

# Saguaro Astronomy Club

Metro Phoenix, Arizona

## SACNEWS



October 1995 — Issue #225

v9.19

## A Guide to Eyepieces

### Part 1—The Math

by Steve Coe

If you get a group of observers together and let them chat for long enough, the subject will become eyepieces sooner or later. The reason is that eyepieces are the most important accessory that you can purchase for your telescope. Once the scope itself has been purchased, then all the characteristics of that astronomical viewing system are determined by the eyepiece. I always look at an eyepiece as a small magnifying microscope which allows me to inspect the image formed by the mirror in my telescope. If you aim your scope at the Moon, then your optical system will create a tiny image of the Moon in midair; your

### Are you looking for Encke's division in Saturn's rings?

eyepieces let you observe that image with varying magnifications and fields of view, all by changing the eyepiece.

So, let us begin by getting some terminology straight. Here is a list of the definitions of some words used in connection with eyepieces:

**Apparent field of view**—this is the width in degrees of the field as seen through just the eyepiece alone. If I have two eyepieces with the same focal length, the one with the larger apparent field of view will show more of the sky if inserted into the same telescope. This parameter is determined by the design of the lenses inside an eyepiece.

**Curvature of field**—good eyepieces provide a field of view which is flat. The focused image should be sharp from edge to edge. Star fields are a tough test of this characteristic.

**Distortion**—good eyepieces also have little distortion, this means if you viewed a piece of lined graph paper that all the lines would be straight and would cross at right angles. Distortion can be a problem for only a small section of the field of view, but curvature generally happens to the entire field of an eyepiece.

### Quick Calendar

SAC Meeting  
7:30 PM, Friday, October 6

All-Arizona Star Party  
Arizona City  
Saturday, October 20–21

### Magazine Renewals Due

Renewals are due by the October Meeting.

**Exit Pupil**—the lenses in an eyepiece form an image that floats in midair just outside the lens closest to your eye. When you observe you place your eye so that it can see this exit pupil image. If all is going as planned, the image size will fit with room to spare within your eye. The size of this image is the exit pupil.

**Eye relief**—the distance from the eye lens to your eyeball. This value is important to eyeglass wearers. If you need to have your glasses on to view the sky, there must be plenty of eye relief so that your eyeglasses will fit between the eyepiece and your face. Those of us who don't wear glasses to observe generally like some eye relief to avoid the feeling that I am jamming my eye lens against the glass lens of the eyepiece.

**Focal length**—the apparent distance from the lens to the object being viewed, in this case the image formed by your telescope. Long focal length eyepieces show a large portion of the image being viewed and short focal

### SAC Officers

Area Code (602)

|                |                    |  |
|----------------|--------------------|--|
| President      | Bob Gardner        | 274-5046   |
| Vice President | Susan V. Pritchard | 934-7496<br><a href="mailto:devrylib@pinyon.libre.com">devrylib@pinyon.libre.com</a>                           |
| Treasurer      | Adam Sunshine      | 780-1386<br><a href="mailto:sunshine@ensrv1.bcasd.az.honeywell.com">sunshine@ensrv1.bcasd.az.honeywell.com</a> |
| Secretary      | A.J. Crayon        | 938-3277<br><a href="mailto:a.crayon@az05.bull.com">a.crayon@az05.bull.com</a>                                 |
| Properties     | Pierre Schwaar     | 265-5533   |
| Public Events  | Rich Walker        | 997-0711   |
| SACNEWS Editor | Paul Dickson       | 862-4678<br><a href="mailto:p.dickson@az05.bull.com">p.dickson@az05.bull.com</a>                               |

length eyepieces will allow a small section of the image to be inspected. This is how you choose the magnification of your optical system. Pick out a long focal length eyepiece, say 40mm to 24mm, and the system will give a wide field and low power. Select a short focal length eyepiece, around 8mm to 4mm, and you will get a high power, small field of view look at whatever is in the scope.

**Ghost images**—in poorly made eyepieces some of the light from a bright star can reflect about within an eyepiece and form faint images within the field of view. These ghost images can be subdued by multicoating the lenses in the eyepieces. Only the cheapest eyepieces nowadays are not coated to suppress this problem.

**True field of view**—this is the field of view of the entire telescope system, including the eyepiece.

Now that we know the meanings of some key phrases, let us move gently into a little calculation concerning eyepieces. There are three formulae that apply to using and understanding the values associated with eyepieces. These formulae are:

$$\text{Magnification} = \frac{\text{Telescope focal length}}{\text{Eyepiece focal length}}$$

$$\text{Exit pupil} = \frac{\text{Telescope aperture}}{\text{Magnification}}$$

$$\text{True field of view} = \frac{\text{Apparent field of view}}{\text{Magnification}}$$

Just remember that one inch equals 2.5 cm or 25 mm and you are ready to figure out these values for your telescope. So, grab your calculator and we will try a worked example of some scope and eyepiece combinations. Assume you have a 6 inch *f*/8 telescope. That means the scope has 48 inches of focal length from 6" times *f*/8. Converting 48 inches to millimeters equals 1200 mm of focal length from 48" X 25 mm/in.

