

# Saguaro Astronomy Club

Metro Phoenix, Arizona

## SACNEWS



December 1996 — Issue #239

v11.24

## 1996 All-Arizona Star Party Big Turnout, So-So Skies by Ken Reeves

The All-Arizona Star Party at Arizona City was sponsored by the East Valley Astronomy Club (EVAC) on October 11 & 12. I had been looking forward to this for quite some time and took off Friday from work to get



This photo was taken by Paul after he had set up and took a break. His telescope was illuminated by waving a dim LED flashlight over it. Steve's RV is in the background and Marjory was setup beyond Paul's car. A.J. Crayon and Ken Reeves were off to the left, but out of this image.

All photos and captions are by Paul Dickson.

down there in plenty of time and do some observing both nights. I met a friend for lunch in Ahwatukee, so rather than spending my afternoon in Phoenix, I decided to head straight down there.

I got there at about 2:00 and was the first person in the field. It's so much fun waiting around in the middle of the hot desert for people to arrive! The place had grown over with weeds quite a bit and it was hard to find my way onto the field. By about 4:00, some people started to come in. Setting up in my area was A.J. Crayon, Brian Workman, Steve DeWell, Michael Ohrt, and Ron Schmidli. Several other people also setup just down from me, but I don't want this to become a list of names (actually, I don't remember names very well and I

### Quick Calendar

**SAC Star Party**  
Buckeye Hills Recreation Area  
Saturday, December 7

**SAC's End-of-Year Party**  
Steve Coe's Home  
Saturday, December 14

**SAC Star Party**  
Buckeye Hills Recreation Area  
Saturday, January 4

### 1997 Officers

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

don't want to embarrass myself here).

Just after twilight, I saw two cars coming in so I decided to go out and help guide them in. It turned out to be Paul Dickson and Marjory Williams. Both set up in our area bring the count up to 8.

I didn't do a scope count on Friday, but I am estimating that there were at least 20 scopes on the field. A

### SAC Officers

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This is actually two photos, taken within a few seconds of each other. It is about 90 minutes until sunset on Saturday evening and most of the people had not yet arrived at the site yet. The mountain off in the distance, behind the foreground truck is Kitt Peak. Looking closely, you might be able to see the white speck that is the dome for the 4-meter Mayall Telescope. The vehicles left-to-right, starting with the foreground truck, belong to Rick Rotramel (SAC), Hazel Lawler (TAAA), Glenn Nishimoto (TAAA), and Robert Kerwin (EVAC). Hazel had the shortest distance to arrive at the site. She lives in Arizona City.

few people even set up in the south field.

One of the more unusual scopes I looked through was a 7 inch folded refractor. The views of Saturn were superb!

After checking out the field, I got back to my scope to do some serious observing. I gave the skies a rating of 7/10, A.J. gave it an 8/10. I spent most of the evening looking for Steve Coe's objects in Piscis Austrinus. With my 10" scope, they were all very faint and I was unable to find either of the IC objects. I then moved on to the Merope nebula in the Pleiades. This was the best I have ever seen and definitely the most obvious. I finished up the

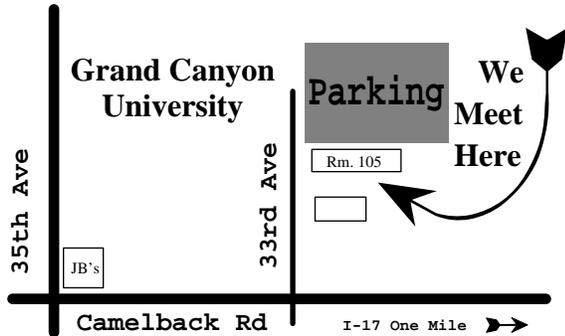
evening with several galaxies in Cetus, one of my favorite fall constellations. I turned in about 2:00, figuring that I had another night to observe.

Saturday was one of those days where one just lays around. Steve DeWell shot off a couple of model rockets in the morning for some different entertainment, a nice touch. The rest of the day was spent trying to keep cool, I was lucky to be able to spend some time in Steve's air conditioned RV, but as long as one was able to stay in the shade, it wasn't too bad.

