



Sacnews

Issue 280

July 2000

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Inside this issue:

Astronomy 101	1
Stone Mountain Marathon	3
Fuzzy Spot	4-5
Double Vision	6
Calendar of Events	7
Aurora Phoenicia: Lunar Photos from Downtown	8-9
SAC & SETI	10

Astronomy 101 Stuff You Don't Want to Learn the Hard Way

By Rick Tejera

This will be the first of a series of articles aimed at the beginner. I could go on about the different types of telescopes and the basics of celestial motion yada yada, but that's been done to death. Instead, I plan to let you in the stuff I learned the hard way. If you're new to astronomy settle on in and laugh at me (most of have probably had some practice there!), if you're an old vet take a walk on the nostalgia highway.

Stuff You Don't Know You Need Till You Need It

You finally got that 8' telescope you've been drooling over and you're ready to show it first light. You carefully place it in the car make sure you have the eyepiece, and head out 60 miles to Flat Iron. You get out there and set it up and at twilight try to grab that first look at Venus low on the horizon. You now have come to the realization that a chair would be pretty darn convenient about now. My first light was spent kneeling and stooping over. Needless to say I wasn't very comfortable. A good observing chair is just as important as the telescope itself. Will any

chair do? Maybe but like everything else in life, some are better than others. You can spend nothing or up to about \$160.00 depending on budget and need. Things to consider: can you reach the eyepiece when the scope is pointing at the zenith (more important for dobs)? Is it readily portable? Does it take an engineering degree to set up? How easy is it to adjust the height. How long will it delay purchase of that new eyepiece? Does your butt hurt the next day? These questions should all be answered before plunking down your money. As for me I made my own from plans found on the Internet. It is similar in design to the \$160.00 adjustable chair in the Orion catalogue and cost me less than \$30.00 in materials and an evening of time to make. (I'll include the site at the end of the article).

So you get an observers chair. Next month you pack the telescope and the chair. You get out there and ask yourself: Where the heck is M1?? Wouldn't a good star atlas be useful right about now???

(Continued on page 2)

(Continued from page 1)

Here the choices aren't as clear-cut. Atlases range from simple planispheres to tomes the size and heft of a set of encyclopedias. What choice should you make? For the beginner the best advise is the KISS principle, keep it simple Silly. A good choice for the beginner is The Cambridge Star Atlas, by Wil Tirion. It is pretty small yet covers the entire sky. The deep sky objects it contains should get you through the Messier and Sac 110 lists with ease. Most important, it shows the constellation outlines. Most advanced atlases like Sky Atlas and Uranometria don't show these. It's tough enough trying to find the constellations in the sky with the outlines drawn let alone without them, at least till you learn the sky a bit better. Another advantage of the CSA is it is inexpensive, about \$20.00-\$25.00 depending on where you look. I also carry Orion's Deep-map600, which folds up to the size of a road map. I like this for general finding, as it is primarily a deep sky object map. Showing only the brightest stars (down to Mag 6, I believe), the deep sky objects are easy to locate in relation to the constellations. I then use my other charts to refine my search, but that's another article.

Ok, NEXT month you load up the telescope, pack up the chair and toss the atlas in the right seat and head out. You set up the scope, put out the chair open the atlas to Taurus and find M1. You the go and put the book down on your table. After the cloud of dust settles you bend over and pick the atlas off the ground, dust it off and give yet another Homer Simpson "DOH!" Yep, a table of some sort sure helps to keep your stuff organized. Once again you can go for the simple to the elaborate. I use a \$25.00 card table from Wal-Mart (comes in handy at parties too, just remember to clean off the dust!). There are tables that roll up into nice neat bundles and I've even seen old end tables pressed into service. If you're handy, you can probably fashion something pretty

fancy for a few bucks. Just remember, the idea is to keep it light and compact enough to transport. Observing with a hernia can't be fun.

