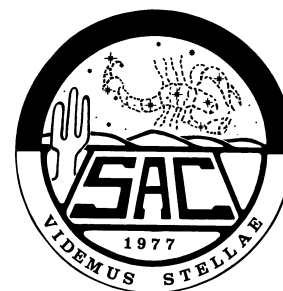


Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



September 1994 — Issue #212

v8.28

Choosing Eyepieces A Buyer's Guide Part 2

by Alan Dyer
Astronomy Magazine

This article is reprinted from the May, 1994, issue of Focal Point (Vol. VI, No. 9), the monthly notices of the Atlanta Astronomy Club, Inc. Which in turn, reprinted it from the June, 1993, issue of Astronomy magazine. Copyright © 1993 Kalmbach Publishing Co. The original article contains a 4-page table listing specifications and prices for all of the eyepieces offered by manufacturers in North America as of early 1993. Back issues of Astronomy can be ordered by calling 800-533-6644. Club members can subscribe to Astronomy at a discount. See back cover for details.

Keep this article handy. After completing this article, it will be followed by another from Rick Blakely with references back to this article. Rick's article is directed to those who are committed amateurs.

Other Eyepiece Features

22 Besides optical design and field of view, you should consider several other factors when selecting eyepieces.

23 **Barrel Diameter.** Some entry-level telescopes accept eyepieces with only the smaller 0.965-inch-diameter barrels. However, the majority of telescopes on the market now accept 1.25-inch eyepieces. In this larger barrel size, the selection of eyepieces is much greater and includes many wide-angle and extra-wide-angle models. For eyepieces that combine long focal length (yielding low power) and wide field, you need to turn to models with 2-inch diameter barrels. These require telescopes with giant 2-inch focusers. A few eyepieces have barrels that can fit both 2-inch and 1.25-inch focusers.

24 **Coatings.** Most eyepieces have optics coated with at least a single layer of magnesium fluoride on all air-to-glass surfaces. These coatings (which give the glass a bluish tint) help increase light transmission and reduce

Quick Calendar

SAC Star Party
Buckeye Hills Recreation Area
Saturday, September 3

SAC Meeting
7:30, Friday, September 16

SAC Star Party
Buckeye Hills Recreation Area
Saturday, October 1

All-Arizona Star Party
New Arizona City Site
Friday & Saturday, October 7 & 8
Public Star Party — Thunderbird Park
59th Avenue, 1 Mile North of Beardsley
Saturday, October 8

Magazine Renewals Are Due

Renewals must be in by the September meeting.
See Member Services Form on the back page.

the internal reflections that create ghost images. Many eyepieces offer multicoated optics. Good multicoatings, which can look yellow, red, green, deep blue, or purple, offer even better contrast and light transmission and are a necessity on complex 6- to 8-element eyepieces. However, the effectiveness of any coating depends on how well it is applied. An eyepiece with superb single-layer coatings can be better than an eyepiece with poor multicoatings.

25 **Filter Threads.** Most eyepieces have barrels that are threaded to accept standard filters. Exceptions are the Clave Plössls and the Zeiss Jena Orthoscopes — their barrels are not threaded. The VernonScope Brandons are

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Properties	Pierre Schwaar	265-5533
SACNEWS Editor	Paul Dickson	862-4678
Public Events	Rich Walker	997-0711

threaded but accept only special VernonScope filters.

26 Eye Cups. More manufacturers are offering eyepieces with rubber eye cups as standard fittings. These help block stray light.

27 Parfocal. Parfocal eyepieces are part of a series designed to focus at nearly the same point. When you switch eyepieces you do not need to refocus.

28 Price. Eyepieces retailing for \$60 and under are considered "Economy Eyepieces." There is a good selection here, but to buy a wide-angle eyepiece, you'll need a budget of at least \$75 to \$100.