In the afternoon, some clouds started building up in

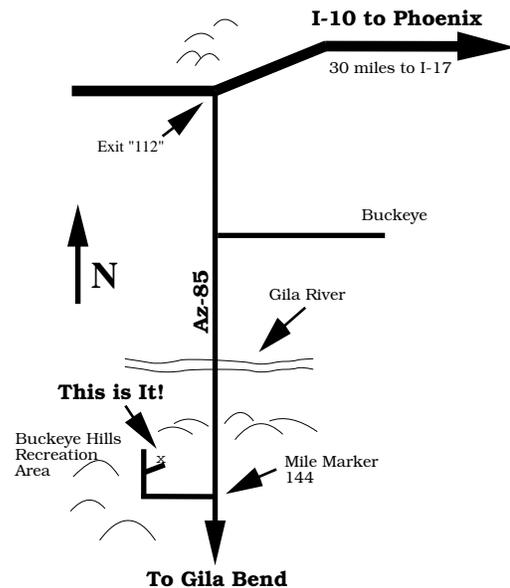
## Directions to SAC Events

**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.



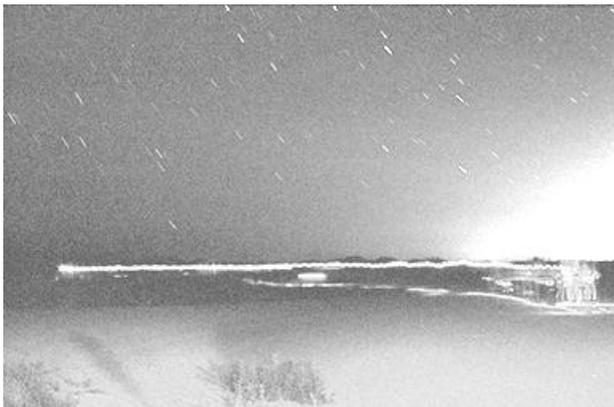
**SAC Deep Sky Subgroup Meeting at John & Tom McGrath's, 11239 N. 75th St., Scottsdale, 998-4661** — Scottsdale Rd. north, Cholla St. east to 75th St., southeast corner.

**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.



the south. I didn't pay too much attention to them, figuring they would dissipate when the sun went down.

As evening rolled around, the people started pouring in. At 5:30, I counted 42 scopes with 5 cars still not setup. At least 10 more vehicles came in after that.



Visiting. Seeing who showed up and what they brought on Friday night. The bright glow over the horizon at the right edge is the sky-glow of Tucson. The foreground is illuminated by a red LED flashlight.

As evening rolled around, the people started pouring in. At 5:30, I counted 42 scopes with 5 cars still not setup. At least 10 more vehicles came in after that.

The evening started out pretty good, I did a few ob-

jects I had left in Scutum, then moved over to the Helix Nebula in Aquarius. This is one of my favorite object in the sky and can spend hours looking at it. Next was M74 in Pisces, one of the dimmest and toughest of the Messier objects.



On Saturday evening, everyone showed up. This photo begs the question, "Why did the Tarantula cross the observing field?" Obviously because that's where the folded refractor was.

By this time, those clouds in the south that I thought would dissipate started rolling in and by 10:00, it was obvious that it was going to be a night of sucker holes. Most of us pretty much gave up and just kicked back and BS'd the rest of the night. Brian, the go-getter that he is,

# Comet Comments

by Don Machholz

(916) 346-8963 CC220.TXT November 6, 1996  
DonM353259@aol.com

**Comet Hale-Bopp** continues to brighten as it passes north of the sun and into the morning sky as 1996 draws to a close. Northern Hemisphere observers will have difficulty seeing it for a few weeks, while Southern Hemisphere observers won't see it until May 1997. While Comet Hale-Bopp has developed jets near the nucleus and a tail a few degrees long, **Comet Tabur** began to fade rapidly in late October. This was unexpected and it is unusual behavior for a comet. It may now be fainter than the adjusted magnitude estimates listed in the ephemerides below.

1995 O1 (Hale-Bopp)					
Date	RA-2000-Dec	Elong	Sky	Mag	
11-28	18h01.1m	-00°58'	33°	E	4.2
12-03	18h06.2m	-00°22'	31°	E	4.1
12-08	18h11.6m	+00°18'	29°	E	3.9
12-13	18h17.3m	+01°03'	28°	E	3.7
12-18	18h23.4m	+01°57'	27°	E	3.5
12-23	18h29.9m	+02°53'	27°	E	3.3
12-28	18h36.8m	+03°55'	27°	E	3.1
01-02	18h44.0m	+05°05'	28°	M	2.9
01-07	18h51.8m	+06°23'	29°	M	2.7

Several comets should be easily visible to us in 1997. **Comet Hale-Bopp** will likely be the brightest, reach-

ing perihelion in late March. Between January and June, **Periodic Comet Wild 2** will reach magnitude ten in the northern evening sky. At nearly the same time **Periodic Comet Wirtanen** will be of similar brightness. **Periodic Comet Encke** is visible to the Southern Hemisphere in mid-summer. Toward the end of the year **Periodic Comet Hartley 2** may reach binocular visibility in the evening sky, while **Periodic Comet Tempel-Tuttle** crosses through the north polar region at magnitude nine. In addition to these returning periodic comets, one never knows when and where new comets will be discovered.

