comet Machholz 2 (1994o) is dimming in our morning sky. During the past month one of its companions brightened briefly, it even exceeded the primary coma for a few days. The orbital period is now computed to be 5.23 years. When it comes back next time it will be in the evening sky, and, as it did this time, will approach to within 35 million miles of the earth. At no time will it ever get closer to the earth than 10 million miles, this applies to the companions too since they seem to be staying on the same orbit as the main comet.

Two small pieces have broken off of periodic Comet Harrington (1994g) recently. This was discovered last week by Jim Scotti. The fragments are magnitudes 20 and 21 while the main nucleus shines at magnitude 12.

Periodic Comet Reinmuth 1 (1994p): A. Nakamura of Japan and Jim Scotti of Kitt Peak recovered this comet in early September at magnitude 20. It orbits the sun every 7.3 years, this time around it is not well-placed and will remain faint.

Periodic	Comet	Borrelly	(1994l)		
Date	RA-2000-Dec	Elong	Sky	Mag	
10-20	07h08.7m	+08° 22'	99°	M	8.1
10-25	07h21.7m	+10° 50'	101°	M	8.0
10-30	07h34.8m	+13° 33'	103°	M	7.9
11-04	07h47.9m	+16° 32'	106°	M	7.8
11-09	08h00.9m	+19° 47'	108°	M	7.7
11-14	08h13.9m	+23° 17'	111°	M	7.7
11-19	08h26.7m	+27° 01'	114°	M	7.6
11-24	08h39.2m	+30° 57'	117°	M	7.6
11-29	08h51.5m	+34° 59'	120°	M	7.7
12-04	09h03.2m	+39° 05'	122°	M	7.7
12-09	09h14.3m	+43° 09'	125°	M	7.8

Periodic	Comet	Machholz	2 (1994o)		
Date	RA-2000-Dec	Elong	Sky	Mag	
10-20	10h07.4m	+06° 28'	55°	M	9.3
10-25	10h17.5m	+04° 11'	57°	M	9.6
10-30	10h26.9m	+02° 03'	59°	M	9.9
11-04	10h35.5m	+00° 03'	61°	M	10.2
11-09	10h43.3m	+01° 49'	64°	M	10.4
11-14	10h50.4m	-03° 34'	67°	M	10.7
11-19	10h56.6m	-05° 12'	70°	M	10.9
11-24	11h02.1m	-06° 43'	73°	M	11.2
11-29	11h06.7m	-08° 09'	76°	M	11.4
12-04	11h10.5m	-09° 28'	80°	M	11.6
12-09	11h13.4m	-10° 42'	83°	M	11.7

1994l	Orbital Elements	1994o
1.3651 AU	Perihelion	0.7526 AU
Nov. 01.5, 1994	Perihelion Date	Sept. 18.8, 1994
353.359°	Argument of Perihelion	149.257°
075.424°	Ascending Node	246.181°
030.271°	Inclination	012.788°
0.6228036	Eccentricity	0.750261
6.88 years	Period	5.23 years
MPC 18259	Source of 2000 Elements	MPC 23956

What's Up

by Steve Coe

November 1994

Aquarius

It is Fall and that means it is time to bundle up, even when observing in Arizona. So, here are a few of my favorite tips for keeping warm. First, put on the warm clothes **BEFORE** you get really cold. Trying to warm up after letting yourself get cold is tough. Next, make certain that the head and feet are especially comfortable. I wear a stocking cap and muffler for the head and "Moon boots" to keep toes warm. Many different types of warmly padded boots are available, try some on and remember you will be standing in them for a long while.

NGC 6981 (M 72) is at 20 hr 53.5 min and -12 deg 32 min. It is bright, pretty large, round, much compressed, and much brighter in the middle. I easily resolved it at 150X in my old 17.5". There is a inner bright region with a well-resolved outer section which showed 20 stars resolved on a night I rated 7/10 for seeing. It was seen in 10X50 finder. I also observed M 72 from Buckeye with my 13" f/5.6. I saw a an overall triangular shape to this globular and resolved 12 stars at 220X.

