

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



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A Guide to Eyepieces

Part 2 — Eyepiece Types

by Steve Coe

Last time we used some eyepiece math and got familiar with terminology associated with eyepieces. In the same way that there are several different designs of telescope optics, the lenses within an eyepiece are arranged in a variety of ways to provide the observer with magnification and a focussed field of view to observe. This article will look into the types of eyepieces available to modern observers and the strengths and weaknesses of each design.

Basically, as lens makers got better at making consistent glass with the same curves each time, they realized that adding more lenses generally reduced the aberrations in the eyepiece. Many of the designs I will discuss are named for the person who invented the combinations of lenses which make up these eyepieces.

So, the first eyepiece designs, the Ramsden and Huygenian, only contain two lenses and are very poor eyepieces by modern standards. They have very narrow fields of view, short eye relief and many aberrations. Cheap telescopes often include these inexpensive eyepieces.

The Kellner is the best of the inexpensive eyepieces. This style of lens has been around for many years and it contains one doublet (two lenses together) and one singlet lens for a total of three pieces of glass inside. The Kellner does not have any excellent characteristics, but it also has few real flaws. Kellner eyepieces have decent eye relief, a fair field of view (45 degrees) and little curvature of field.

The Plössl eyepiece is composed of two doublets, which are identical to each other. For this reason, you will also hear it called a symmetrical eyepiece. It is an excellent eyepiece and many observers look no farther than a good set of Plössl's. They have a wide field of view (55 degrees), very good eye relief and are well corrected for aberrations. They cost more than Kellners, but they are worth it.

Orthoscopic eyepieces are generally not named for their inventors, Mittenzwey and Abbe, and I think you can see why. The "Orthos" have one outstanding characteristic, the aberrations and distortions in these eyepieces

Quick Calendar

SAC Meeting
7:30 PM, Friday, November 3

SAC Deep Sky Meeting
September and October *What's Up* Columns
7:30, Thursday, November 9

SAC Star Party
Buckeye Hills Recreation Area
Saturday, November 18

Officer Elections

are virtually non-existent. These flat field eyepieces have a fair amount of eye relief and field of view (50 degrees). This design contains a triplet lens with one singlet nearest your eye.

The Erfle eyepiece was invented to provide a wide apparent field of view and they do that (65 degrees). What the Erfle design gives up is some sharpness of the image at the edge of the field of view. Also, if there is a very bright star nearby where you are observing, some ghost images can appear within that wide field. Inside the Erfle is a combination of three doublet lenses.

This is where the eyepiece world stood for many years. Then the advent of computerized lens designs changed the standards for eyepiece manufacturers.

Enter the Nagler and Ultra Wide designs. These computer-designed eyepieces contain either seven or eight

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lenses, some with curves ground into them which would have been impossible before modern grinding machines were constructed. These designs provide an extremely wide field of view (82 degrees) and very distortion-free fields at those wide angles. They all have two disadvantages: cost and weight. All that glass is going cost more to grind and put together, also, once it is assembled these eyepieces weigh nearly two pounds in long focal lengths.

Along with eyepieces themselves, there is a device which will change the magnification of your system. It is called the Barlow lens. Just slide your eyepiece into the Barlow and put the whole thing into the eyepiece focuser and you have raised the magnification. The good news is that the eye relief of the system is the eye relief of the eyepiece alone. So, for high power it is much easier to use a 10mm eyepiece and a 2X Barlow than it is to use a 5mm eyepiece and its short eye relief.

This is a great idea and I have owned a Barlow since my first scope, but there are limits. I find that Barlows which more than double the power are also introducing too many optical aberrations to the viewing system to allow me to believe I am seeing more detail than I saw without the Barlow in place. So, use your Barlow in moderation and purchase a Barlow that magnifies either 1.8X or 2X and it will prove a very useful device.

Now that you have acquired all this knowledge about eyepieces, I'll bet you are still left with the same question "which ones do I buy?" That is a tough query, but I will give you my opinion. If you are just getting started, purchase three eyepieces and a Barlow lens in the beginning.

Buy one low power, wide field eyepiece which has a focal length between 25mm and 20mm. Get one medium power eyepiece, from 16mm to 12mm. Buy one high power eyepiece, from 9mm to 6mm focal length. Get a Barlow lens with a magnification of either 1.8X or 2X. With those four things you will be prepared to observe a wide variety of what there is to see in the sky.