Choosing a Core Set

29 With so many types of eyepieces to pick from, selecting a set that's right for you seems difficult. These recommendations may help you narrow your choice:

30 0.965-Inch. A good core set for a typical department-store telescope would be a 40-mm, a 25-mm, a 12-mm, and a 9-mm or 7-mm, either Kellners, Modified Achromats, or Orthoscopics.

31 1.25-Inch. A set of four eyepieces with 28- to 24-mm, 20- to 15-mm, 13- to 10-mm, and 9- to 7-mm focal lengths will provide magnifications to handle just about all observing situations with most telescopes. You could also restrict your choice to as few as two, a 28- to 24-mm low-power and a moderate-to high-power 12- to 9-mm, and add others later. All designs will work well, but Orthos and Plössls are better for high-power use.

Expanding the Core Set

32 In 0.965-inch barrel sizes there are no wide-angle eyepieces available. You can choose from some superb standard-field models from Takahasi and Zeiss but at over \$100 each, these eyepieces are for the planet-observing aficionado and are likely to be beyond the budget of most owners of entry-level telescopes. But in the 1.25-inch size,

you have several choices for expanding your core set.

33 An Ultra-Low-Power Eyepiece. A 35-mm to 40-mm Plössl or Modified Plössl will show you as much sky as you can get out of any 1.25-inch-diameter eyepiece. If you enjoy deep-sky observing, an eyepiece in this range is an excellent choice as your first additional eyepiece beyond the core set, with one proviso — avoid any eyepiece that provides too low a power.

34 At too low a power, the eyepiece puts out a cone of light wider than the diameter of the pupil in your dark-adapted eye. Some of the light coming from the telescope will not make it into your eye. In this situation, with reflector telescopes you see the dark shadow of the secondary mirror floating in the center of the field.

35 A good rule of thumb for determining the longest focal-length (or lowest power) eyepiece you can use is to take the f /ratio of your telescope and multiply it by 7. For example, on any $f/4$ telescope, the longest eyepiece you should use is a $7 \times 4 = 28$ -mm eyepiece. This rule applies for people whose pupils can open as wide as 7-mm when fully dark adapted. When you get past age 30, your eyes lose about 1-mm of aperture every 10 years. For people age 40, 6mm is a more likely figure for their dark-adapted pupils. In this case, a 24-mm eyepiece (6 X 4) is a better choice as the lowest power model with an $f/4$ reflector.

36 An Ultra-High-Power Eyepiece. You might wish to add a 6-mm to 2.5-mm eyepiece, provided such an eyepiece does not give you much more than 50X to 60X per inch of aperture with your telescope. For example, if you have a 4-inch telescope with a focal length of only 500-mm, a 2.5-mm eyepiece will give you 200X, a magnification at the upper limit but usable on nights with steady seeing conditions.

37 Wide-Angle Eyepieces. For spectacular deep space views, consider replacing the low- and medium-power

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

- Jan. 28
- Feb. 25
- Mar. 25
- Apr. 22
- May 20
- Jun. 24
- Jul. 22
- Aug. 19
- Sep. 16
- Oct. 21
- Nov. 18
- Dec. 17 Party

1994 SAC Star Parties

Date	Sunset	Moonrise
Jan. 8	5:38pm	5:22am
Feb. 5	6:05pm	4:11am
Mar. 5	6:29pm	2:58am
Apr. 9	6:55pm	5:42am
May 7	7:16pm	4:17am
Jun. 4	7:34pm	2:52am
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

“core set” eyepieces with wide-angle models. A good first choice would be purchasing a 24-to 22-mm wide angle instead of the 28-to 24-mm standard-field model. A second choice would be purchasing a 19-mm to 15-mm wide angle in place of the 18- to 15-mm standard-field eyepiece.

38 Extra-Wide-Angle Eyepieces. If your budget will allow it, you could select extra-wide-angle eyepieces in the 14- to 4.8-mm range for all your moderate-to high-power eyepieces. All will fit 1.25-inch focusers. Extra-wides are especially recommended for owners of fast *f*/ratio tele-

scopes or for observers keen on deep-sky observing. However, purists who shun multi-element eyepieces often like to retain less complex Plössls or premium Orthoscopies for high-power planetary use.