NGC 7009 is at 21hr 04.2 min and -11 deg 22 min. This is the Saturn Nebula, a famous planetary with outer ansae (wing-like projections) and a bright inner disk. It was discovered by William Herschel in 1782 but Lord Rosse was the first to see the extending ansae. The projections reminded him of the planet Saturn and he gave this object its nickname. Amateurs have been trying to duplicate that observation ever since.

Using the 13" at Cherry Rd. on a 8/10 night; Bright, pretty large, elongated 1.5 X 1 in PA 75, at 220X the central star and ansae are obvious and the nebula is light green.

This observation of the Saturn Nebula is made with Helen and Richard Lines' 20" f/6 Newtonian in Meyer, Az. The nebula is bright, small, somewhat elongated and light green at 150X. Raising the power to 225X

will show the ansae as faint projections from the bright central section. At 400X the central star is obvious and the ansae stand out more clearly. One of the bright spots along the ansae (Helen Lines calls them wing tanks) is visible at this higher power. All these observations are on a night I rated 7/10 for seeing and transparency and I found that the UHC filter did **NOT** help with either the central disk or the ansae detail. Several observers, myself included saw the nebula as light green, without the UHC filter installed.

NGC 7088 is faint, large and elongated 2x1 E-W. This star cluster is 26' North of M2. It took a 38mm eyepiece which gives a one degree field to get some contrast surrounding this cluster. It is just a faint glow with some mottled structure and 6 stars superimposed across the face. I have heard this object called Baxendell's Unphotographable Nebula, probably because it could be seen but not photographed with older technology. In the era of long focal ratio scopes and slow emulsions, this was "unphotographable." It certainly would be fun to try a picture of this object with a modern lens and film, just to see if you could shoot the "unphotographable" nebula.

There are lots of nice double stars in Aquarius, and several of them will provoke a discussion of colors in binary stars. One evening a group of people observed Tau 1 AQR (69 AQR) and here are the results of these observations:

Tau 1 (69) AQR at 22 47.7 -14 03 with 17.5" at 150X:

A.J. Crayon — white and pale blue
Gerry Rattley — yellowish and orange
Dave Fredericksen and Me — blue-white and green
Gene Lucas — blue-white and pale blue
George deLange — white and yellowish

Binocular fields

I have always loved to sit back in a lounge chair and just enjoy the sights of Our Galaxy with a pair of binoculars, it is very relaxing and just plain fun. There are several places in Aquarius that are worth some time scanning with binoculars. I recommend the areas near Psi and Omega AQR. These areas contain some beautiful curved chains of stars that cross each other and form interesting patterns in my pair of 10X50's. I would highly recommend looking at the sky with both eyes for a while.

The most used method for gathering data on a graze these days is to start your tape recorder about 10 minutes before predicted central graze and to leave it running until you're sure the graze is over — if the star has been on for over 5 minutes after central graze time, it's a sure bet nothing is going to happen. Once the recorder is going, you need to get your time signal going and place it so that it records its beeps as a background on your tape (continuously throughout the graze is best). With the recorder and WWV going, you stand at your eyepiece can

call out your D's and R's, winks and flashes or whatever else strikes your fancy. The graze itself will generally last for only a few, 1-5, minutes.

Sometime after the graze is over you will have to listen through this tape and record the events on a reporting form (supplied by your graze leader). The graze leader the collects all these forms, correlates them, adds the geodetic information (your station location) and reports the graze data back to IOTA and to ILOC, International Lunar Occultation Centre, in Tokyo, Japan. Results of a successful

Lunar Observing for Advanced Beginners

by Don Wrigley

This is an introduction to a series of articles about observing our moon. It seems that a lot of observers put away their scopes for the two weeks each month when the moon dominates the night sky. This series should complement the "What's Up" column and give you something to look at without having to leave town.