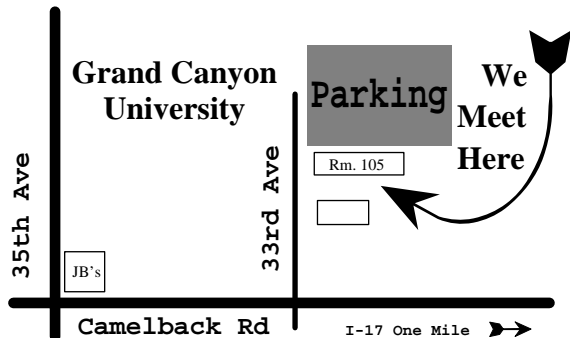
As time goes by you can fill in as much as your budget will allow. You might choose a really wide field 32mm to 35mm eyepiece. Or maybe something between the medium and the high power. I know that if you are just getting started, you might be thinking about a very high power eyepiece in the range of 4mm focal length. Even though it seems nifty to have a scope that can go to 600X, the number of evenings steady enough to use extreme magnifications is rare. You can make use of very high power occasionally, but not often.

What design of eyepiece to purchase is the subject of much talk while astronomers compare eyepieces and determine how much money they have to spent. If you can afford it, at least start with a medium power Plössl, a high power Orthoscopic, and a wide field Erfle. If you are really in a pinch for money then Kellners will suffice. However, if you go out and observe with other folks who have better eyepieces than yours, it can be an expensive trip. One spectacular view through someone's brand new pride and joy eyepiece can have you looking through catalogs and checking the limit on your credit card.

I have had a variety of different eyepieces in the 20 years that I have been using telescopes. My first scope

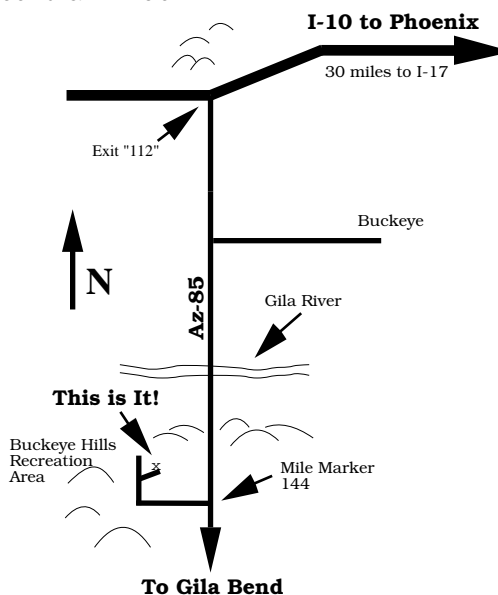
Directions to SAC Events

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.



was an 8 inch $f/6$ and it had a 1.25" focuser, so all my eyepieces were that size. I used three Erfles: 20mm, 16mm and 12mm for medium power viewing. When I first got the scope, I did what I have told you not to do, I ordered it with a 4mm eyepiece and never saw a clear view in it. I was able to trade the 4mm for a 6mm Orthoscopic that became a prized eyepiece for looking at fine detail on the Moon and the planets. Once I added a 2X Barlow, I was set and my eyepiece collection changed little for several years.

When I sold the 8" to finance a 17.5" Dobsonian (yes, aperture fever got me too), I decided I needed a 2" focuser and an eyepiece to fit. Luckily, I found a war surplus

38mm Erfle that only needed some machining to make a sleeve that fit the 2" focuser. A friend with a lathe made the part and I was in business. Again, my eyepiece collection seemed complete for a while.

In the 80's the Nagler revolution hit. The first 13mm Nagler eyepieces I used had a problem that was serious for some observers, including me. Some folks see a "kidney bean", a dark marking within the field of view, which will not go away regardless how the observer moves their eye or head. I did not view this as a problem, because it prevented me from spending the money for these expensive eyepieces.

However, Meade decided to release its Ultra Wide se-

Comet Comments

by Don Machholz

(916) 346-8963 CC207.TXT October 6, 1995

An exciting bright comet is visible in our morning sky, while not far away Comet Bradfield dims. Meanwhile Comet Hale-Bopp, in the evening sky, has recently dimmed by about one magnitude.

122P/de Vico					
Date	RA-2000-Dec	Elong	Sky	Mag	
10-10	11h12.2m	+22°45'	40°	M	5.7
10-15	11h57.8m	+27°20'	41°	M	5.8
10-20	12h46.1m	+30°17'	42°	M	6.1
10-25	13h33.0m	+31°33'	44°	M	6.5
10-30	14h15.3m	+31°27'	45°	M	6.9
11-04	14h51.5m	+30°28'	46°	E	7.4
11-09	15h21.9m	+29°03'	46°	E	7.9
11-14	15h47.2m	+27°28'	46°	E	8.3
11-19	16h08.5m	+25°53'	46°	E	8.8
11-24	16h26.6m	+24°23'	45°	E	9.2
11-29	16h42.3m	+23°02'	45°	E	9.6
12-04	16h56.0m	+21°50'	44°	E	10.0
12-09	17h08.2m	+20°47'	44°	E	10.3

gested that amateurs be on the lookout for its return. A copy of this paper is still available from me for \$2.00 (P.O. Box 1716, Colfax, CA. 95713).