39 Giant Two-Inch Eyepieces. The next step in expanding your viewing choices is, if possible, to outfit your telescope with a focuser or star diagonal that accepts 2-inch-diameter eyepieces. These jumbo models offer wider fields and lower powers than are possible with restrictive 1.25-inch barrels.

Comet Comments

by Don Machholz

(916) 346-8963 CC193.TXT August 8, 1994

Three comets remain visible in our skies. A new orbit calculation for Comet Nakamura-Nishimura-Machholz (1994m) indicates that perihelion was on July 13 at 1.14 AU. The comet will be closest to the Earth on August 31 at 0.41 AU. It will then rapidly move southward as it dims.

Sometime during the next five years a comet known as Periodic Comet DeVico is expected to return to our skies. Last seen in 1846, this comet was missed in 1921–2 and at most most returns prior to 1846. The orbit is not well known; the window for its next return extends over the next few years. Therefore, observers are asked to be on the lookout for this comet, which will probably reach naked-eye visibility as it passes perihelion at a distance of 0.66 AU from the sun. A high inclination of 85 degrees will bring it in from the south.

I recently wrote a paper providing the history, orbital calculations, search suggestions and a search ephemeris for Periodic Comet DeVico. It is printed in the *The Strolling Astronomer* (The ALPO Journal), Vol. 38, #1. If you are interested in reading the article and perhaps searching for the comet, but don't receive the Journal, send me \$2.00 in postage stamps and/or money for duplication and

shipping, and I'll send you the complete 15-page report. Reach me at P.O. Box 1716, Colfax, CA. 95713

Periodic	Comet		Tempel		1
Date	RA-2000-Dec	Elong	Sky	Mag	
08-21	15h38.2m	-26°38'	91°	E	10.3
08-26	15h52.8m	-27°48'	89°	E	10.5
08-31	16h07.7m	-28°49'	88°	E	10.7
09-05	16h22.8m	-29°44'	87°	E	10.9
09-10	16h38.1m	-30°30'	85°	E	11.1
09-15	16h53.5m	-31°08'	84°	E	11.3
09-20	17h09.0m	-31°39'	82°	E	11.6
09-25	17h24.4m	-32°02'	81°	E	11.8
09-30	17h39.8m	-32°17'	79°	E	12.0
10-05	17h55.1m	-32°26'	78°	E	12.2
10-10	18h10.2m	-32°28'	76°	E	12.5
10-15	18h25.1m	-32°24'	74°	E	12.7

Nakamura-Nishimura-Machholz (1994m)					
Date	RA-2000-Dec	Elong	Sky	Mag	
08-21	23h34.3m	+49°28'	115°	M	7.6
08-26	22h55.7m	+36°28'	132°	M	7.4
08-31	22h23.1m	+19°24'	152°	M	7.4
09-05	21h56.9m	+01°40'	163°	M	7.7
09-10	21h36.7m	-12°53'	155°	E	8.2
09-15	21h21.6m	-23°16'	143°	E	8.7
09-20	21h10.6m	-30°23'	133°	E	9.2
09-25	21h03.0m	-35°16'	124°	E	9.7
09-30	20h58.1m	-38°41'	117°	E	10.1
10-05	20h55.2m	-41°09'	111°	E	10.6
10-10	20h54.2m	-42°57'	106°	E	11.0
10-15	20h54.5m	-44°17'	101°	E	11.3

Latest news: Added to this issue of Comment Comets is Periodic Comet Machholz 2. The data is from IAU Circular #6059.