OK, finally you load up the scope, pack up the chair and table, toss the atlas in the right seat and off you go. You set up the scope, put out the table and chair, grab the atlas and go to find M1. It's been so long getting all this stuff that summer's gone and it's already dark, After trying to find M1 on the atlas using the LED on your watch, you decide you really do need that flashlight. You are smart enough not to go to the car and get that 500 candle power camping lantern, so the next morning you go to Wal-Mart and look for a red flashlight. I found a camper light with colored lenses there. It works fairly well. The Orion catalogue has a variety of astronomers' lights at a variety of prices. It's all a matter of how fancy you want to get. My wife gave me a pen with a red tip that lights that I think is really cool. I also made a light out of a small plastic flashlight by using the wrapper from a bag of candy hearts. I cut it out and placed it over the lens. Works real fine. A bit bright for use at the scope but good for finding your way out to the bushes when nature calls. (You did remember the roll of toilet paper, didn't you? Trust me on this, you'll only forget that only one once!!!).

By the way M1 is just above the southern horn of the Bull in Taurus. Clear Skies.

(ed. Note: Here are the addresses of the places I've mentioned in this article:

Observers Seat:

<http://www.du.edu/~pryan/seat.html>

Orion Telescope: [www. Orientel.com](http://www.Orientel.com).

And don't forget, all the above, except the Observers Seat plans, can be had locally at the Astronomy Shoppe. Support your local Merchants!!!

Stone Mountain Marathon

By Steve Dodder

With a cutoff low-pressure weather system hanging over central Phoenix all week, the marathon for 2000 threatened to be a wash. Right up until it was time to leave, the emails were flying; people were scrambling in search of "official" status and looking for clear skies. With the coordinator announcing he wasn't attending, I figured I'd just run the marathon from my own Stone Haven Observatory, in Maricopa, AZ, 32° 55' N lat., 112° 9' W. lon, elev. 1408'.

In attendance was Jim Deck, another SAC (Saguaro Astronomy Club) member. He used his 8" Dob and I used my trusty C8. The evening started off with clouds to the NW, effectively eliminating the possibility of seeing all 110 objects. M31, 32, 110, 76, 52, 33 and 103 were all obscured, with M74 and 77 being difficult, if not impossible in the twilight. We also intended to view all 9 planets on this night. I had been monitoring the progress of Pluto all week, with marginal success, due to the weather, but managed to see it at least twice during the week, the last time on Saturday morning at 1:30 AM MST. Mars, Jupiter and Saturn were close together and easy naked eye before twilight, but I turned the scope on them in turn anyway. Always a nice view. Jupiter had Ganymede and Europa on the east and Io and Calisto on the west.

Starting with M34, our marathon went fairly smoothly. Jim is a novice, but did exceptionally well, bagging objects all over the sky, seemingly without difficulty. He attributes this to preparation and good finder charts, which isn't surprising. Some clouds rolled in around the time we were viewing Cancer and Leo, so we took a little break. It was interesting because most of the sky was obscured, but Leo was nicely framed. Not that you could see the galaxies there, but the stars were nice.

After it cleared again we proceeded through the Virgo cluster without a pause. Once again, Jim proved that the key is preparation—he bagged them all on his first "run" through the area and only asked for confirmation twice. "Is this M87 or 89?" Well done! We completed this area by around 9:30, so had to cool our heels for some time before the rest came up.

Got back to it sometime after midnight. I monitored the field of Pluto, waiting for the seeing to clear. Finally, around 3 AM, it was detected, just popping in and out along with several stars around 14th magnitude, Pluto being 13.8, according to Earth Centered Universe S/W.

The night stayed very nice, seeing-wise for the rest of the night. It was very clear, very transparent, but a little murky close to the horizons. As short breaks in action occurred waiting for objects to rise, I took opportunities to find Neptune and Uranus. Both were discovered around 4:50 AM. Neptune was decidedly blue and barely showed its disk at 112X. Uranus shows a wonderful green shade and seemed bright by comparison.

The last 3 objects, M72, 73 and 30 were difficult because they were very low, but we both found them with patience and perseverance. M73 always surprises me with how small it is.