Sometimes I feel like a teenager who has been asked to teach Fred Astaire how to do the "Funky Chicken" — I know in my heart that if he were to put his soul (and soles!) into it, he could do it far better than I. The hard part seems to be convincing him that he ought to try!

I compare lunar observing with an obsolete dance step because they happen to share this one common feature: back in the sixties it seemed everyone was doing it — from rooftops, back yard observatories, public parks, anywhere that a telescope could be set up — and lunar afficianadoes abounded. Now we only draw curious stares when we refer to some not so obscure lunar feature that was once the topic of much interest. The rise of deep sky observing coincided neatly with the ending of the Apollo program, and for some time now lunar observing seems to have passed, like an old fad, into the realm of the mundane.

It seems rather tragic that this should be the case, given the state of today's amateur equipment: apertures have never been larger, eyepieces have never been sharper (or Wider!), mountings and drives have never been sturdier or smoother, and the opportunity for an amateur to obtain observatory quality views of the lunar surface with the same equipment used for deep sky

observing have never been better. When all things are considered, this should be the golden age of amateur lunar observations. The only thing that seems to be lacking is interest.

Perhaps some amateurs feel that the moon has been completely mapped, and that there is no further need to explore it. The fact is that the lunar orbiter mapping showed many areas under only one angle of illumination, and that these areas should be observed under many different lighting conditions in order to be fully understood. The Apollo Program gave us hints as to what to look for and where to look, so that, while many of the telescopic observations of the past have been obsolete, there is no reason why an informed observer today cannot make useful observations.

Others have suggested that the moon is a dead object, geologically, and therefore pointless to observe from a scientific standpoint. Lunar outgassings have been reported on many occasions, and confirmed spectrographically at least once. Another such occurrence would be of great interest to planetary geologist; although such an observation is not likely to be made by any major observatory. It is up to serious amateurs to notice any changes in the lunar environment, and I think it is only a matter of time before such an observation will be made. This past summer's collision between Jupiter and SL-9 ought to have made us aware that it is not so impossible for such an event to occur at a more local level. Though no new craters have been noted in modern times (since the advent of good reliable lunar maps), it is not too foolish to keep watch for any future possibilities.

Should such an event occur, it will very likely be an amateur who discovers it! Imagine the stir that would create! Comet hunts would pine! In the mean time the search continues: from every type of backyard observatory, a few score stalwart observers perch from every angle, hunched over the bright glow of their eyepieces, doing a strange sort of funky chicken to a tune only they can hear.

graze will also be published in the SAC newsletter.

This current graze is a good one, as grazes go and if weather permits, I encourage everyone to come out to see it. If you are interested in participating as a member of the graze team, please call me. It is very helpful for me to know about how many stations I will need to prepare. If you just want to watch, I will put you where I expect the best action to take place (enjoy). My home phone is (602) 892-5698. I have an answering machine (leave your name, at least say the word "graze", and your number). I will answer immediately or will call you back ASAP. I've been doing grazes since the mid 70's, and leading them since 1982. Gene Lucas will be helping me to set up this one.

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.

Bits and Pieces

Coming Events

Star Parties

Solstice Party	Dec. 17
Messier Marathon	Apr. 1
Sentinel	Apr. 29
Grand Canyon	Jun. 17-24

Deep Sky Meeting

The Deep Sky Group is made up of people that like to observe celestial bodies out past the far reaches of our Solar System. These bodies include stars, nebula and galaxies. If you are interested in sharing your observations, or knowing what they look like in telescopes — then by all means come join us at the next meeting. The meeting will be held at John McGrath's house; directions are here in the newsletter.

As we begin closing in on the completion of our discussion of the 110 Best NGC objects the constellations for the November meeting are Andromeda, Cassiopeia, Cetus, Sculptor, Aries, the magnificent Eridanus and Perseus will be discussed. Following are the constellations and objects: Andromeda 891, 7662; Cassiopeia 185, 281, 457, 663, 7789; Cetus 246, 936; Sculptor 253; Aries 772; Eridanus 1232, 1535 and Perseus 869, 884, 1023, 1491.