C/1996 Q1 (Tabur)					
Date	RA-2000-Dec	Elong	Sky	Mag	
11-28	15h51.2m	+23°37'	45°	M	10.0
12-03	15h55.9m	+21°36'	45°	M	10.3
12-08	15h59.9m	+19°47'	45°	M	10.6
12-13	16h03.5m	+18°09'	46°	M	10.9
12-18	16h06.7m	+16°40'	47°	M	11.2
12-23	16h09.5m	+15°20'	48°	M	11.5
12-28	16h11.9m	+14°08'	50°	M	11.8
01-02	16h13.8m	+13°04'	53°	M	12.0
01-07	16h15.4m	+12°06'	56°	M	12.2

### Orbital Elements

Object:	Hale-Bopp	Tabur
Peri Date:	1997 03 31.86770	1996 11 03.50419
Peri Dist:	0.9170703 AU	0.84001480 AU
Arg/Peri (2000)	130.40061°	057.37495°
Asc Node (2000)	282.46983°	031.41231°
Incl (2000):	089.38442°	073.36167°
Eccentricity:	0.99674010	1.0
Orbital Period:	4700 years	Long period
Reference:	MPC 27287	MPC 27882

# What's Up

## by Steve Coe

Best Tips

December 1996

Well, here we are at the last "What's Up" for a while and I think I will end with some of the most important things I have learned about going out to observe the night sky. These are in no order of importance, just some things to think about.

### 1) Dress Warmly.

You will never do anything as cold as astronomy. Wait—maybe ice fishing. Anyway, standing still to observe at the eyepiece will not heat up your muscles very much and once it gets near midnight, you will start to get cold. So, bring more clothes than you think you will need and always have boots and thick socks for those chilly nights.

### 2) Take a break.

I find that even on the best of nights, I need a while to get off my feet and rest my eyes. I often use this time to chat or observe the Milky Way with naked eyes. So, bring a comfortable folding chair. A.J. brings two, one for his fanny and one for his feet, good idea.

### 3) Buy good binoculars.

I have used my pair of 10X50 binocs so often for so many purposes that I just don't leave home without them. Just scanning the Milky Way for fun, looking for the new comet or trying to find a neat star cluster, they are invaluable.

### 4) Don't forget.

I have a list of things I will need to go out and have fun with astronomy. It is posted right next to the scope in my garage. I check that list everytime before I go out and go telescoping. Not having the (*fill in the blank*) can really ruin a fun night.

### 5) Buy equipment you will use.

Building or buying that huge telescope that you say you will use for years to come sounds really appealing, until it is time to load, unload, setup and adjust that new monster scope. Make your equipment convenient and it will get used.

### 6) Get a unit power (1x) finder.

The Telrad is the device of choice in SAC for making certain that the star you THINK you are starting to hop from is really the one in the eyepiece.

### 7) Make a list, check it twice.

Arriving at the observing site with a well-made list of objects for that night will allow you an opportunity to observe more sky and keep good records. I know that I have been a professor for 16 years, but you have got to do your homework.

I think that seven is a nice, magical number at which to stop. I do wish to say that writing this column has provided me with a lot over the years. I have had to become organized about my observing and lots of folks have told me that they do use the information provided while they are out with their scope. I know that the editor of this fine newsletter is always asking for contributions, so just don't let your ego get in the way and write a few lines about what you are doing with your telescope. I promise it will improve your observing. So, thank you to all and clear skies!

kept on going and managed to do quite a bit of observing in Cassiopeia and Perseus before the clouds got in his way.

Once again, I turned in between 1:00 and 2:00. Every time during the night I would wake up, I would wonder if it had cleared off any, but was too lazy to get up and find out.

By the time I got up in the morning, most of the people had already left, many obviously frustrated with the clouds.

Even though we got clouded out on Saturday, I still had a great time. The clouds gave me a chance to get to know some of the people a little better. I still met my main objective which was to get out, forget the rest of the world, enjoy myself, and relax. It will be an outing I will long remember (there's something about the barlow pop that's always funny).

## Another Look at the All-Arizona Star Party

### by Paul Dickson

This article started out covering both the All-Arizona Star Party and the earlier Kitt Peak Cook-out & Star Party. After a aborted attempt at putting this article together in less than two days time, I decided to hold it a month so I could get pictures ready. I also decided to split it into two articles.

On the Friday of the first night of the All-Arizona Star Party, it seems that everything was in disarray. I seemed to be even more disorganized than I was for the Kitt Peak Cook-out the weekend earlier. The few tasks I had to finish all took longer than expect. The main saving grace was that I was still mostly packed from the previous star party. Sunset occurred at the All-Arizona site around 6 PM and I finally reached the turn-off of Interstate at 6:30.

Well, this isn't exactly true. I had arrived at this exit

point earlier, but I stopped to get a motel room and food. See, I remembered the lack of sleep I got last year. The desert heat during the day was so bad I couldn't get any sleep during the day. The result was I fell asleep early Saturday evening and slept 'til dawn. This year I got a motel room.

As I was traveling to the site, the dust was horrible. In some places I could not even see the road ahead of me. Thoughts entered my head, wondering how bad the observing site was going to be this year. Then I noticed tail lights ahead of me. Obviously, there was someone just ahead of me going to the site. This was a relief. When I passed the finally gate and turned left, I could see the tail lights far ahead of me turning right on to the path into the site.



The observing field looking NE. Pierre Schwaar's van is on the left and Rick Rotramel's pickup is in the foreground at the right.

At this time, twilight was just ending when I reached the observing site and it was very dark. The weeds had grown during the summer and the lack of traffic for the Friday night session made it very difficult to locate the path into the observing site. After not finding tire tracks leading off the dirt road, I stopped the car, turned off the lights, got out, and looked around. Sure enough, I could see the red flashlights at the observing site. I had to backtrack to the path to the site.