I decided to go inside to check on when Venus and Mercury would rise and as I left, I noticed Cassiopeia rising through the Phoenix sky glow. When I came out, Jim was fervently searching for some of the objects we'd missed earlier! Great idea! I went to work looking for M31, found the group and sent my total up to 104. Jim found M52 and 103, bringing his total to 102.

(Continued on page 10)

Fuzzy Spot, Hercules

By Ken Reeves

Hercules, the demigod or strongman, is the offspring of the great Zeus and the mortal Alcmene. As a result of this affair, Zeus' wife, Hera, resolved to make Hercules' life miserable by casting him under a spell of madness. During this time, he committed the crime for which he was condemned to perform the Twelve Labors.

Many try to make the connection of the 12 signs of the zodiac with the Twelve Labors, but this is incorrect as both were developed independently. Likewise, there is no connection with Hercules and Gilgamesh of the Babylonian time, as Hercules was created much later during the Greek time period.

Hercules is well populated with galaxies, but with its position closer to the summer Milky Way than Virgo, planetary nebulae, globular clusters, and even a few sparse open clusters are present. In fact, the most famous object in the constellation is M-13, the great globular cluster. M-92, though not as spectacular or famous as its cousin, is a beauty in its own right.

NGC 6058 (16h04.4 +40 41): Our first object this month is a planetary nebula. I saw it as pretty faint, pretty small, round, and sitting in the middle of a triangle of stars. There is possibly a star involved on the E end. It does respond somewhat to the UHC filter, and using averted vision helps a little. The central star was suspected with a dark area around it.

NGC 6166 (16h28.7 +39 34): This very faint galaxy, which is not plotted on Sky Atlas 2000, sits in a small half-circle of stars. It is faint enough that I couldn't make out any detail in the 10" scope. In larger aperture scopes, many faint companion galaxies can be glimpsed.

NGC 6205 (16h41.7 +36 28): M-13 is a beauty, whether you look at it through binoculars, in a small scope, or in a large light bucket. I have always liked the way it looks in binoculars with the 2 neighbor stars. In the city, I often think binoculars do it more justice than a scope does. In the 10" scope, it is very bright, very large, with 5 strings noticed. Many, many stars are observed and using averted vision brings out tons more. I esti-

mated 100 stars with direct vision. The very granular haze is evenly round, brightening up quite a bit to the middle.

NGC 6207 (16h43.1 +36 50): This galaxy is a neighbor to M-13. At 140X, I saw it as somewhat small, somewhat faint, very elongated NE/SW, and containing a very definite sub-stellar nucleus. Using averted vision made it grow quite a bit. If you want a real tough object, look for IC-4617 about halfway between M-13 and 6207. It sits right next to a faint parallelogram of stars. I could not find it in the 10" scope, but did spot it in the 20" scope with averted vision.

NGC 6210 (16h44.5 +23 49): This planetary was observed at 350X as pretty small, pretty bright, elongated E/W with a very definite blue tinge to it. The halo is subtle at best. The UHC filter brings out the halo only slightly, add averted vision to this and the object grows quite a bit.

NGC 6229 (16h47.0 +47 32): Forming a nice triangle with 2 bright stars, this globular cluster is somewhat small, fairly bright, round, and brighter towards the middle. I couldn't resolve any stars, but the background is grainy. Increasing the power to 250X and using averted vision possibly resolves a few stars around the edge.

NGC 6239 (16h50.1 +42 43): This faint and pretty small galaxy is elongated 2:1 NW/SE and has a very faint halo, which slowly brightens up to the middle. Using averted vision helps bring out the galaxy a little.

NGC 6341 (17h17.1 +43 08): The final object of the night is globular cluster M-92. It is pretty large, pretty bright, with 5 nice strings of stars. Unlike most globular clusters, this one is slightly elongated N/S. The granular halo gradually brightens up to a bright middle. There are many stars resolved over both halo and middle, estimating 100 stars with direct vision.