## 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.

Let's say you have three eyepieces which have focal lengths of 20mm, 12mm and 7mm, here are the magnifications each will supply:

$$60 \text{ X for the } 20\text{mm eyepiece from } \frac{1200\text{mm}}{20\text{mm}}$$

$$100 \text{ X for the } 12\text{mm eyepiece from } \frac{1200\text{mm}}{12\text{mm}}$$

$$171 \text{ X for the } 7\text{mm eyepiece from } \frac{1200\text{mm}}{7\text{mm}}$$

Now, here are the exit pupils for those eyepieces. Remember, you had to convert 6 inches to 150mm first.

$$2.5\text{mm exit pupil for the } 20\text{mm eyepiece from } \frac{150\text{mm}}{60 \text{ X}}$$

$$1.5\text{mm exit pupil for the } 12\text{mm eyepiece from } \frac{150\text{mm}}{100 \text{ X}}$$

$$0.88\text{mm exit pupil for the } 7\text{mm eyepiece from } \frac{150\text{mm}}{171 \text{ X}}$$

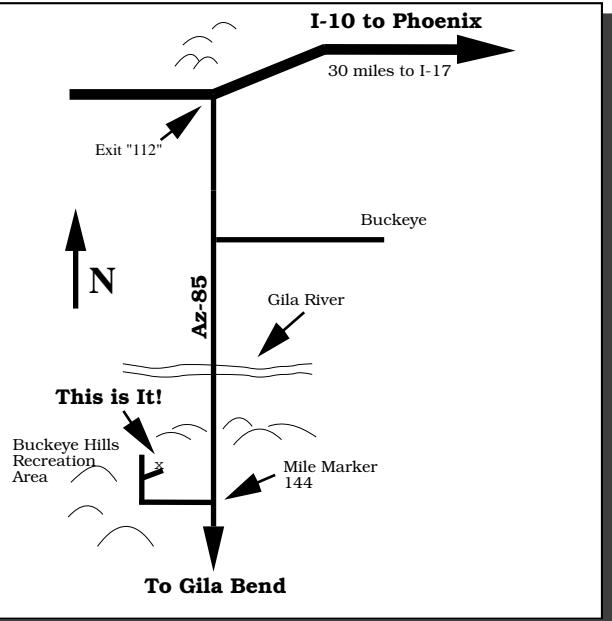
To figure out the True field of view for each eyepiece, we need to know the apparent field of view for the type of eyepiece used. Let's assume you are evaluating eyepieces with an apparent field of 60 degrees.

$$1^\circ \text{ FOV for the } 20\text{mm eyepiece from } \frac{60^\circ}{60 \text{ X}}$$

$$0.6^\circ \text{ FOV for the } 12\text{mm eyepiece from } \frac{60^\circ}{100 \text{ X}}$$

$$0.35^\circ \text{ FOV for the } 7\text{mm eyepiece from } \frac{60^\circ}{171 \text{ X}}$$

Because the True FOV is often less than one degree, this value is generally given in arc minutes. There are 60 arc minutes in one degree. So, 0.6 degrees X 60 arcmin



per degree equals 36 arc minutes as the True FOV of the 12mm eyepiece. Also, 0.35 X 60 means that the 7mm eyepiece provides a 21 arcmin field.

I know that all this math is not particularly fun, but it does give some useful results. We can draw some general conclusions from our results. As the power is increased in your telescope, you get a smaller exit pupil and a narrower field of view. Because the pupil cannot generally get wider than 7mm, it is not useful to buy an eyepiece that gives a larger exit pupil than that. The news is worse for those of

us in advanced puberty, if you are over 35 years old, your eye probably does not open larger than 6mm. At the other end of the scale, magnifications which yield an exit pupil smaller than 0.5mm are not very useful either. It turns out that your eye has its best resolution if provided with an exit pupil of about 2mm. So, every set of eyepieces should provide a magnification that gets the system close to this value.

So, if you are looking for great, wide angle views of The Andromeda Galaxy or Double Cluster, then get an

## Comet Comments

by Don Machholz

(916) 346-8963 CC206.TXT September 7, 1995

Two new comets have been discovered recently, one should be visible in our morning sky soon. Meanwhile, Comet Hale-Bopp continues to look promising.