I lucky enough to get help getting to the site. Ken Reeves came out and showed me the way into the site. The path was a torturous, twisty path that took a few minutes to navigate. I wasn't the last person to arrive though. Ken went back out to lead in another car, which made me only the second-to-last person to arrive. Later I asked who was in the car that arrived just before me. I

was told that no one had arrived just before me.

Later that night, we heard a VW motor start up nearby and leave. This wouldn't have been unusual except it was towards the west and we were at the western edge of the field. Obviously, someone had been observing by themselves at the eastern edge of the farm field, without ever getting to the observing site.

Friday night was spectacular. I spent a lot of time visiting, but I also got 25 of the objects (out of 39) on my observing list. I had taken time during the week to create a list of objects by constellation. I can definitely state, the worst objects in my book are the planetary nebulae. There are 22 of these in the *SAC's 110 Best of the NGC*. Fortunately, I now have only four more to do.

On Friday night I observed until 5:20, my last observation was in Puppis. The sky was quickly brightening as I packed and left the site. Everyone else appeared to be asleep. During the night, the temperature had dropped to 56 degrees by 3:30. During the day, it would rise by nearly 50 degrees. I'm glad I had an air conditioned room waiting.



Robert Kerwin (left), President of EVAC, had set up in the south field Friday night. Here, he's getting ready for Saturday night.

When I arrived back at the site Saturday afternoon, everyone who stayed the day looked like they had barely made it. And me, I had to turn down the air conditioning at the motel room after it got too chilly. I wisely kept my mouth shut.

The sky didn't look too promising during the late afternoon. Clouds were dominant in the southeastern sky,

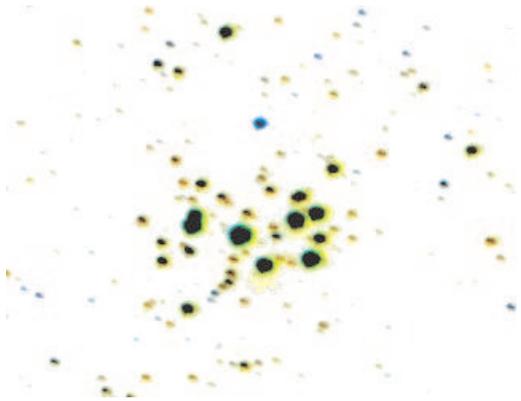
## Such-A-Deal

**SUCH-A-DEAL** is a place to advertise equipment, supplies, and services related to amateur astronomy. This is a free service for SAC members and friends. SAC is not responsible for the quality of advertised items or services. All insertions must be submitted in writing.

**For Sale**—Moving. *Sky & Telescope* 1968 to present. *Astronomy* Premier issue to present. Both in binders. Observatory: 90" dome, 10" Meade LX-200 (8 years old) w/ digital setting circles, CCD capable w/ some accessories, ST4X CCD camera/guider, Two CCD-245 CCD heads and single power supply. Original Altair 8800 computer and a TRS-80 with 4 floppy drives, both with software. Available for best offer. Stan Student, 948-3954 or E-mail: [sgsman@worldnet.att.net](mailto:sgsman@worldnet.att.net)

**For Sale**—Meade 10" f/6 Research Grade Newtonian and mount. Rotating rings, 7x50 finder, manual Dec slow motion, 2 inch focuser. The mirror was re-configured by Pierre Schwaar a couple of years ago. \$850 firm. Paul Maxson, 995-5164. [SunSpot@starlink.com](mailto:SunSpot@starlink.com)

although it was clear overhead and in all other directions. By 9 PM, the clouds had filled the sky, occasionally offering sucker-holes. I did some piggyback astrophotography in some these "holes," the results: they had clouds too!



Pleiades (AKA M45).  
A very small piece of a much larger image. It's presented as a negative to print better and show the nebulosity around the larger stars.

I decided to call it quits by 12:30. The sky had not improved and I didn't want to spend the entire night doing nothing. So I packed up and headed home. There were some reports that it did clear somewhat by 2:30.

As for observing, I was able to add 5 more objects to my tally of seen objects. This brought me a grand total for the weekend of 30 objects (of 39). I missed the Saturn Nebula due to clouds on the second night. One of the objects I did see, took me about 40 minutes to track down. I finally got out my *Herald-Bobroff Astroatlas* and found the troublesome planetary 3 minutes after opening the atlas.

I'm now down to about 40 objects left unseen, on the SAC 110 Best of the NGC List. Most of these are north of Virgo, so I will have to wait for the spring star parties to see these.

## Thank You

I would like to thank Jim Crisman, Jack Jones, and Marjory Williams for staying a few minutes after the October SAC meeting to help stuff the remaining SAC constitutions into envelopes. With less than 15 minutes of work, all that remained was adding stamps. Thanks for the help. —*Paul Dickson*

# Bits and Pieces

## Minutes from the October Meeting

The October meeting was called to order by Gerry Rattley at 7:30.

There were 3 guests present at the meeting.