You don't need to RSVP, we don't extend special invitations to anyone — ourselves included. If you are interested show up, we'd love to have you.

The Deep Sky meeting will take place on Thursday, December 1 at 7:30pm.

Minutes of the September Meeting

Immediately upon opening the meeting the President announced that next month was nominations for offices for 1995. Being an officer of SAC is a great way to meet more members in the club. If you are considering it speak to one of the current officers.

Adam Sunshine gave a treasurer's report. The club is in good financial shape — it was also announced there was a \$1.97 made on interest from savings. While giving a treasurer's report Adam also announced that magazine subscriptions are due by the end of September. If you haven't got them in by then see the Treasurer — immediately!

The Deep Sky Chairman announced the next meeting and took a head count of those members interested in attending the All Arizona Star Party, October 7-9. Fifteen hands were raised.

Rich Walker discussed the Public Star Party to be held at Thunderbird Park on October 8. About five hands were raised.

Gerry Rattley discussed an upcoming lunar graze occultation scheduled to occur in November. The bad news is it happens around 4:30am MST. The good news is the path is from northwest Phoenix through Mesa and Florence Junction. Many of us will not have to travel to a remote site. You can do it from your backyard!

At the break there were 30 people in attendance.

Our speaker was Jim Scotti from the University of Arizona Lunar and Planetary Laboratory. He discussed his work on the Space Watch Program where they working on detecting asteroids that approach the earth.

The president promptly closed the meeting on Saturday, September 17, 1994 at 4:55:22 UT.

—A.J. Crayon, SAC Secretary

Grand Canyon Star Party

A date has been set for the 1995 Grand Canyon Star Party. If you need to make plans early, the dates are June 17-24. You can attend all or part of the star party. The basic format is a public session after the sunsets with more serious observing as it gets later and people go to bed. This star party is organized by TAAA and has had a lot of people from Tucson attending. In 1994, several SAC members were there too.

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.

For Sale—Meade Series 4000 Super Plössl 9.7mm 4-element eyepiece, 1.25", new condition, \$75. Meade Modified Achromatic 9, 12, and 25mm 3-element eyepieces, 1.25", new condition, \$25 each, \$60 set. Call Jack Jones, 944-5488 eve.

November 1994

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
All Times are Mountain Standard Time			Taurid Meteors Nov. 3-13 Z.H.R. 11	New Moon 6:35 A.M.	TAAA Meeting (Tucson)	
		1	2	3	4	5
Mercury at greatest elongation 19° (morning)			First Quarter Moon 11:14 P.M.			
6	7	8	9	10	11	12
	Mercury & Venus within 5° (morning)		EVAC Meeting (SCC: Rm. PS172)	Leonid Meteors Full Moon 11:57 P.M.	SAC Meeting Grand Canyon University, Fleming Rm. 105	
13	14	15	16	17	18	19
			Sun enters Scorpius 1 A.M.	Thanksgiving Day	Tomorrow Last Quarter Moon 12:04 A.M.	SAC Star Party Buckeye Hills (members&guests)
20	21	22	23	24	25	26
		Sun enters Ophiuchus 9 P.M.	Venus 2° N of Moon 7 A.M.	Nov. 26 at 4:28 AM Lunar Grazing Occultation Contact Gerry Rattley, 892-5698		
27	28	29	30			

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 pro-rated as follows: Jan - Mar 100%, Apr - Jun 75%, Jul - Sep 50%, Oct - Dec 25%.

- \$20.....Individual Membership
- \$30.....Family Membership (one newsletter)
- \$100.....Business Membership (includes advertising)
- \$4.....Nametag for members
- \$10.....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 treasurer to renew your subscription.

Sky & Telescope.....\$20.00 for one year

Astronomy.....\$18.00 for one year

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

Make checks payable to SAC.

Mail the completed form to:

Adam Sunshine
SAC Treasurer
20401 N 30th Drive,
Phoenix AZ 85027



SACNEWS

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

Stamp

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