### 6P/d'Arrest

| Date  | RA-2000-Dec | Elong   | Sky  | Mag    |
|-------|-------------|---------|------|--------|
| 09-10 | 00h43.5m    | -30°13' | 147° | M 10.2 |
| 09-15 | 00h46.1m    | -32°00' | 146° | E 10.5 |
| 09-20 | 00h47.8m    | -33°21' | 145° | E 10.7 |
| 09-25 | 00h48.6m    | -34°18' | 144° | E 11.0 |
| 09-30 | 00h49.0m    | -34°52' | 142° | E 11.3 |
| 10-05 | 00h49.0m    | -35°06' | 140° | E 11.6 |
| 10-10 | 00h49.0m    | -35°00' | 139° | E 11.9 |
| 10-15 | 00h49.1m    | -34°38' | 136° | E 12.3 |
| 10-20 | 00h49.4m    | -34°02' | 134° | E 12.6 |
| 10-25 | 00h50.1m    | -33°14' | 132° | E 12.9 |
| 10-30 | 00h51.1m    | -32°16' | 130° | E 13.2 |
| 11-04 | 00h52.7m    | -31°10' | 128° | E 13.5 |
| 11-09 | 00h54.7m    | -29°58' | 125° | E 13.9 |

**C/1995 Q1 (Bradfield):** William Bradfield of Australia discovered this, his 17th comet, on the evening of August 17. Bradfield found it with his 6" refractor. Them at magnitude 6, the comet was closest to the sun (0.44 AU) on Aug. 31. It will emerge into our northern morning in late September.

**C/1995 Q2 (Hartley-Drinkwater):** Discovered by Malcolm Hartley on plates taken by Michael Drinkwater (at Siding Spring, Australia) on Aug. 29, this 13th magnitude comet was closest to the sun at 1.89 AU on Aug. 3. It is now dimming in our southern morning sky.

**Comet Hale-Bopp:** This comet continues to slowly brighten in our southern evening sky. The hope is that this comet will become quite bright in late 1996 and early

### Orbital Elements

|                         | 6P/d'Arrest        |
|-------------------------|--------------------|
| Perihelion Date         | 1995 July 27.36197 |
| Perihelion              | 1.34587 AU         |
| Argument of Perihelion  | 178.0504°          |
| Ascending Node          | 138.9874°          |
| Inclination             | 019.5232°          |
| Eccentricity            | 0.6140404          |
| Period                  | 6.51 years         |
| Source of 2000 Elements | MPC 20122          |

### C/1995 Q1 (Bradfield)

| Date  | RA-2000-Dec | Elong   | Sky | Mag    |
|-------|-------------|---------|-----|--------|
| 09-10 | 11h15.3m    | +07°34' | 3°  | M 5.9  |
| 09-15 | 11h13.6m    | +11°16' | 9°  | M 6.6  |
| 09-20 | 11h12.3m    | +14°42' | 16° | M 7.2  |
| 09-25 | 11h11.3m    | +17°56' | 23° | M 7.7  |
| 09-30 | 11h10.7m    | +21°06' | 30° | M 8.2  |
| 10-05 | 11h10.3m    | +24°16' | 37° | M 8.6  |
| 10-10 | 11h10.3m    | +27°32' | 43° | M 9.0  |
| 10-15 | 11h09.6m    | +30°59' | 50° | M 9.3  |
| 10-20 | 11h08.9m    | +34°40' | 57° | M 9.6  |
| 10-25 | 11h07.7m    | +38°40' | 64° | M 9.8  |
| 10-30 | 11h05.6m    | +43°02' | 72° | M 10.0 |
| 11-04 | 11h02.1m    | +47°48' | 79° | M 10.2 |
| 11-09 | 10h56.5m    | +52°59' | 87° | M 10.4 |

### 1995 O1 (Hale-Bopp)

| Date  | RA-2000-Dec | Elong   | Sky  | Mag    |
|-------|-------------|---------|------|--------|
| 09-10 | 18h18.8m    | -30°16' | 107° | E 10.3 |
| 09-15 | 18h17.6m    | -30°02' | 102° | E 10.3 |
| 09-20 | 18h16.8m    | -29°48' | 97°  | E 10.3 |
| 09-25 | 18h16.3m    | -29°34' | 92°  | E 10.3 |
| 09-30 | 18h16.2m    | -29°20' | 87°  | E 10.3 |
| 10-05 | 18h16.3m    | -29°06' | 82°  | E 10.3 |
| 10-10 | 18h16.7m    | -28°52' | 77°  | E 10.2 |
| 10-15 | 18h17.4m    | -28°38' | 72°  | E 10.2 |
| 10-20 | 18h18.3m    | -28°25' | 68°  | E 10.2 |
| 10-25 | 18h19.5m    | -28°11' | 63°  | E 10.2 |
| 10-30 | 18h21.0m    | -27°58' | 63°  | E 10.1 |
| 11-04 | 18h22.6m    | -27°45' | 54°  | E 10.1 |
| 11-09 | 18h24.5m    | -27°31' | 49°  | E 10.1 |
| 11-11 | 18h26.6m    | -27°18' | 45°  | E 10.1 |

*Don Machholz's article "The Positions of Comet Hale-Bopp through 1997" is not included in this issue due to a lack of space. It will appear in next month's issue.*