November will be the elections for the club. Except for the Vice-President, all of the officers are willing to keep their jobs. Thanks to everyone for their help. Gerry offered to take over the VP's job if someone else wants to be President.

We also opened up a discussion on the club Constitution. There was a short discussion about one discrepancy found in the Constitution. The November meeting is where we will hold our voting on the changes.

The Steward Observatory Mirror Lab is going to have an open house some time in January. They are getting ready to spin cast the 8.4 meter mirror. If you want to go, you need to get your name on a list so that Steward Observatory knows who is going to be there.

We had our public star party at Thunderbird Park on October 19. There were 13 telescopes and a pair of 11x80 binoculars. There was a nice sized crowd out in spite of the clouds. Thanks to everyone that was there.

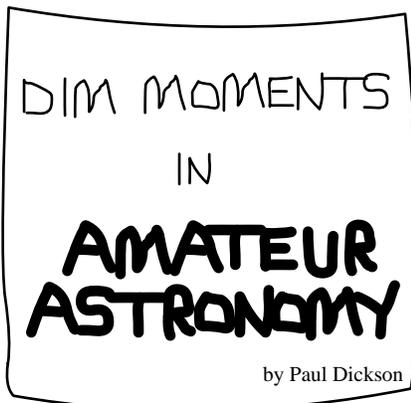
A.J. Crayon told us about the Deep-Sky Meeting on Nov. 7 at the McGrath's house. The constellations to be discussed are Aquila and Piscus Austrinus.

Pierre Schwaar talked about an observing project on Nov. 10. There will be a 14.5 hour Moon rising. If you see Spica rise, move 2 degrees South of Spica and wait for 1 hour and 19 minutes and the Moon will rise.

For Show and Tell Marjory Williams told us about the Lunar Eclipse in Chaco Canyon. The Park Ranger is interested in astronomy and we may try to hold a star party there. Paul Dickson and Chris Schur both showed us some slides.

At the break, there was about 40 people in attendance.

After the break, Gerry introduced Jason Oftenburg who is a graduate student at ASU. He is doing work in stellar winds and mass loss in stars and how this is important to the stars and their neighbors. Very interesting talk, Jason. Thanks!!



We adjourned to JB's were 12 people continued their astronomical discussions.

—David Fredericksen, SAC Secretary

## T.A.A.A.'s Kitt Peak Cook-out & Star Party by Paul Dickson

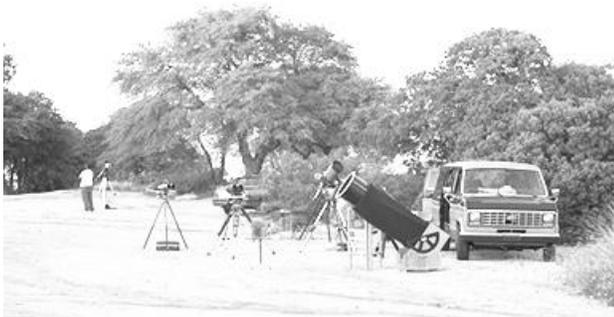
Early October was a time of Star Parties. I skipped SAC's star party at Buckeye Hills on October 5 in favor of the Tucson Amateur Astronomical Association's (TAAA) Kitt Peak Cook-out & Star Party. I figured the sky would be a lot better on Kitt Peak at 7000 feet than at Buckeye Hills at 1300 feet. I figured it correctly.



**The Kitt Peak Cook-out & Star Party.**

The dome for the Mayall 4-meter telescope is in the upper left and the dome for the 3.5-meter WIYN telescope is in the upper right.

This was the second time I had been on Kitt Peak after sunset. The first time was with a group of U. of A. students. The 30 of us got to see a total of 5 objects, the last only because I knew how to star hop to M 51. This time it would be different. This time I had my own scope.



The main observing field during daylight.

I only negative aspect of this star party was my own fault. I was so rushed getting ready for the star party, that I forgot to bring along my observing list. My own copy of my book, *SAC's 110 Best of the NGC*, was left on the table in Phoenix. This wasn't a total disaster. I at

least had extra copies of my book with me, so this only meant I wouldn't know which objects I've already seen.

Saturday afternoon was moderately cloudy, with patches of clouds drifting by. From the information from the Weather Channel, I believe they were the remains of Tropical Storm Hernan which had broken up on the west coast of Mexico and was drifting across to Texas.

It seems a law of nature. If you want cloudy skies, hold a star party. Of course, there is a little known loophole to this law. If you have the star party at an observatory, nature balances the wishes of the professional astronomers against those of the amateur astronomers. Nature can then ruin the professional astronomer's night by giving him another perfect night. And so by sunset, it was clear.

It is interesting to note that the skies would remain clear for a little more than a week. It wouldn't be until late Saturday evening at the All-Arizona Star Party that the clouds would return.

There were only of us from Phoenix at this star party. Myself and Russ Chmela. We were setup next to each other so we talked most of the evening, first while waiting for the seeing to stabilize and later while observing.



The dome of the 3.5-meter WIYN telescope.