Periodic	Comet		Borrelly		(1994l)
Date	RA-2000-Dec	Elong	Sky	Mag	
08-21	04h35.0m	-08°31'	83°	M	10.3
08-26	04h47.6m	-07°38'	84°	M	9.9
08-31	05h00.3m	-06°41'	85°	M	9.7
09-05	05h13.0m	-05°42'	86°	M	9.4
09-10	05h25.7m	-04°38'	87°	M	9.2
09-15	05h38.5m	-03°28'	88°	M	9.2
09-20	05h51.2m	-02°13'	89°	M	9.0
09-25	06h04.1m	-00°51'	91°	M	8.9
09-30	06h16.9m	+00°39'	92°	M	8.7
10-05	06h29.8m	+02°18'	93°	M	8.5
10-10	06h42.7m	+04°07'	95°	M	8.4
10-15	06h55.7m	+06°08'	97°	M	8.2

Periodic	Comet		Machholz 2		(1994o)
Date	RA-2000-Dec	Elong	Sky	Mag	
08-26	07h03.4m8	+49°41'.7	56°	E	9.9
08-30	07h30.3m2	+44°49'.9	53°	E	9.9
09-03	07h51.2m4	+40°16'.5	51°	E	10.0
09-07	08h08.4m6	+36°04'.3	49°	E	10.1
09-11	08h23.3m5	+32°12'.6	48°	E	10.1
09-15	08h36.7m2	+28°39'.6	48°	E	10.3
09-19	08h49.0m9	+25°23'.1	48°	E	10.4
09-23	09h00.7m7	+22°21'.0	48°	E	10.6

Bits and Pieces

Coming Events

Star Parties

All-Arizona Oct. 7 & 8
Solstice Party Dec. 17

Public Star Parties

Thunderbird Park Oct. 8

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.

Continuing our discussion of the 110 Best NGC objects, the next 15 will cover the summer constellations Cepheus, Cygnus, Aquila, Lacerta and Pegasus. The following objects will be discussed in the indicated constellation: Cep 40, 6939, 6946, 7129; Cyg 6819, 6826, 6960, 6992, 7000, 7027; Aqr, 7009, 7293; Lac, 7209, 7243; and Peg, 7331.

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, September 22 at 7:30pm.

40 2-Inch Wide-Angle Eyepieces. A 32-mm to 40-mm eyepiece can provide spectacular wide-field vistas of Milky Way starfields. But watch the low-power limit. These models aren't recommended for reflectors faster than $f/5$.

41 2-Inch Ultra-Low-Power Eyepieces. The tables list a class of 2-inch eyepieces that have focal lengths of 35-mm to as long as 80-mm. All provide low power but within this class, don't think the longer the eyepiece the more sky you'll see. All models in this class have apparent fields of no more than 50 degrees. In models longer than 55-mm, the apparent fields are limited by the size of the barrel and can actually shrink to as little as 35 degrees. A 55-mm Plössl will show you as much sky as is physically possible with a 2-inch-barrel eyepiece. But surprisingly, a 40-mm wide angle, despite its higher power, will show you nearly as much sky on any telescope. This is because it has a wider apparent field—65 degrees, versus the 50 degrees field of the 55-mm Plössl.

Eyepieces are Forever

42 Like a fine diamond, a sparkling new eyepiece is a long-term investment. With care, an eyepiece will never wear out and can be used on any telescope you will ever own. Eyepieces are available for every budget and observing interest. A core set is all you need to get started, but few backyard astronomers stop there. Chances are you won't either. After all, happiness is a new eyepiece.

Newsletter Deadline

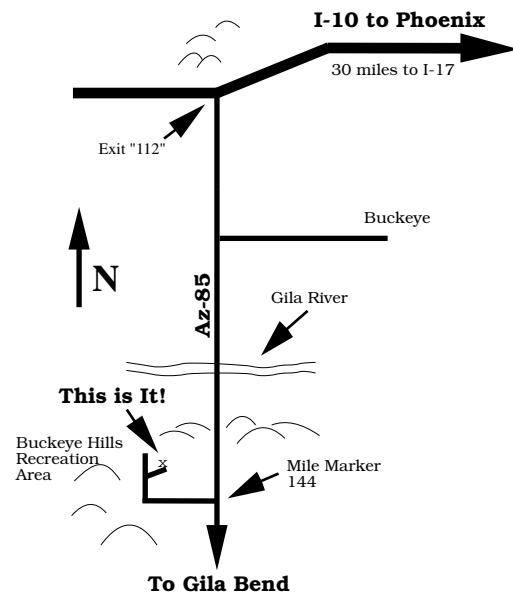
Mail items at least two weeks before the end of the month. Items arriving too late for an issue will be included in the next newsletter.