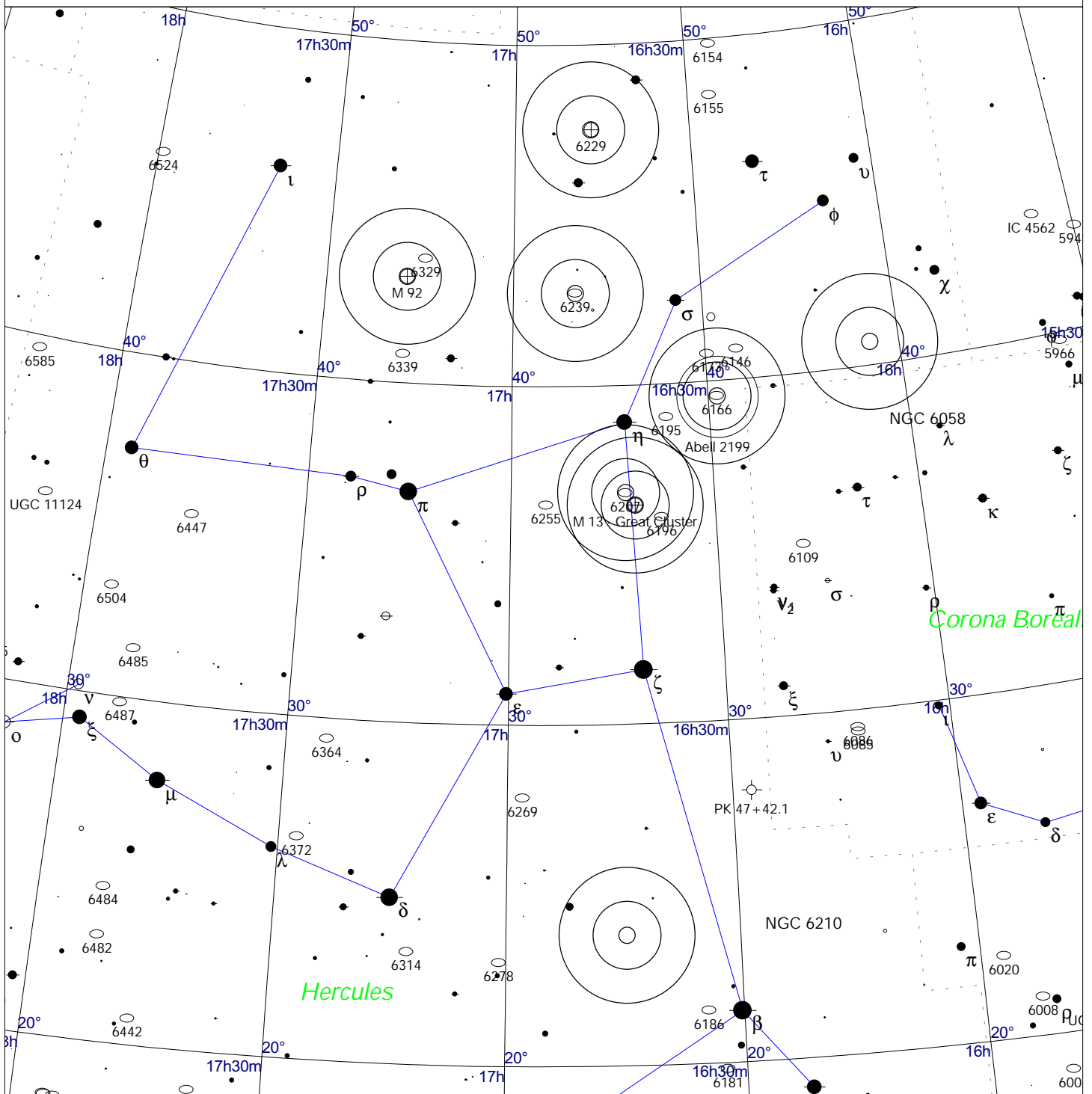
Herschel 400 Objects

6207, 6210

SAC's 110 Best of the NGC Objects

6207, 6229

Fuzzy Spot Hercules



<p>STARS</p> <ul style="list-style-type: none"> ● <math><3</math> ● 5.5 ● 3.5 ● 6 ● 4 ● >6.5 ● 4.5 ● 5 	<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☉ Galaxy □ Bright nebula ☉ Dark nebula ⊕ Globular cluster ○ Open cluster ☉ Planetary nebula ☉ Quasar △ Radio source × X-ray source ○ Other object 	<p>Limiting magnitude: Stellar: 6.5, Deep Sky: 13.0</p>
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Local Time: 22:19:01 7-Jun-2000