The comet is presently barely visible to the naked eye, and through binoculars it sports a thin narrow tail several degrees long. It is in the morning sky, well north of the sun. It then crosses into the evening sky, but will be visible during both the evening and morning. Periodic Comet de Vico fades by the end of the year. We'll see it again in the year 2069.

C/1995 Q1 (Bradfield)					
Date	RA-2000-Dec	Elong	Sky	Mag	
10-10	11h09.9m	+27°35'	43°	M	9.0
10-15	11h09.5m	+31°02'	50°	M	9.3
10-20	11h08.8m	+34°44'	57°	M	9.6
10-25	11h07.6m	+38°44'	64°	M	9.8
10-30	11h05.5m	+43°07'	72°	M	10.0
11-04	11h02.1m	+47°55'	79°	M	10.2
11-09	10h56.3m	+53°07'	87°	M	10.4
11-14	10h47.0m	+58°42'	94°	M	10.5
11-19	10h31.2m	+64°30'	102°	M	10.7
11-24	10h03.4m	+70°17'	109°	M	10.9
11-29	09h11.6m	+75°31'	115°	M	11.1
12-04	07h34.9m	+79°06'	120°	M	11.4
12-09	05h23.0m	+79°29'	123°	M	11.6

Periodic Comet de Vico (P122/, 1846 D1, C/1995 S1): This comet was discovered on Sept. 17 by Y. Nakamura, M. Tanaka, S. Utsunomiya and T. Seki of Japan, and eighteen hours later by me. Two days later, the newly-computed orbit was matched to the long-lost Periodic Comet de Vico. This comet was discovered in 1846 by Francesco de Vico, and missed when it came back in 1921. Two years ago I researched this comet and wrote a paper which was published in the *Journal of the Association of Lunar and Planetary Observers*. In it, I discussed the 1846 apparition, various orbital solutions, and sug-

1995 O1 (Hale-Bopp)					
Date	RA-2000-Dec	Elong	Sky	Mag	
10-10	18h16.9m	-28°52'	77°	E	11.3
10-15	18h17.6m	-28°38'	72°	E	11.2
10-20	18h18.5m	-28°25'	68°	E	11.2
10-25	18h19.7m	-28°11'	63°	E	11.2
10-30	18h21.1m	-27°58'	58°	E	11.1
11-04	18h22.8m	-27°45'	54°	E	11.1
11-09	18h24.6m	-27°31'	49°	E	11.1
11-14	18h26.7m	-27°18'	45°	E	11.1
11-19	18h28.9m	-27°04'	40°	E	11.0
11-24	18h31.4m	-26°51'	36°	E	11.0

Orbital Elements	P/de Vico
Perihelion Date	1995 10 06.0228
Perihelion	0.6589113 AU
Argument of Perihelion	012.9732°
Ascending Node	079.6191°
Inclination	085.3914°
Eccentricity	0.9627370
Period	74.36 years
Source of 2000 Elements	MPC 25715

C/1995 Q1 (Bradfield)	1995O1 (Hale-Bopp)
1995 08 31.41866	1997 04 01.09654
0.436402 AU	0.9139252 AU
331.1617°	130.59714°
178.0516°	282.47197°
147.3931°	089.42220°
0.9980457	0.9950484
Approx. 3337 years	Approx. 3300 years
MPC 25714	MPC 25714

The Positions of Comet Hale-Bopp through 1997 — by Don Machholz

1995 O1 (Hale-Bopp)

Date (00UT)	RA-2000-Dec	R-AU-D	Elong	Sky	Mag
10-15-95	18h17m	-28.6°	6.43 6.66	72°	E 10.2
11-04-95	18h23m	-27.7°	6.25 6.79	54°	E 10.1
11-24-95	18h31m	-26.8°	6.07 6.85	36°	E 10.0
12-14-95	18h42m	-26.0°	5.89 6.82	18°	E 9.9
01-03-96	18h55m	-25.0°	5.70 6.69	2°	E 9.7
01-23-96	19h08m	-24.0°	5.52 6.45	17°	E 9.5
02-12-96	19h20m	-22.8°	5.33 6.11	34°	M 9.2
03-03-96	19h32m	-21.6°	5.14 5.69	52°	M 8.9
03-23-96	19h40m	-20.3°	4.94 5.20	70°	M 8.5
04-12-96	19h45m	-18.8°	4.74 4.67	88°	M 8.1
05-02-96	19h44m	-17.3°	4.54 4.14	107°	M 7.7
05-22-96	19h36m	-15.6°	4.34 3.64	128°	M 7.2
06-11-96	19h19m	-13.8°	4.13 3.22	150°	M 6.7
07-01-96	18h55m	-11.8°	3.91 2.91	168°	M 6.3
07-21-96	18h26m	-09.8°	3.70 2.76	154°	E 5.9
08-10-96	18h00m	-08.1°	3.48 2.74	130°	E 5.6
08-30-96	17h41m	-06.6°	3.25 2.81	107°	E 5.4
09-19-96	17h31m	-05.5°	3.02 2.92	86°	E 5.1
10-09-96	17h31m	-04.5°	2.79 3.01	68°	E 4.8
10-29-96	17h39m	-03.4°	2.55 3.05	51°	E 4.5
11-18-96	17h53m	-01.9°	2.30 3.00	38°	E 4.0
12-08-96	18h13m	+00.4°	2.05 2.86	29°	E +3.4
12-28-96	18h38m	+04.0°	1.80 2.61	27°	M +2.6