During the night I was able to write the observations of 8 objects, 6 of them being from my book. The other two were observations through Russ Chmela's scope. Russ also showed me the Saturn Nebula, without telling me what it was. I was able to detect the ansae that make it look like it has rings without being told that they were there. I wish I'd written the observation down. It is part of the SAC 110 Best of the NGC and I haven't gotten to this object, not even at the All-Arizona Star Party.

I left the star party just before 1 AM. Just as the sky was brightening with moonrise. It took me nearly 30 minutes to drive down the mountain, then another 2 1/2 hours to get home.

## 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.

# Getting Started The Christmas Scope

by Wil Milan

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When one first develops an interest in astronomy the natural temptation is to zip right out and buy a telescope. That's particularly true during the Christmas season, when the itch to buy is in the air. I won't try to talk you out of it; a telescope is, after all, a basic implement of astronomy. But if you talk to most astronomers they'll tell you their first telescope was a mistake. Most started out with a small department-store telescope, usually a little 60mm refractor that is often worse than useless: using them can be so frustrating that they cause many budding astronomers to give up astronomy altogether.

But with a bit of care and foresight you can avoid that. Instead of ending up with a throw-away telescope you can end up with a scope that can serve you well for many years. Let's discuss some of the basics of telescopes, then some recommendations on what to get.

## The Basics

There are three basic types of telescopes: refractors, reflectors, and a combination of the two known as catadioptrics.

**Refractors** are what most people think of when they think of a telescope. They gather light with a lens at the front (known as the *objective*) and focus it down a long tube onto the eyepiece (the small lens you look into) in the back.

Refractors have many wonderful qualities. Top-quality modern refractors (particularly *apochromatic* refractors, meaning their optics are free of the false-color fringes common in older refractors) offer razor-sharp views and high-contrast images unmatched by any other type of telescope (though some of the very best reflectors come very close). If all else were equal everyone might use top-quality refractors, but all else is not equal: inch for inch, refractors are much more expensive than any other type of telescope. Top-quality refractors are affordable by amateur astronomers in only the smallest sizes, up to about 6 or 7 inches or so, and even those are very expensive.

The foregoing comments about the high quality images from refractors do **not** apply to the most common refractors seen, which are the cheap 60mm department-store refractors sold by Tasco, Meade, and a few other makers. These are typically of poor optical quality, come with impressive-sounding but cheap accessories, and have mounts of such poor quality that every year many budding astronomers are frustrated right out of astronomy by trying to use them. Do not buy such a telescope, no matter how tempting it may seem. In fact, stay away from any telescope which touts very high magnification: Good

telescopes are not sold on the basis of magnification, and such claims are misleading in any case.

**Reflectors** gather light with a focusing mirror instead of a lens. (For reflectors this main mirror is known as the objective, which corresponds to the main lens in a refractor.) Because a mirror requires less exotic materials and is much easier to make than a lens, reflectors can be much less expensive than equal-sized refractors. Most reflectors you'll see have the eyepiece opening on the side of the tube almost at the top of the telescope, a design known as the *Newtonian* reflector (named after Isaac Newton, who invented it).

The big difference in cost means that for the price of a 4-inch refractor you can usually buy a 8-inch, 12-inch or even larger reflector. That's a big difference in aperture, and there is no denying that such a medium-to-large reflector will gather much more light and therefore make visible many objects which the 4-inch refractor cannot see. But there's a trade-off: Some reflectors don't have the razor-sharp images of the best refractors. Also, while buying a larger reflector for the same money is good deal optically, but keep in mind that you are also buying a telescope which is quite a bit larger and heavier. An 8- or 10-inch reflector will typically be several times as large and heavy as a the 4-inch refractor and therefore that much harder to transport and set up.

Another consideration with Newtonian reflectors is that they occasionally (sometimes frequently) need adjustments to their optical alignment. This is a fairly straightforward procedure anyone can learn, but it's a nuisance which refractors almost never need.

*Catadioptrics* are a combination of the reflector and refractor, sort of. They have a main mirror like a Newtonian reflector, but also have a thin lens in front. However, the thin lens (known as a *corrector plate*) isn't used for light-gathering as in a refractor, but to correct for the inherent optical distortions of the main mirror.

The most common type of catadioptric telescope is known as the Schmidt-Cassegrain, or SCT (**S**chmidt-**C**assegrain **T**elescope) for short. A similar type is known as the Maksutov-Cassegrain, a more expensive type which offers generally sharper images. Both are characterized by short-fat tubes with a very thin lens at the front, a mirror in the back, and the eyepiece opening in the back, like a refractor.

Catadioptrics, particularly Schmidt-Cassegrains, are very popular telescopes, probably the most popular amateur scopes today. Though perhaps not the best at any one thing, they offer a good combination of features: good images, moderate prices for the aperture, and a very compact form factor, which makes them much easier to transport than an equivalent Newtonian. Schmidt-Cassegrains are the bread and butter of major telescope manufacturers such as Meade and Celestron, and you'll see ads for them in all the astronomy magazines.

## Some recommendations

So what should you get? There is no one answer for

everyone, but I'll make some recommendations based on price range.