UTC: 05:19:01 8-Jun-2000

Sidereal Time: 14:55:20

Location: 33° 39' 56" N 112° 49' 10" W RA: 16h55m12s Dec: +35° 07' Field: 32.0°

Julian Day: 2451703.7215

Seeing Double

By Thad Robosson

Welcome to the June edition of Seeing Double. The first thing I'd like to bring up is resources. Most atlases are resources in themselves. Even Sky Atlas has known doubles above a certain magnitude specially marked as double. All that's left is to find out what the stats are. Enter Sky Catalog, Volume 2. Just by knowing the coordinates of a double, you can look up it's numbers in this book. An hour or two of browsing through Sky Catalog is sure to have at least a moderate list in your hands. And in today's computer age, no astronomer should be lacking for ways to create an observing list, especially double stars. Nearly every sky charting software has data on most doubles. And if that isn't enough, log on in to the US Navy's Washington Double Star Catalog. You and your computer will have plenty of data to sift through. There are also groups, like the 33 Doubles discussion group, that can provide one with ideas. (The 33 Doubles group is a loose, fun forum that can often go off on tangents, like J.R.R. Tolkien, or eye-pieces, or computer programming, but nonetheless is a wonderfully colorful collection of talent and is a cornucopia of ideas for lists and projects.)

Now before you can use the stats and make a list, you need to know what it is you're trying to observe. In the case of doubles, you'll need to know if it will be do-able from your location. To help you discover these limits, I propose some easy projects that you can do every time you do some observing:

1) Keep a log of conditions when you observe.

Learn how to determine limiting magnitude and rate seeing.

2) Make a list of close doubles, observe, and find out how far down you can split. Make notes relating to the conditions....The one you split yesterday may not split tomorrow.

3) Make a list of faint doubles, observe, and make notes relating to the conditions.

Do this for a while, and you'll get a good feel for what you "should" be able to see in the sky that night. It also let's you know if any given double is worth trying for. Here's a partial list from the 33 Doubles group for Hercules, well placed for evening viewing.

Name	RA 2000	Decl 2000	M/1	M/2	Sep	PA
Alpha Her	17 15	+14 23	3.5	5.4/11.1	5.0/81.0	105/39
OS 358	18 36	+16 59	6.2	7.2/?	1.6/201	158/234
Rho Her	17 24	+37 09	4.1	5.6	4	318
95 Her	18 02	+21 36	5.0	5.1	6	257
STF 2085	16 42	+21 36	7.2	8.8	6	313
100 Her	18 08	+26 06	5.9	6.0/?	15.0/?	183/?
OS 346	18 15	+19 46	7.9	9	5	329
STF 2213	17 45	+31 08	7.7	8.5	5	326
STF 2232	17 50	+25 17	6.6	8.3	6	141

If you would like to discuss observations, techniques, or need a link to some of the sites I mentioned in this article, feel free to contact me at: tmrob@primenet.com.

July 2000

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Schedule of Events for July 2000

- July 3rd** Earth at apahelion, 94.5 million miles from the Sun.
- July 4th** Carl Sagan Station established on Mars by the Pathfinder probe and Soujourner rover in 1997.
- July 6th** Mercury at inferior conjunction.
- July 8th** Moon at first quarter, 0553 mst.
- July 9th** Voyager 2 passes Jupiter at 443,750 miles. 1979
- July 14th** **SAC General Meeting. 1930 at Grand Canyon University.**
Guest speaker Amanda Bosch will speak about Ring Structures
- July 16th** Full Moon at 0655 mst.
- July 17th** Birth of Geoges Lemaitre, Belgian priest and mathematician. His work led to what we now call the Big Bang theory of the origin of the universe,. 1894. He died in 1966.
- July 19th** Apollo 11 lunar module "Eagle" lands in Mare Tranquillitatus. Neil Armstrong becomes the first human to set foot on another world early on the morning of the 20th, 1969.
- July 22nd** **SAC Star party at Flat Iron Mountain site.** Sunset 1937, Ast. Twilight ends 2114, Moonrise 2329.
- July 24th** Moon at last quarter, 0402 mst
- July 25th** Comet LINEAR at Perihelion, 71.1 million miles from the Sun.
- July 27th** Southern Delta Aquarid Meteor Shower peaks.
- July 30th** Moon is new, 0725 mst