### C/1995 Q1 (Bradfield)

|                    | 1995O1 Hale-Bopp    |
|--------------------|---------------------|
| 1995 Aug. 31.39230 | 1997 March 31.90909 |
| 0.436815 AU        | 0.9175546 AU        |
| 331.0513°          | 130.37477°          |
| 178.0412°          | 282.47182°          |
| 147.3865°          | 088.89240°          |
| 1.0                | 0.99692670          |
| Long Period        | Approx. 5900 years  |
| MPC 25623          | MPC 25623           |

# What's Up

by Steve Coe

October 1995

Cassiopeia

So far all the deep sky objects I have discussed in What's up have generally had either Messier or NGC (New General Catalog) numbers associated with them. This month I wish to introduce you to some of the other designations you will bump into as you find your way around the sky beyond our Solar System. Many different surveys of the sky have been conducted over the years and therefore there are lots of names associated with deep sky objects. I will use the constellation of Cassiopeia to demonstrate a variety of objects with different designations.

Let's start with the (IC) Index Catalog. The IC was a continuation of the NGC, also complied by J.L.E. Dreyer. These two listings were published to catch up with findings made after the NGC was published. One of the things it proved was that the observers who had contributed to the NGC had done a good job of finding the brightest objects in the sky. All my observations are with the 13".

**IC 10** is extremely faint, pretty large, elongated 2X1 in PA 90 with a somewhat brighter middle. At 100X it grows with averted vision. It is in a very rich field, including an 11th mag star on the western tip of this galaxy, it is located at 00 20.4 +59 18.

**IC 166** displays 47 stars counted at 135X. I see it as bright, pretty large, compressed and pretty rich. This nice cluster has a wide dark lane that splits the cluster into 1/3 and 2/3 portions. There are many lovely delicate pairs. This much-ignored cluster is one of the best IC objects I have ever observed. It is at 01 52.5 +61 50.

**IC 1795** is pretty faint, pretty large, irregular in shape and the west side is brightest at 135X. There is a dark lane through this nebula which almost cuts it in

eyepiece with a long focal length and a wide apparent field of view. Are you looking for Encke's division in Saturn's rings? Or maybe trying to spot detail within planetary nebulae? Then look for an eyepiece with a short focal length and still with good eye relief so you don't have to jam your eye into the glass to observe. Maybe you wish to observe star clusters and galaxies at their best, then get an eyepiece that provides that magic 2mm exit pupil.

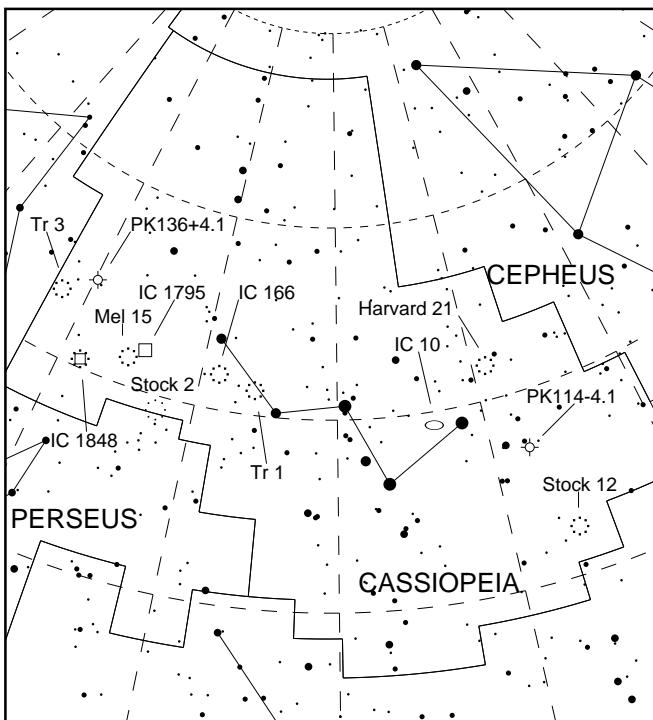
Next time, we will delve inside the eyepiece and get some info on what type of eyepiece will provide the best views for the money. Clear skies until then.

## Bits and Pieces

### Minutes of the September Meeting

The meeting was opened with a Treasurers Report.

half. There are six stars involved within the nebulosity. It was just seen at 100X without the UHC, but going to a little more power with the filter makes it much more noticeable. This nebula is at 02 26.5 +62 04, it is the brightest part of the huge nebulosity IC 1805.



**IC 1848** is pretty faint, pretty large, pretty compressed, 18 stars counted at 135X. Two stars are 11th mag and 16 others of mags 13 and dimmer make up the cluster. There is a nebula associated with this cluster, it was just seen at 100X without the UHC filter. It is more contrasty with the UHC and consists of two faint, very large streamers of nebulosity that pass north and south of the cluster. This combination cluster and nebula is at 02 51.2 +60 26.

*Continued on next page...*

Adam requested that 1996 subscriptions be mailed in ASAP as they will be mailed shortly after the October meeting. Be sure to give you account number from the mailing label.