Under \$350: Unfortunately, at this price there are no brand-new telescopes which you'll find very useful for astronomy. This is the price range of the cheap department-store telescopes, and you really should avoid those. If you don't have a good pair of astronomical binoculars, you'd be better off buying the binoculars. Binoculars are very useful astronomical instruments which you never outgrow; if you're looking at the low end of telescopes you should really acquire some good binoculars first.

There are, however, a couple of ways to acquire a good telescope for less than \$350: build one, or buy one used. Building a simple Newtonian telescope is fairly easy and yields an instrument as good as any you can buy. Many books are available on building telescopes, and it's something to consider if you are reasonably handy with simple tools and are willing to expend time instead of dollars.

Buying a used scope is even simpler. Astronomy shops often have used scopes, and there are two national sources of used scopes: *The Starry Messenger* (a national newspaper of astronomy ads, phone 201-992-6865) and, if you have access to the Internet, Astromart (<http://www.astromart.com>). Good bargains are available on both, but shop carefully and get second opinions on anything you propose to buy. Many of the scopes in the \$350 to \$600 range when new are available for less than \$350 used, so consider those listed below and shop for the used.

\$350 – \$600: Within this range are many good telescopes. Probably the best bargains in this range are the 6-inch and 8-inch Newtonian reflectors from Meade, Celestron, Orion, and others. These simple Newtonians are on *Dobsonian* mounts, simple but effective wooden mounts which are very easy to use. If your finances can afford it go with the 8" models; they offer significantly more capability than the 6" models.

Within this price range you'll also find several 80mm (3.1") and 90mm (3.5") refractors from Meade, Celestron, and others. While not the latest apochromatic designs, these are generally good refractors which offer a lot of capability. Beware, however, of their mounts: many of these refractors come with poor-quality mounts which make them wobbly and difficult to use. At this price range, avoid equatorial mounts (mounts which can automatically track stars across the sky); inexpensive equatorial mounts are of such poor quality that you'll be better off with a simple altazimuth mount (the kind that moves up/down/left/right, like a photo tripod). If you buy one of these scopes be sure you get a money-back guarantee; if the images are poor or the mount wobbly, take it back without hesitation. In fact, that's probably good advice for any scope you buy.

There are also a few small catadioptrics in this price range. A standout value under \$600 is the Meade ETX, a 90mm Maksutov-Cassegrain which is so popular that

the biggest problem you'll have is finding one to buy. It comes with a fairly good small equatorial mount which is a bit awkward to use on a tripod, but is nevertheless a nice feature at this price.

\$600 – \$1,000: In this price range you'll find some truly high-quality instruments. Among refractors you'll find the Tele Vue Ranger, a 70mm "semi-apochromatic" refractor which offers superb images in an amazingly small and portable package. The Ranger does not come with a mount, but can be used on any good photo tripod.

For under \$1,000 you'll also find some very capable 10-inch and even 12-inch Newtonian reflectors on Dobsonian mounts. These are serious instruments, capable of serious deep-sky exploration as well as very good lunar and planetary views. With such an instrument you may never need anything else. Keep in mind, however, that these are physically large telescopes. A 12" reflector will typically be over five feet long and weigh close to 100 lbs—quite a load to tote even into the back yard, not to mention a remote site. Many such hefty scopes end up gathering dust as their owners swear they get heavier and heavier over time.

Some of the Newtonians Meade sells on simple Dobsonian mounts are also available on equatorial mounts with clock drives for under \$1,000. The equatorial mount is a trade-off: it's more awkward and complex than the Dobsonian mount, takes much longer to set up, and for the same price you'll get a larger scope on a Dobsonian mount. The equatorial makes it easier to keep objects in the field of view at high power and (with some extra accessories) you can use the Meade equatorials for limited deep-sky photography. Given the choice I'd go for a larger scope on a Dobsonian mount. In my view the equatorial mount is a needless complexity for most visual uses, and if you really get into astrophotography you'll probably want a better equatorial mount than what comes with these scopes.

You'll see some 8" Schmidt-Cassegrain telescopes advertised for less than \$1,000, but make sure you know what you're getting at that price. The Meade LX-10, for instance, is advertised for \$995, but that price does not include a tripod, and this is not a scope one can use without a tripod. The Celestar 8 from Celestron does include a good field tripod and equatorial drive system, and overall is a very good package for the price.

Over \$1,000 you'll find wonderful telescopes of every kind, but if you're considering a scope in this range you should read and research a lot more than just reading this column. (In fact, you should do more reading and research on anything you're considering; this column is only intended to get you started.)

Whatever you're considering, keep in mind that, above all else, the most effective scope is the one you'll use most. Buying the largest, most complex scope you can afford will quite possibly lead to a scope which is so heavy, awkward, and a pain to set up that it mostly gathers dust. If you have a half-hour to do some observing, you will not want to use a scope that takes a half-hour to set

up. No matter how much you get into astronomy and telescopes someday, you'll always need a "quickie" scope that can be up and observing in five minutes or less, and you'll probably find that scope gets more use than any other. If you're just starting out, think about getting such a scope as your first scope and you'll have a scope that will serve you for life. *That's* what makes a truly good buy, and that's what you should strive for when you shop for your new scope.