Aurora Phoenicia

Moon Photos by Alan G. Toleman

How to take good moon photos in "Aurora Phoenicia" on purpose? This is a valid question. Since I retired, and am new to astrophotography, I have learned a few valuable things about moon photography in almost-downtown Phoenix (36th St. and Camelback Rd.) conditions. I use a 10-inch Meade deep sky telescope with 1/16th wave on the primary, and 1/20th wave on the secondary, mirrors. My photography equipment is an Olympus OM-IN 35mm camera with mechanical mirror lock-up and three 2X-teleconverters for eyepieces. Although the teleconverters have 7-lens elements each, I like them because they are made for the camera and work very well. Next I fabricated a cardboard end cap with a 4-inch iris diaphragm, to control the amount of light from the moon. The moon is bright, bright,

and bright. I stop the iris diaphragm down to about a 2.5-inch opening. This size opening usually gives the best contrast and resolution. I do not use a moon filter with this set up as it gives a soft focus. Atmospheric disturbances at high power are problems that are best handled by using ASA400 or ASA800 speed films. These high-speed films allow fast shutter speeds to be used for sharper photos. I spend about 10 to 15 minutes determining the best focus for the atmospheric "shimmering" of the evening. I then mentally count the "in-focus" periods, lock up the mirror, let all vibrations dampen out, and trigger the camera shutter on one of the "in-focus" counts. With any luck at all, you will get a pretty good photo of the moon.



Photo 1



Photo 2



See Captions on next page



Photo 3



Photo 4



Photo Captions

Photo 1: Mare Crisium, Mare Tranquillitatis, Mare Fecunditatis and Mare Serenitatis. The area between Mare Crisium and Mare Tranquillitatis is Palus Somni, the bright crater is Proclus. Taken 4/13/00 with two 2x teleconverters.

Photo 2: In addition to the Maria in the Photo 1, we see Mare Nectaris. The crater below Tycho is Clavius. Taken 4/12/00 with one 2x teleconverter. (ed note: I've always seen the eastern maria as forming the outline of a soccer player kicking Mare Crisium into space. Do you see it? Add this to the Lunar list??)

Photo 3: Crater Archimedes, Autolycus and Aristilus in Mare Imbrium. The Montes Alp (lunar Alps are to the north (up), Crater Plato is just barely visible at the terminator at the end of Montes Alps chain.

Photo 4: Craters Clavius, Blancanus, Scheiner, Longomontanus, Maginus and Tycho. The crater at the rim of Clavius is Rutherford, Mare Nubium is to the north (up). Taken 4/13/00 using three 2x teleconverters.

Thank you Alan for sharing your work with us.

SAC & Seti@Home

By Paul Dickson

Eight SAC members have been contributing processing time to the Seti@Home project. Below are the current statistics from midnight of December 31st. The Seti@Home project is now completing its first phase and about to begin its second phase. During the first phase, the data recorded from Arecibo from December 1998 through May 1999 was analyzed generating a database of 100 million signals. The second phase will start soon looking for "repeat" signals while rejecting man-made interference. If you wish to contribute to Seti@Home, see their website:

<http://setiathome.ssl.berkeley.edu/>. To find SAC's current members' standings look for "Saguaro Astronomy Club" under groups.

Performance tip: The graphical display while the program is running is very pretty, but it eats up a lot of CPU time. The best way to get the most performance from your machine is to download the software for Windows NT text version. This software will run even on Windows 95 machines.