We can also get a discount from *CCD Astronomy* magazine as a club. If 5 or more members subscribe then the discounted rate is \$20 per year.

There were four first time visitors in attendance.

AJ Crayon announced the Deep Sky Meeting and Rick Walker discussed the Public Star Party on September 30th at Thunderbird Park.

For Show-n-Tell Rick Rotramel gave a slide show of his "Best of Riverside Telescope Makers Conference" based on his 13 years experience.

For the break there were 35 members in attendance.

After the break Susan Pritchard introduced the evening's speaker. He was Steve Coe and his topic was

*Continued from previous page...*

**Harvard 21** is an open cluster that was discovered on the patrol plates shot at Harvard University around the turn of the century. I imagine light pollution has halted this project. I counted 12 stars with a fuzzy background at 100X. About 5' in size and pretty compressed with two stars of 10th mag. H 21 is located at 23 54.1 +61 46.

**Melotte 15** is an open cluster which I saw as bright, pretty large, pretty rich and pretty compressed. I counted 20 stars at 135X, some form a circular ring. Some of the nebulosity IC 1805 forms an arc on the south side. This cluster is also Collinder 26 at 02 32.6 +61 27.

**PK 114-4.1** is one of the many planetary nebulae spectroscopically discovered by Perek and Kohoutek in the 1950's. It is faint, pretty small, round, not brighter in the middle at 135X with the UHC filter. It is only suspected without the filter. The size from the P-K list is 94" and I am only seeing about 10" of this object. The outer layers that showed up on the survey photos must not be prominent visually. It is at 23 45.8 +57 04.

**PK 136+4.1** is also Abell 6. In the 13" I saw it as extremely faint, pretty small, round, just a faint blob with averted vision at 135X. Higher powers make it almost disappear. Only seen with UHC filter and dark hood covering my head. This is from a site 50 miles from Phoenix, on a night I rated 5/10 for seeing and

6/10 for transparency. This tough object is at 02 58.9 +64 30.

**Stock 2** is on a list of open clusters published in the 1930's. I counted 88 stars in this cluster at 60X. It is very bright, very large, not compressed and very rich. This cluster takes up the entire one degree field of the 38mm Giant Erflle eyepiece. There are many beautiful chains of stars and dark lanes across the face of this group. In the 11X80 finder or binoculars there are 18 stars involved with a very grainy Milky Way background at 02 15.0 +59 16.

**Stock 12** is pretty bright, pretty large, pretty rich and little compressed. This cluster is just seen in the 11X80 finder. There are 22 stars resolved at 100X, including a lovely blue and gold double star on the south side. This nice grouping is at 23 37.2 +52 26.

**Trumpler 1** is the first on a list of open clusters published by one of the leading experts on clusters, Robert Trumpler. I see Tr 1 as containing 12 stars at 135X. It is pretty faint, pretty small, somewhat compressed and pretty rich. 4 stars form a straight line across the center of the cluster. Lots of unresolved stars are in the background at 01 35.7 +61 17.

**Trumpler 3** has 31 stars counted at 100X. Bright, pretty large, not compressed and pretty rich. It could be seen in the 11X80, this is one of the best Trumpler or Harvard clusters I remember seeing. It is at 03 11.8 +63 15.

## What are the SAC Offices?

by Paul Dickson

If you have been to a few meetings or looked at the first page of the newsletter, you probably know the offices of the club. Those who have been with the club for more than a year probably know which offices are elected. But do you know what each office oversees? If you haven't served as an officer, it's unlikely that you would know.

The Saguaro Astronomy Club is fairly unique in that club members can not serve more than two consecutive terms in the same office. Some years this has meant some difficulty finding members willing to fill positions. This rule happens to be one of the resulting forces that formed the club, so is unlikely to change in the foreseeable future.

SAC has five offices that are elected. These offices are President, Vice-President, Secretary, Treasurer, and Properties Director.

The President is ultimately responsible for the running of the club and provides the leadership necessary for doing so. The President organizes the monthly meeting and board meetings, finding locations for these meetings when necessary. This means that President is the contact person for the club.

The Vice President take the President's place when

"Eye Pieces." If you wanted to know what their insides look like; this was the talk that showed all and told all.

—A.J. Crayon, SAC Secretary

## Time to Ask: "What can I do for my Astronomy Club?" by Steve Coe

Well, it is October and the Saguaro Astronomy Club is facing the same thing it faces often at the end of the year; it is time to try and convince people to become officers in the club. I have come to the realization that people are not necessarily convinced of anything, they just see that they want the club to continue and it is in their self-interest to see that happen. So, as a one-man, self-elected "find some great officers for next year" committee, I would like to ask the members of SAC to consider what the club has provided for them and then look at what they can provide for the club. Officers are needed for all the positions and I am planning to take on the office of Vice-President. I would invite anyone who wishes to contribute to the Saguaro Astronomy Club in the form of becoming an officer to join me in having some fun while serving the members of the club. Let's do it!

necessary. Otherwise, the Vice-President is in charge of coordinating and scheduling general business meetings and the program agenda. The Vice-President is also responsible for both general club publicity and program publicity, but this job has been delegated to the Public Events committee.