1995 O1 (Hale-Bopp)

Date (00UT)	RA-2000-Dec	R-AU-D	Elong	Sky	Mag
01-17-97	19h11m	+09.6°	1.54 2.28	32°	M +1.7
02-06-97	19h56m	+18.3°	1.30 1.90	40°	M +0.6
02-26-97	21h10m	+31.4°	1.09 4.53	45°	M -0.6
03-18-97	23h35m	+44.4°	0.95 1.33	46°	M -1.5
04-07-97	02h41m	+41.4°	0.93 1.42	41°	E -1.5
04-27-97	04h28m	+28.4°	1.03 1.71	33°	E -0.6
05-17-97	05h25m	+17.0°	1.23 2.05	26°	E +0.4
06-06-97	06h04m	+08.0°	1.46 2.35	22°	E +1.5
06-26-97	06h36m	+00.3°	1.71 2.59	23°	E 2.4
07-16-97	07h02m	-07.0°	1.96 2.78	30°	M 3.1
08-05-97	07h26m	-14.3°	2.21 2.91	39°	M 3.8
08-25-97	07h46m	-22.0°	2.46 3.00	49°	M 4.3
09-14-97	08h01m	-30.1°	2.70 3.07	60°	M 4.7
10-04-97	08h11m	-38.5°	2.94 3.13	70°	M 5.2
10-24-97	08h11m	-46.8°	3.17 3.21	79°	M 5.5
11-13-97	07h59m	-54.4°	3.40 3.32	86°	M 5.9
12-03-97	07h29m	-60.3°	3.62 3.48	91°	M 6.3
12-23-97	06h42m	-63.6°	3.84 3.67	93°	M 6.7
01-12-98	05h54m	-63.8°	4.05 3.89	92°	M 7.0
02-01-98	05h19m	-61.8°	4.26 4.15	90°	M 7.4
02-21-98	05h02m	-58.4°	4.47 4.42	87°	M 7.7
03-13-98	05h00m	-55.6°	4.67 4.69	83°	M 8.1

Above are tables giving information about Comet Hale-Bopp through 1997. The date is followed by Right Ascension and Declination in 2000 coordinates. This is followed by the comet's distance to the Sun (R) and the Earth (D) in Astronomical Units (AU). Following this is the comet's elongation in degrees from the sun as seen

from the Earth. Then the "E" means that the comet is in the evening sky, while a "M" means it is in the morning sky. The final column provides a magnitude estimate assuming that this comet behaves normally and that its current brightness is not due to a temporary outburst.

ries and I got a chance to use the 14mm at Riverside. That was the final straw. The wide field of view, generous eye relief and excellent contrast of these eyepieces sold me. I found someone to purchase my old eyepieces and I have recently completed the set of Ultra Wide eyepieces. In the same time, I also used and then bought a 22mm Panoptic eyepiece that is excellent in my 13" f/5.6 Newtonian. The wide, flat, contrasty field of view of the Panoptic is stunning and it has become one of my favorite eyepieces. Now that I know how good the Panoptic design is, I plan to upgrade my widest-field eyepiece to a 35mm Panoptic. There is one drawback, it is one of the most expensive eyepieces available. Don't say you weren't warned.

Once you have purchased the eyepieces which will serve you, make certain they are well cared for. Get some foam padding and cut out cavities to fit the eyepieces and protect them. Be careful when cleaning your eyepieces. Never rub them with any real force, always gently, or you will scratch the coating. Use a squeeze bulb or canned air to blow off any dust before cleaning. I use a cleaning rag I purchased at a camera store which does an excellent job removing greasy fingerprints which inevitably happen. If you are thoughtful in purchasing good eyepieces and then protecting them from the elements, they will last many years and provide you with spectacular views of the heavens.

Bits and Pieces

Call for Newsletter Articles

This issue of SACNEWS uses the remaining articles from SAC members. For more than half a year, there has always been articles available from members. I presently have nothing for the December newsletter from club members. This does not mean that that issue will be empty, I'm pretty sure I can dig up something from outside the club.

The SACNEWS is a club newsletter. Someone commented earlier this year that SACNEWS should print more articles by members, and I agree with this sentiment. I was also fortunate to have articles available to do this for most of the year.