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.



What's Up

by Steve Coe

September 1994

Capricorn

Capricorn is one of those parts of the sky that does not have a lot to offer in the way of deep sky objects. At a light polluted site the arrowhead shape of the "Sea-goat" is also tough to pick out. So, if it were not for two facts, Capricorn would be generally ignored. First, it is a constellation of the Zodiac and so the planets move through this area for one twelfth of their trip around the sky. Second, there happens to be a Messier object with the boundaries of Capricorn. So, Messier certificate hunters have learned of this region as part of their quest to follow in Charles Messier's footsteps. Let's start with M 30 and see what else is available in Capricorn.

NGC 7099 or M 30 is bright, large and much brighter in the middle. I counted 45 stars resolved in this globular cluster at 220X using my 13" f/5.6. This nice globular is easy in the 11X80 finder. It is elongated 2X1 E-W and there are several nice chains of stars on the south side. There are many faint stars that form a background glow.

These three galaxies get progressively fainter and more difficult in the 13". All these observations are from the SAC site at Buckeye Hills on a night I rated 6/10 for seeing and transparency.

NGC 6903 is faint, small, elongated 2X1 in PA 45 and somewhat brighter in the middle at 135X. A 10th mag star is on the NE edge.

NGC 6907 is pretty faint, pretty large, round and somewhat brighter in the middle at 100X.

NGC 7131 is extremely faint, pretty small and not brighter in the middle at 100X. Rocking the telescope tube helps some, but it is just a dull glow.

NGC 7158 is given as a triple star in *NGC 2000*. Sure enough, there is a triple with two members about 9th mag and one 11th at this location. They are separated by about 30 arc seconds in a straight line at 100X. This multiple star system must have been included in the NGC because of its appearance at low power, using 60X this group is nebulous. It is marked as a galaxy on Uranometria 2000.

Double Stars in Capricorn

Sigma (σ) Easily split at 100X, light yellow and light blue.

Pi (π) Elongated at 100X, split at 200X, white and blue.

Omicron (\omicron) Easy at 100X, blue-white and blue.

Minutes of the July Meeting

Immediately after opening the meeting, President Bob Gardner asked for visitors to identify themselves. After which, as acting treasurer, he gave a partial treasurer's report.

Nominations were opened for filling the vacant treasurer position for the remainder of this year. Adam Sunshine was the only volunteer. Previously, he made the mailing labels for the Newsletter for the August issue. There was no debate and as a result is a natural for this position. The club breathed a sigh of relief at filling this most important position so fast.

Deep Sky Chairman AJ Crayon announced the next meeting and indicated where the objects for discussion would be found. He also mentioned his drawings of Comet Shoemaker-Levy 9 colliding with Jupiter.

Paul Dickson announced the EVAC site would be available for viewing the Perseid Meteor shower.

Steve Coe showed diskettes that had GIF's (Graphic Information Files) from the Hubble Space Telescope of SL-9 impacts on Jupiter.

Rich Walker, Public Events, announced the next Public Star Party for October 8th at Thunderbird Park. He also requested volunteers for supporting school Star Parties. If you are interested in showing kids and their parents the delights of the night sky, see Rich. He'd love more volunteers.

While discussing Star Parties the question was posed about Buckeye Hills being closed due to budget cut backs by Maricopa County. It was felt that the park was not in eminent danger of being gated shut.