The Secretary is the custodian of all official documents and records of the organization. The Secretary also records the minutes of all meetings, including the Board of Directors meeting, for publishing in the next newsletter. The Secretary is also the official correspondent with other clubs, organizations, etc. The Secretary is also responsible for the publication of the club newsletter, but this has been delegated to the Newsletter committee.

The Treasurer maintains and proposes the club's budget, handles the clubs bank accounts, handle the collection of dues and subscription. Currently, the Treasurer maintain the newsletter mailing list as a courtesy for the newsletter editor.

The Properties Director is in charge of SAC properties which include the club library, and club's telescopes, and is the host for the regularly scheduled star parties or delegates the role.

There are two other officers on the SAC Board of Directors. These are not elected officials, but are the appointed chairs for the Newsletter and Public Events committee. These standing committees have usually had only one member in the past.

## New Asteroid Discovered

by Dr. Paul Comba

*This was originally in the Minor Planet Observer, Vol. 6, No. 9, September 1995 issue. It was sent in by Paul Comba. This is definitely not a visual object.*

In the early hours of 1995 July 25 I took three photographs (with my 18" reflector tele-extended to f/8.1) of an area in Sagittarius about 3 degrees NW of where

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I saw a faint smudgy trail that seemed to change position.

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Uranus was located. The purpose was to do astrometry on 1985 TP<sub>3</sub>, a minor planet that had just passed through opposition. Later that day I developed and printed the photos, and had no trouble finding the object that I wanted to measure. Then I decided to scan two of the prints with a stereo viewer and—surprise—in one corner I saw a faint smudgy trail that seemed to change position. A check of the negatives showed that the little trail was there on all three, which clearly indicated a moving object.

The next night, with great expectation, I took three longer exposures, two of them CCD-guided and one visually guided on the presumed motion of the object. This time the object showed up quite clearly and I estimated its magnitude at 17. Since I could not identify it, I sent the information to the Minor Planet Center and eventually was notified that the object seems indeed to be new, and has been designated **1995 ON**.

The orbital elements were computed by G.V. Williams of the Minor Planet Center were derived from 15 astrometric positions that I supplied, covering the period July 25 – August 2.

Using these elements I computed an ephemeris and was able to photograph **1995 ON** again on August 19 and 22, and obtained 6 more astrometric positions. Needless to say, this has been a very exciting experience.

All photographic measurements were done in collaboration with Dr. Padraig Houlihan.

### Preliminary elements for 1995 ON

From MPC 25514

|                   |            |
|-------------------|------------|
| E = 950722        | i = 6.98   |
| M = 45.31         | e = 0.1317 |
| $\omega$ = 110.90 | a = 2.2931 |
| $\Omega$ = 130.03 | H = 13.5   |

| 1995 ON |             |         |      |        |
|---------|-------------|---------|------|--------|
| Date    | RA-2000-Dec | Elong   | Sky  | Mag    |
| 09-25   | 19h45.8m    | -22°47' | 112° | E 17.7 |
| 10-01   | 19h51.1m    | -22°47' | 107° | E 17.8 |
| 10-07   | 19h57.1m    | -22°43' | 103° | E 17.9 |
| 10-13   | 20h03.9m    | -22°35' | 98°  | E 18.0 |
| 10-19   | 20h11.3m    | -22°23' | 94°  | E 18.1 |
| 10-25   | 20h19.2m    | -22°07' | 90°  | E 18.2 |
| 10-31   | 20h27.7m    | -21°47' | 86°  | E 18.3 |

## Last Chance for Third Mt. Graham Telescope?

by Bruce Walsh

The third and largest telescope (the 11 meter large binocular telescope, LBT) slated for the University of Arizona's Mt. Graham International Observatory is presently in great peril for the strangest of logic. Its survival needs your help.

First, some background. As most are aware, Congress authorized construction of three telescopes on top of Mt. Graham in the late 1980's, ending almost eight years of debate about whether the telescopes pose a threat to the Mt. Graham Red squirrel. This question was also efficiently settled by the squirrels themselves. Just before the start of construction, the official number for the squirrel population was around 150. It is currently around 400, showing