I would like to take a moment to thank those people who wrote articles for SACNEWS in 1995: Rick Blakley, Steve Coe, Paul Comba, A.J. Crayon, Bob Goff, Sam Herchak, Jack Jones, Dean Ketelsen, Andrew J. LePage,, Don Machholz, Paul Maxson, Tom Polakis, Gerry Rattley, Bernie Sanden, Pierre Schwaar, Bruce Walsh, and Don Wrigley. Without the efforts of these people, SACNEWS would have been pretty thin and an enormous chore this year. Having articles available makes putting SACNEWS

What's Up

by Steve Coe

November 1995

Sculptor

Sculptor is one of the places in the sky where nature forgot to put stars. There are few easily seen naked eye stars in this region and that is not entirely due to the fact that Sculptor is near the Southern horizon for Arizona observers. Because the southern galactic pole is within the borders of Sculptor, we are looking straight out of Our Galaxy in this area. That means that even though there may be few stars, there will be LOTS of galaxies. The Sculptor Group is a clustering of galaxies that are only slightly farther away than the M 81 Group in Ursa Major. So, let's look at some deep sky goodies in Sculptor.

NGC 24 is pretty bright, pretty large and much elongated NE to SW, averted vision makes this object grow in size quite a bit at 100X. A pretty bright star is located on the tip of this galaxy. In good seeing there is a bright core which is almost stellar at 165X. It is located at 00 07.4 -25 15.

NGC 55 is at 00 12.5 -39 50. I see it as bright, very, very large, very, very elongated at 100X. It is visible in the finder. At 100X it is longer than the field of view. There are several H II regions involved, so a UHC filter helps a lot on these gaseous nebulae in another galaxy. The nucleus is stellar at high power and some mottling is noticed at 165X.

NGC 134 is at 00 27.9 -33 32. It is pretty bright, pretty large, very elongated and has a bright nucleus at 135X. On a sharp night it looks like a mini-Sombrero galaxy. There is a dark lane that runs the length of the galaxy at 165X. There is a pretty faint companion galaxy that has the same PA as this one.

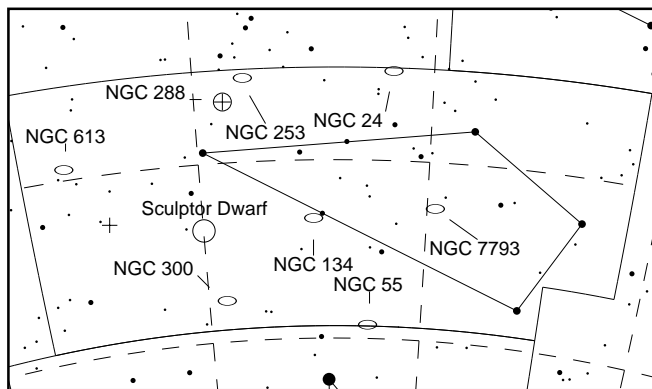
NGC 253 Very bright, very large, very, very elongated at 100X. Many dark lanes with swirls and rifts prominent throughout the galaxy to a somewhat brighter core. This beautiful galaxy displays lots of mottling across its surface. It is easy in binoculars or a finderscope. Wait for that clear night where stars don't twinkle, even near the horizon and the view of NGC 253 is spectacular. The dark lanes stand out in bold relief and the mottling shows a "texture" not seen in many other galaxies. It is at 00 41.5 -25 34.

NGC 288 is pretty faint, large, not much brighter in the middle, irregularly round with 40 stars resolved at 135X. It can be seen in a pair of 10X50 binoculars as a dim, small spot. Even this low surface brightness

globular cluster is a welcome as a break in all these galaxies. Located at 00 50.2 -26 52.

NGC 300 is faint, large, has several stars superimposed, and is somewhat brighter in the middle at 100X. This is a low surface brightness object. Imagine M 33 only 10 degrees above the horizon. See if you agree by looking at 00 52.6 -37 58.

NGC 613 is at 01 32.0 -29 40. I saw this galaxy as pretty bright, pretty large, bright middle, elongated 3 X 1, there is a pretty bright star on the NE side at 100X. The outer tips of the spiral arms curve in opposite directions as if to show the direction of spiral motion.



NGC 7793 is pretty bright, large, round, bright middle at 100X. At 165X, there are two brighter shells which surround the core. The stellar core and concentric shells around it were only seen on the best of nights, I was able to pick out this bull's eye pattern on a night I rated 8/10 at Sentinel. It is at 23 55.3 -32 51.

MCG-06-03-015 is the Sculptor System, it is extremely faint, very, very large, little elongated and very little brighter in the middle. That observation was with a 4.25" f/4 at 16X. When I first thought of observing this very low surface brightness object, I looked it up in Burnham's and it said "eeF", an abbreviation for extremely, extremely faint. This told me that I was only going to have a chance to see the Sculptor System from a very dark site. After trying to see this huge object with a 16" scope at low power, I reasoned that we needed a wider field of view and went after it with the little RFT. Every precaution was taken to get fully dark adapted and a cloth was held over the observer's head to block out extraneous light. Using all those precautions, there is a very faint, roundish blob at the location marked on Tirion Sky Atlas at 00 57.0 -34 00.