For Show and Tell Pierre Schwaar showed a magnificent video of, what else, SL9 impact sites on Jupiter. The

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.

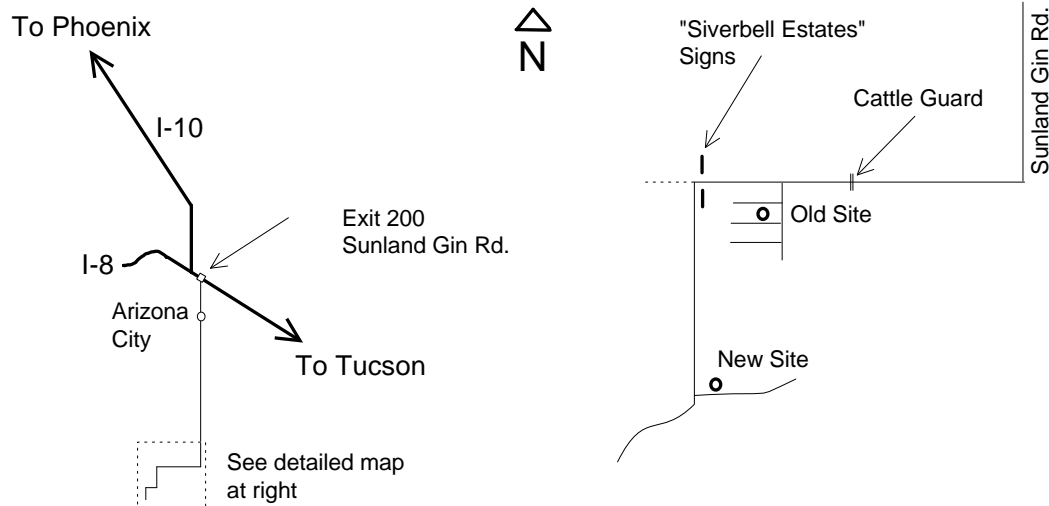
For Sale—SBIG ST-4 CCD camera & autoguider—Retails for \$900—Will sell for \$600. Call Adam Sunshine at 780-1386.

For Sale—ST-4. \$750. Call Glenn Nishimoto 1-602-321-4737 (Tucson).

The 13th Annual All-Arizona Star Party

The All-Arizona Star Party will be hosted again this year by the East Valley Astronomy Club (EVAC). This star party is a two night affair, Friday and Saturday nights, October 7 & 8 at the new Arizona City site (the same site as the 1994 Messier Marathon). There is plenty of room for camping and scope set-up.

Friday night's observing session will begin at sunset. On Saturday, from 2-5 PM, there will be a Swap Meet. The second observing session will begin Saturday night.



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. One mile past the road to the old site, the main road will turn south just after the "Silverbell Estates" signs. Continue for another 2.5 miles. The road will veer off to the west. Immediately to the east is the road to the site. About 100 yards down this road are several large, open areas to the left.

impact sites showed signs of umbra and penumbra effects left by some of the fragments.

Brian Vorndam followed with a video of the solar eclipse earlier this year.

At break time there were 35 in attendance.

After the break Susan Morse introduced our speaker, Jeff Hopkins, from Hopkins Phoenix Observatory. Jeff spoke about astrology (yes astrology) and astronomy. As we all know, astronomy is a science; astrology isn't. Surprisingly though, astrology was the foundation for astronomy (gulp).

—A.J. Crayon, SAC Secretary

Public Star Party at Thunderbird Park

Due to scheduling mis-communications, this public star party got scheduled the same weekend as the All-Arizona Star Party. Would those of you who aren't going to attend the All-Arizona Star Party, please bring your scope to this public star party. Thanks.

Thunderbird Park is one mile north of Beardsley on 59th Avenue. Please arrive between 5:30 and 6 PM.

September 1994

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>					TAAA Meeting (Tucson)	SAC Star Party Buckeye Hills (members&guests)
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

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

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