# The 14th Annual All-Arizona Star Party

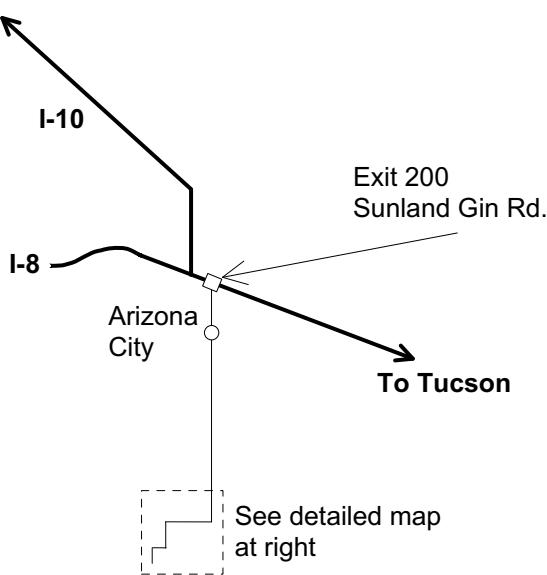
**October 20–21, 1995**

The fourteenth annual All-Arizona Star Party is a two night event, held during the new moon of October. This year's event is again sponsored by the East Valley Astronomy Club (EVAC).

In past years, this event has been sponsored by both the Tucson Amateur Astronomy Association (TAAA) and the Saguaro Astronomy Club (SAC). This event originated from the TAAA and in the beginning the event was held at David Levy's house.

The star party is held at a site near Arizona City,

## To Phoenix



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

that the most potentially disruptive phase, observatory construction, had no impact on the population's ability to recover. This is not surprising given that the density of squirrels is about one per five acres and the total footprint of the observatory project (all three telescopes plus the access road) is 8.6 acres, only half of which is in squirrel habitat. Likewise, the squirrel monitoring team has shown that the bulk of the squirrel population is in the 8,500–10,000 foot range, not the areas above 10,000 feet (which includes the observatory site) as claimed by telescope opponents. As a result of these ongoing studies, the head of the monitoring team (Dr. Paul Young) suggested that the slight impact of the observatory could be furthered reduced by moving the LBT site 400 yards to a location that in five years of monitoring showed no signs

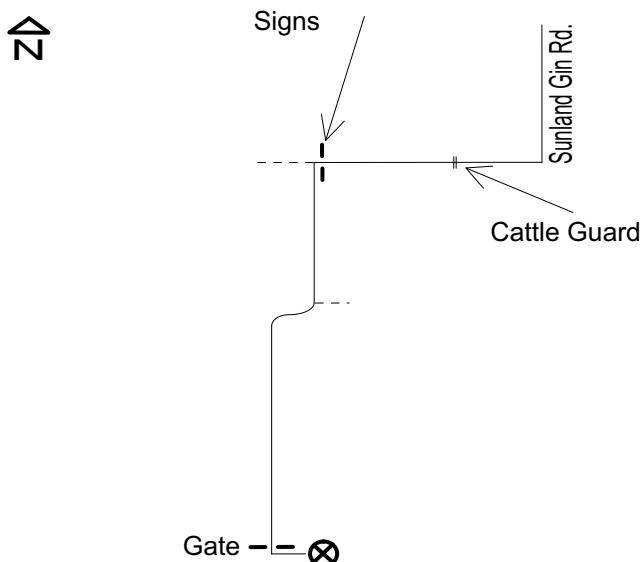
which is almost equal distant from Phoenix and Tucson (see the map).

Staying the night means you have to plan ahead. The desert tends to be hot and sunny during the day and cold at night. Plan accordingly. Remember to bring warm clothes and food and drinks. It's best to bring too many warm clothes than too few.

All Arizona astronomy clubs are invited and it's hoped for a large turn-out. Last year there was a large number of people setup at sunset on Saturday night. So plan on being there early to see old friends and make new ones. Last year, Friday night was clear but very cold. Saturday night was clear and still until the moon set, then the wind picked up and blew enough dust to send most people home.

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

## "Silverbell Estates"



of squirrel activity. This request was supported by biologists from both the US Forest and US Fish and Wildlife Services, and agreed to by the University of Arizona. Following approval by these agencies, 1.5 of the 1.7 acres were cleared in December 1993.

Observatory opponents, so-called "environmentalists," sued to stop the project because they claimed this 400 yard movement violated the congressional act, even though the move was beneficial to the squirrel. Unfortunately, the courts agreed, opening the way for years of additional "studies." It is indeed very strange that this slight change to reduce impact on the squirrel was protested by these "environmentalists," but it has been clear for quite some time that their object is stopping the telescope project, not protecting the environment of

Mt. Graham. These opponents have ignored all the key findings from the last eight years of studies on the Red Squirrel because these did not fit their agenda of stopping telescope construction.

The specter of five to ten years of additional court action, after over 10 years of on-going studies (including almost eight years of active squirrel monitoring) showing no obvious impact of the project has forced partners of the University of Arizona to seriously consider pulling out. Representative Jim Kolbe, whose district includes Mt. Graham, has stated that he will attempt to save the project by introducing legislation this fall to authorize the US Forest Service to place the third telescope where it will cause the least damage (most likely the already cleared LBT site). I strongly encourage club members to write both of their senators as well as their representative and encourage their strong support of this legislation (see addresses below). Observatory opponents will clearly be engaged in a massive campaign of their own and it is important for our voices to be heard.