Red Stars in Sculptor

There is a great Carbon (red) star in Sculptor, **R Sculptoris** is very orange at 100X, it is even off color in the finderscope. This nice red star is at 01 24.7 -32 48.

together fun and interesting.

Getting an article into the newsletter isn't that hard. In fact the most difficult part is finding time to sit down and write about something you know.

As for size, there is enough room in SACNEWS to print articles of almost any length. For those of you wanting some metrics: one column in SACNEWS is about 600

words, a page — one-sided — is 1200 words. Steve Coe's *What's Up* column in this issue is around 800 words long, just less than 5 Kbytes.

It is possible to digitize diagrams, but the preferred method is to redraw if possible. Digitizing is done with a hand scanner, so straight scans are difficult at times. If the diagrams are generated on a computer, they should

be made Encapsulated Postscript Files (EPSF or EPS). This type a file is easily include into the newsletter.

Articles can be submitted handwritten or typed, on computer diskette (IBM, Mac, and Amiga formats), or e-mailed to: p.dickson@az05.bull.com.

—Paul Dickson, SACNEWS Editor

Minutes of the October Meeting

The President opened the October meeting. Adam Sunshine gave the treasurers report. Visitors were asked to identify themselves and we had 1 do so.

Paul Dickson brought up the idea of having a 20 year anniversary party next year.

Rich Walker talked about the observing session at the school. He then discussed the very SUCCESSFUL public star party at T-bird Park. He estimated that there were jillions of people present. He also discussed upcoming events.

Steve Coe talked about the nominations for the new officers. Nominated are the following:

President	Gerry Rattley
Vice President	Steve Coe
Secretary	David Fredericksen
Treasurer	Regina Lawless
Properties	Adam Sunshine

The elections are at the November meeting. It was mentioned that this is the first time in a long time that we had people for all of the offices before the election.

Steve Coe also talked about the Feb., 1998 solar eclipse in the Caribbean and had flyers for those interested.

Pierre Schwaar talked about Comet de Vico and showed his pictures.

At the break there were 31 people in attendance.

After the break, Susan Pritchard introduced Amanda Bosh from Lowell Observatory. Amanda talked about Saturn's disappearing rings and 4 new objects recently found in the rings from Lowell.

—A.J. Crayon, SAC Secretary, from notes taken by Dave Fredericksen

Minutes of the October 12 Board Meeting

A Board of Directors meeting took place on October 12, 1995. Paul Dickson, Bob Gardner, Susan Pritchard, and Pierre Schwaar attended.

First item mentioned was that Pierre purchased a new spare bulb for the club's slide projector.

The subject of the December party was covered. As of the meeting Leroy Paller had not yet been approached about hosting the party again this year. Bob Gardner said he would give Leroy a call. Susan Pritchard offered her home in the event that Leroy wasn't able to be host.

Paul Dickson was appointed chairman of a committee formed to clean up obsolete portions of the SAC constitu-

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The following letter was given to me by Bob Goff. It references the policy statement which follows. I thought it was interesting enough to what to publish it in SACNEWS.

International Standards for Amateur Astronomical Telescope Systems

The International Standards Organization (ISO) is establishing international standards for the optics industry. The American National Standards Institute, the National Association of Photographic Manufacturers, and the Imaging Technology Committee 11—Optics and Optical Instruments (ANSI/NAPM IT.11) have appointed me the United States leader to the ISO Technical Committee 172 (Optics), Subcommittee 4 (Telescopic Systems), Working Group 3 (Amateur Astronomical Telescopes), referred to as ISO/TC 172/SC4/WG3. Countries represented on SC4 are Austria, China, Germany, Japan, Russia, United Kingdom, and USA. The Japanese are conveners of WG3 and have responsibility for overall administration of this work.

My role is to formulate the US input to the convener and to see that drafts of pertinent documents are circulated to the US members of this working group. It is also my function to represent USA amateur telescope manufacturers' and users' interest at the international level to set standards of performance, test methods, and general terms and definitions that are typical for all amateur astronomical telescopic systems.

Two recent meetings held relative to this effort were the ISO/TC 172/SC4 Moscow meeting held June 28 to July 1, 1994, and the ISO/TC 172 Plenary, attended by more than 270 experts from all over the world, held in Tucson, June 5–17, 1995. See the Strategic Policy Statement drafted at this meeting for the ISO/TC 172/SC4 (Telescopic Systems). The committee will be developing standards to be provided in a document to the user at the time of telescopic purchase.