Saguaro Astronomy Club Seti@home Standings

	Name	Results Receive	Total CPU Time	Ave. CPU per Work Unit
1	Paul Dickson	1184	1.87 yrs	13 hr 50 min 34.9 sec
2	Steve Dodder	224	6361 Hr 42 min.	28 hr 24 min 01.9 sec
3	Craig & Robyn Thompson	215	1.08 yrs	43 hr 55 min 45.0 sec
4	John McGrath	207	7678 Hr 14 min.	37 hr 05 min 34.7 sec
5	Joe Goss	193	3369 Hr 6 min.	17 hr 27 min 23.4 sec
6	Adam Sunshine	137	4956 hr 26 min.	36 hr 10 min 42.1 sec
7	Ken Reeves	52	2844 hr 31 min	54 hr 42 min 08.2 sec
8	Adam Baird	12	918 hr 21 min.	76 hr 31 min 49.2 sec

Current as of June 6th, 2000

(Continued from page 3)

Mercury rose at 5:14 and was detected just above a beautiful new moon at around 5:30. Venus followed shortly at nearly 6:00. The moon was remarkable; the bottom of the cres-

cent was distorted by the atmosphere, making the sphere resemble the Greek letter Zeta.

An excellent night, after all!

SAC Membership Services

Membership

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

- \$ 28.00 Individual Membership
- \$ 42.00 Family Membership (one newsletter)
- \$100.00 Business Membership (includes advertising)
- \$ 14.00 Newsletter only
- \$ 4.00 Nametag for Members

Subscription Services

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.

- \$ 30.00/yr Sky & Telescope
- \$ 29.00/yr Astronomy

Please Print

Name: _____

Address: _____

Phone: _____

E-mail: _____

Make Checks Payable to SAC

Mail Completed form to:

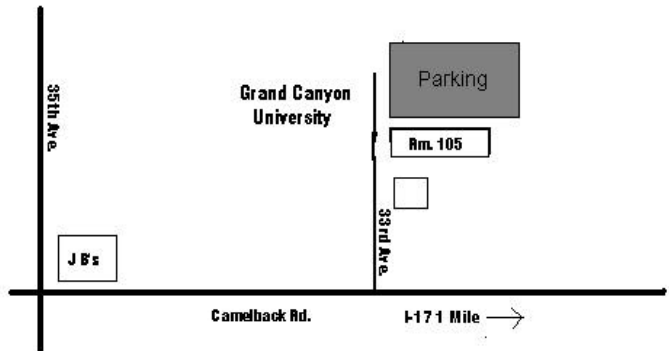
Peggy Kain
SAC Treasurer
P.O. Box 30424
Phoenix, AZ 85046-0424

Directions to SAC Events

General Meetings →

7:30 p.m. at Grand Canyon University, Fleming Building, Room 105: 1 mile west of I-17 on Camelback Rd., North on 33rd Ave., Second building on the right. Note: The I-17 exit at Camelback Will be Closed through October due to construction. Use either Indian School or Bethany Home Rd. Exits.

Flatiron Star Parties



SAGUARO ASTRONOMY CLUB

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Videmus Stellae

[www. Saguaroastro.org](http://www.Saguaroastro.org)

SAC Schedule of Events

SAC Meetings

January 21, 2000	July 14, 2000
Feb 18, 2000	August 11, 2000
March 17, 2000	September 15, 2000
April 14, 2000	October 13, 2000
May 19, 2000	November 10, 2000
Jun 16, 2000	December 9, 2000 (Holiday Party)

Deep Sky Group Meetings

February 24, 2000	August 17, 2000
April 20, 2000	October 19, 2000
June 22, 2000	December 14, 2000

SAC Star Parties

Date	Sunset	Astronomical Twilight Ends	Moonrise
1/29	1759	1924	0245
2/26	1824	1947	0131
3/25	1846	2010	2320
4/22	1907	2036	2350
5/27	1932	2111	0224
6/24	1944	2126	0056
7/22	1937	2114	2329
8/19	1911	2040	2204
9/23	1825	1948	0244
10/21	1750	1912	0141
11/18	1727	1853	0039
12/16	1725	1854	2336