Since observatory opponents have been very effective at spreading misinformation, I welcome the chance to answer any questions members might have. I can be reached at [jbwals@ccit.arizona.edu](mailto:jbwals@ccit.arizona.edu). Further, some home pages containing information on the World Wide Web about Mt. Graham are:

<http://as.arizona.edu/graham/graham.html>

and

<http://www.primenet.com/~lwilson/taaa/rant.htm>

Bruce Walsh

2365 E. Seneca

Tucson AZ 85719

Bruce Walsh is Associate Professor of Ecology and Evolutionary Biology at the University of Arizona. His area of specialty is mathematical modeling of small populations and he has been involved in analyzing population data from Mt. Graham since 1987. He is also a member of numerous scientific groups with interests in conservation biology and has had an active scientific interest in endangered species for over twenty years. His deep-sky life list (<http://nitro.biosci.arizona.edu/zastro/>

Deepsky.txt

) on his WWW home page (<http://nitro.biosci.arizona.edu/>) gets close to 100 hits a day. Alas, this is because it contains SEX (for NGC 3115 in Sextans), and was thus listed under sites containing Sex on several net search programs.

#### **Address of members of the Arizona Delegation:**

The Honorable John McCain  
241 Russell Senate Office Building  
Washington, DC 20510

The Honorable Jon Kyl  
702 Hart Senate Office Building  
Washington, DC 20510

The Honorable Matt Salmon (District 1)  
115 Cannon House Office Building  
Washington, DC 20515

The Honorable Ed Pastor (District 2)  
223 Cannon House Office Building  
Washington, DC 20515

The Honorable Bob Stump (District 3)  
211 Cannon House Office Building  
Washington, DC 20515

The Honorable John Shadegg (District 4)  
503 Cannon House Office Building  
Washington, DC 20515

The Honorable Jim Kolbe (District 5)  
205 Cannon House Office Building  
Washington, DC 20515

The Honorable J. D. Hayworth (District 6)  
1023 Longworth House Office Building  
Washington, DC 20515

## **The SACNEWS On-Line Archive has Moved**

The archive of SACNEWS newsletters, formerly on [chara.gsu.edu](http://chara.gsu.edu), has moved to [www.seds.org](http://www.seds.org). It is the directory /pub/info/newsletters/sacnews.

<ftp://www.seds.org/pub/info/newsletters/sacnews>

## **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**—Classic Celestron C-8 (orange model), fork mounted, special coatings, field tripod, 10x40 spotter scope, latitude adjuster & knob kit. 3 eyepieces, star diagonal, barlow lens. \$950. Call Jim Crisman 584-0896 evenings.

# October 1995

| Sunday  | Monday                             | Tuesday                       | Wednesday   | Thursday                                  | Friday  | Saturday   |
|---|------------------------------------|-------------------------------|---|---|---|--|
| First Quarter Moon 7:36 A.M.<br>1                       |                                    |                               | Mercury at inferior conjunction with the Sun (moves into morning sky)<br>3  | PAS Meeting Brophy Prep. Physics Lab<br>4 | SAC Meeting Grand Canyon University, Fleming Rm. 105<br>5 |  |
| Full Moon 8:51 A.M.<br>8                                |                                    |                               | EVAC Meeting (SCC: Rm. PS172)<br>10   |   |   |  |
| Last Quarter Moon 9:27 A.M.<br>15                       |                                    |                               | Eclipses of Saturn's Satellites<br>Date Start End Event Dims<br>10-01 05:02.9 05:18.4 Saturn eclipses Titan<br>10-02 19:57.9 20:00.9 Enceladus eclipses Mimas 51%<br>10-17 04:17.1 04:32.3 Saturn eclipses Titan<br>10-24 03:19.9 03:21.9 Tethys eclipses Enceladus 28%<br>10-25 01:25.7 01:28.7 Saturn eclipses Rhea<br>10-28 21:21.9 21:23.9 Enceladus eclipses Tethys 28%<br>10-29 19:16.4 19:19.7 Tethys eclipses Rhea 19%<br>Source: Astronomy, Sept. '95, pp. 72-75 |   | Mercury at greatest elongation 18° (morning)<br>20        | All-Arizona Star Party Arizona City Oct. 20 & 21<br>21 |
| Orionid Meteors Peak: 10 P.M. Yesterday Z.H.R. 25<br>22 | New Moon 9:35 P.M.<br>23           |                               |   |   |   |  |
|   | First Quarter Moon 2:18 P.M.<br>29 | Sun enters Libra 2 A.M.<br>30 |   |   | All Times are Mountain Standard Time<br>31                |  |

## 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%.

- \$20.....Individual Membership (\$28 for '96)
- \$30.....Family Membership (one newsletter) (\$42)
- \$100.....Business Membership (includes advertising)
- \$4.....Nametag for members
- \$10.....Newsletter Only (\$14 for '96)

### 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 — |        |          |
| 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