Any users of amateur telescope systems interested in providing input to this process can contact me directly. I will be happy to communicate their suggestions to this committee for setting the optical standards for these products. Suggestions must be provided to me in written format suitable for submission to the international working group.

Sincerely,

Robert F. Goff
Owner & Master Optician

AXE, P.O. Box 44237, Tucson, AZ 85733, Phone (520) 882-8972, Fax (520) 882-4924

AXE = Astronomically Xenogenic Enterprises

Strategic Policy Statement

ISO/TC172/SC4

Telescopic Systems

June 13, 1995

1. Scope

The scope of SC4 concerns optical systems used for direct viewing distant objects. These include monocular and binocular systems supported by hand or tripod, riflescopes that are mounted on firearms and amateur astronomical telescopes. Telescopic systems containing integral light sources and electric detectors, including those that amplify, and microprocessor control of these systems are also included.

The scope includes terms and definitions pertaining to these optical systems as well as test methods to access their optical performance (including user comfort and ergonomics), and performance under varying environmental conditions. The scope also includes accessory devices used with these telescopic systems such as eyepieces, tripods, and light shields, and their interfaces. Not included are systems such as video cameras used for recording distant objects and surveying instruments.

1.1 Monoculars and Binoculars

These are generally portable, hand-held telescopic systems of moderate magnification that are used by amateurs and professionals for viewing distant objects such as sporting events and wildlife. They have variable focus and erect images. Higher power versions generally have provision for mounting on a support device such as a tripod or have some type of image stabilization system.

1.2 Riflescopes

These are monocular optical systems that form erect images and have provisions for mounting on firearms and bows. Riflescopes include a reticle for aiming and a means of adjusting the reticle for boresighting with the firearm. Riflescopes are designed for low mass and rugged mechanical properties to withstand the recoil of firearms.

1.3 Amateur Astronomical Telescopes

These are high power optical systems of large aperture compared to binoculars or riflescopes that are designed for use on a fixed mount and generally have inverted images. Focus is adjustable to accommodate the refractive correction of the user. Amateur astronomical telescopes are often used with tracking mounts and electronic (CCD) detectors, also included in the scope of the WG.

2. Future Work

SC4 is a fairly new SC and is therefore working on basic terms, definitions and methods of test. In some cases, performance standards are also being written for the basic optical devices. No standards have been written for accessory devices.

It is contemplated that future work will include standards for mounting devices such as tripods and tracking mounts, eyepieces designed for use with amateur astronomical telescopes, and for telescopic instruments that may include both detectors and active light sources. The wavelength range considered will move from just visible light into the infrared. Other work may include optical

ranging for applications other than surveying and distant viewing devices under microprocessor control including zoom and image stabilization systems.

3. Trends

An obvious trend is to zoom optical systems. Just as zoom lenses make 35mm cameras more flexible, zoom mono- and binoculars and riflescopes will provide greater flexibility in viewing. The zoom system may be electronically driven as opposed to using a mechanical cam. Light amplification systems attached to telescopic systems will make them useful in situations where it would now be impossible to view distant objects in low light level situations and to control wide variations in light level as viewing conditions change. Electronic and inertial image stabilization will be available on more devices as the price of these options comes down. Integral active light sources will make these devices useful both for seeing in low light situations and also for spotting applications. To reduce weight and cost, greater use of aspheric and diffractive optics in telescopic systems can be foreseen.

4. Priorities

The priorities for SC4 are ordered the following way:

- 1) Finish terms and definitions documents for all 3 working groups as these documents form the foundation for future work.
- 2) Test method documents must be completed because performance specifications depend on methods of test.
- 3) Optical, environmental and user comfort performance specifications must be written that take into account the intended application of the telescopic system.

Once the basic telescopic devices are covered, accessory devices can be covered as well as telescopic systems containing integral light sources, detectors and microprocessor control. These technologies will mature about the same time as work is finished on standards for the basic instruments. Thus there is time to finish the basic standards work that forms the foundation for future work before starting the new work.

One further item that will be added to the work plan is a document describing information to be supplied to the purchaser of telescopic systems. Since most telescopic systems are very difficult to evaluate from catalog descriptions or by viewing through them at the point of purchase, certain information about the telescopic system should be provided with the system at the time of purchase. These minimum requirements for documentation need to be defined early in the program of standards development.

Finally, the work of SC4 must be speeded up. The Secretariat has been asked by the national delegations of SC4 to investigate procedures for improving document circulation (including electronic means) and for placing strict time limits on responses to working and committee drafts. It is appreciated that the mail to and from Russia is slow and that other means are probably necessary for communicating with members of SC4.

It is also recognized that the slow progress in SC4 is not all the responsibility of the Secretariat. The national delegations are likewise encouraged to promptly read the materials distributed by the Secretariat and respond promptly with their comments so the Secretariat can revise documents promptly and recirculate them.