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# Steward Observatory Mirror Lab Open House

Sometime in January  
Sign-up Now

The Stewart Observatory is within months of melting glass in spin-casting their first 8.4-meter mirror. The expectation is that the mirror lab will hold an open house for this event sometime in January (we should know more the closer it gets.) As this is an engineering work, it's possible that the event could be delay weeks or months if problems arise. Whatever the date, I will keep you informed.

If you think you might want to attend, please send me your name and address to me, as well as the names anyone else in your party. You need to register in advance if you wish to attend. When I know for sure when the event will take place, I will mail out postcards with a map and date. This will hopefully take place more than a week before the open house. You will have to make your own arrangement for transportation (it's in Tucson at the university).

Last time, for the second 6.5-meter mirror, it took place mid-week and they were grinding on the first mirror during the day. Currently, they are still working on that mirror. Be sure to bring your cameras. —*Paul Dickson*

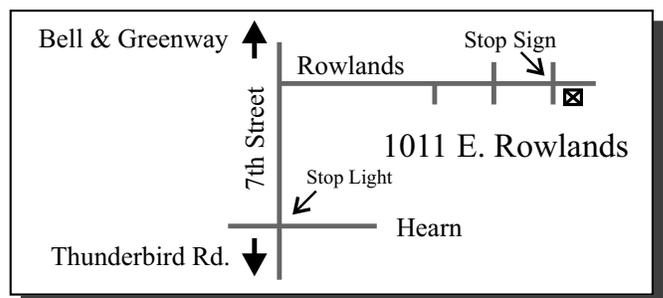
# December 1996

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday				
1	Last Quarter Moon 10:08 P.M.	2	3	PAS Meeting Brophy Prep. Physics Lab	TAAA Meeting (Tucson)	SAC Star Party Buckeye Hills (members&guests)				
Edwin Hubble born 1889	8	9	New Moon 9:56 A.M.	EVAC Meeting (SCC: Rm. PS172)	11	Geminid Meteors Peak: 9 A.M. Z.H.R. 110	SAC Party (See Below)	14		
Mercury at greatest elongation 20.5° (evening)	15	16	First Quarter Moon 2:32 A.M.	Yesterday Sun enters Sagittarius 3 P.M.	18	Galileo flies by Europa at 695km	19	20	Winter Solstice 7:07 A.M.	21
22	23	24	Full Moon 1:41 P.M.	25	26	27	28			
29	30	31	All Times are Mountain Standard Time							

## SAC End-Of-Year Party Saturday, December 14, 7:30

The SAC Christmas party will be held on Saturday, Dec. 14 at 7:00 PM at the home of Steve Coe and Linda Ross. It will be a catered buffet with a cost of \$10 per person. Spaghetti, Lasagne, salad, bread, soda, wine and cake will be provided from the Olive Garden restaurant. We will need some tables and chairs, please bring any you may have available.

Please send the money in advance to Steve at 1011 E. Rowlands Lane, Phoenix, AZ 85022. Make checks payable to Steve Coe.



To get to the party, get to the corner of 7th Street and Thunderbird Road. From there go north, through the light at Hearn and take the next right turn which is Rowlands Lane. The house is 1011 E. Rowlands, on the right hand side after the stop sign. See you there.

## Saguaro Astronomy Club Member Services Form

### Membership

Memberships are for the calendar year and are prorated as follows: Jan - Mar 100%, Apr - Jun 75%, Jul - Sep 50%, Oct - Dec 25%.

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

### Subscriptions

The following magazines are available to members. Subscribe or renew by paying the club treasurer. You will receive the discounted club rate only by allowing the club treasurer to renew your subscription.

- Sky & Telescope.....\$27.00 for one year
- Astronomy.....\$20.00 for one year

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

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

David Fredericksen  
SAC Secretary  
6222 W Desert Hills Dr  
Glendale AZ 85304

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

**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. See inside for a map to the meeting location.

#### 1996 SAC Meetings

Jul. 26  
Aug. 30  
Sep. 27  
Oct. 25  
Nov. 22  
Dec. 14 Party

#### 1997 SAC Meetings

Jan. 24  
Feb. 21  
Mar. 21  
Apr. 25  
May 16  
Jun. 20

#### 1996 SAC Star Parties

Date	Sunset	Moonrise
Jul. 6	7:43PM	11:57PM
Aug. 10	7:16PM	4:46AM
Sep. 7	6:43PM	2:26AM
Oct. 5	6:06PM	1:11AM
Nov. 2	5:35PM	11:54PM
Dec. 7	5:21PM	5:02AM

#### 1997 SAC Star Parties

Date	Sunset	Moonrise
Jan. 4	5:37PM	3:50AM
Feb. 1	6:03PM	2:35AM
Mar. 1	6:28PM	1:23AM
May 31	7:34PM	3:01AM
Jun. 7	7:44PM	1:43AM

## SACNEWS

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

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**Christmas Party — Dec 14**