Continued from page 6...

tion. This committee will make recommend changes to the constitution next spring to be voted on at an open board meeting (changes will be published at least a month in advance). Paul already has one person will to serve on this committee and is looking for one or two more people.

Deep Sky 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, nebula and galaxies.

If you are interested in sharing your observations, or are interested in observing techniques, then by all means come join in. The meetings are held at John McGrath's house every other month; 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. Follow the directions to the McGrath's.

For the November Deep Sky Meeting we will discuss the objects in Steve Coe's *What's Up* column for September and October. If you have new or old observations, bring them along. If you have no observations and want

to know about observing, then come along.

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.

'98 Eclipse Cruise — by Steve Coe

I am just gathering some info on a cruise to the Feb. 26, 1998 total solar eclipse. We are looking at the possibility of either chartering our own ship, probably from Holland American Line, leaving San Juan Puerto Rico, with a stop at St. Thomas, plus another stop and then on to Aruba for the eclipse on that Thursday. This depends on the amount of hurricane damage to St. Thomas. and so all that can be said right now is that there will be two stops in route to Aruba.

Another possibility is to reserve a block of cabins and have a large quantity of fun astronomers show up to occupy them. That would more than likely be on Princess or Carnival Lines, since they already travel to Aruba, the island in the best position for the centerline of the eclipse.

In either scenario, a deposit of \$500 will be needed to confirm and hold your space on the cruise. With the total amount due by Dec. 1, 1997. The complete cruise package will range from \$1850 to \$3500 per person, this includes air fare from your departure city to San Juan. The category and location of your cabin on the ship

will determine the price.

So, our travel agent for this rendezvous with darkness at noon is **Barbara Philips** at Regency Travel in Scottsdale, Arizona. She is not an astronomer, but is learning by being around me for several hours. Barbara can certainly answer any questions you might have concerning the cruise ships or accommodations. You may reach her at 602-596-6787, or 1-800-796-8024 outside AZ.

I know 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 Barbara if you are interested in sailing with us.

After being an active Arizona astronomer for the past 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!

Starting on my tan NOW!

November 1995

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
Eclipses of Saturn's Satellites Date Start End Event Dims 11-09 21:21.0 21:27.4 Titan eclipses Mimas 100% 11-18 02:42.7 02:44.7 Tethys eclipses Mimas 100% 11-19 23:33.2 23:36.5 Dione eclipses Enceladus 100% 11-19 23:59.9 00:01.9 Tethys eclipses Mimas 100% 11-21 21:17.0 21:19.0 Tethys eclipses Mimas 99% 11-23 18:34.2 18:36.2 Tethys eclipses Mimas 94% Source: Astronomy, Sept. '95, pp. 72-75						PAS Meeting Brophy Prep. Physics Lab	SAC Meeting Grand Canyon University, Fleming Rm. 105	
			1	2	3	4		
			EVAC Meeting SCC: Rm. PS172) Yesterday Full Moon 12:20 A.M.	SAC Deep Sky Meeting 7:30 P.M.				
5	6	7	8	9	10	11		
			Last Quarter Moon 4:41 A.M.	Saturday Saturn's ringplane passes across the Sun	Leonid Meteors Peak: 1 A.M. Tomorrow Z.H.R. 10-storm	SAC Star Party Buckeye Hills (members&guests)		
12	13	14	15	16	17	18		
Venus 1.3°N of Jupiter (evening)	Wednesday Mercury at superior conjunction with the Sun (moves into evening sky)	Alpha Monocerotid Meteors Z.H.R. 5-100+ Peaks about every 10 years, last was 1985	New Moon 8:42 A.M.	Pluto at conjunction with Sun (moves into morning sky) Thanksgiving Day	Yesterday Sun enters Scorpius 7 A.M.			
19	20	21	22	23	24	25		
		First Quarter Moon 11:29 A.M.		Sun enters Ophiuchus 3 A.M.	All Times are Mountain Standard Time			
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 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.....\$24.00 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:
Adam Sunshine
SAC Treasurer
20401 N 30th Drive,
Phoenix AZ 85027

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.

1995 SAC Meetings

Jul. 14
Aug. 4
Sep. 8
Oct. 6
Nov. 3
Dec. 9 Party

— 1996 —
Jan. 5
Feb. 2
Mar. 8
Apr. 5
May 3

1995 SAC Star Parties

Date	Sunset	Moonrise
Jul. 22	7:36pm	1:40am
Aug. 19	7:11pm	12:20am
Sep. 23	6:24pm	5:15am
Nov. 18	5:25pm	2:40am
Dec. 16	5:23pm	1:25am

— 1996 —		
Date	Sunset	Moonrise
Jan. 20	5:48pm	8:50am
Feb. 17	6:14pm	6:40am
Mar. 16	6:36pm	5:16am
Apr. 13	6:56pm	3:54am
May 11	7:16pm	2:34am

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