



Sacnews

Issue 278

June 2000

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Reflections

The Sentinel Schwaar Star Gaze

By AJ Crayon

The Sentinel Star Gaze was re-named to Sentinel Schwaar Star Gaze in dedication to long time friend, astronomer, optician and telescope maker Pierre Schwarr. This years event took place on Friday, April 28th and Saturday, April 29th. I was determined to attend both nights as I had missed some important events because "I thought" the weather would be bad. In each of the three cases I was wrong. So I was determined to be there no matter what!

I motored to the site, arriving at 6:30pm on Friday expecting only a couple of observers that said they would be there. But when I arrived instead of the two or three vehicles expected, there were NINE! Of the nine five were from California. A quick round of introductions, while they were setting up two 14" SCTs, found four were named John, one being John Sherman who had been to this site many times before. To make the best of this trip their plans were to observe through Sunday night and return

home on Monday.

Some of the others already there and set up were Aaron McNeely, Steve Bell, Brian Workman and new SAC member Ken Sikes. All were waiting the wind to die down, the scattering of clouds to clear and sun to set. After setting up my telescope I predicted, to all, the wind and clouds would clear up for us. It did, but not until the next day! Guess I'm having a problem predicting the weather lately. Can this be a qualification for predicting the weather on television?

By twilight the number of vehicles had grown to 16 and the arrivals included Ken Reeves and Mark Forkum with their 22" telescopes, Paul Knauth and many others.

Observers with rather sturdy mounts were able to do some observing in the windy conditions but were forced to look at objects in the large sucker holes.

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Guess I'm having a problem predicting the weather lately. Can this be a qualification for predicting the weather on television?

The 2000 All-Arizona Messier Marathon

BY AJ Crayon

This years marathon the site southwest of Arizona City, Arizona was impacted by an unusual cut-off low pressure weather system which started several days before, producing periods of clouds and some scattered thunderstorms. With a last minute posting on an electronic mailing list the coordinator announced he would not be attending due to weather. Shortly thereafter Stan Gorodenski called on the phone to verify the port-a-jon was not going to be canceled. Only later did the humor of this sink in. Rain within a mile of my house convinced me the decision was correct and proper. None the less, those hearty soles that decided to take the risk; braving, clouds, cold damp weather including an early evening breeze, were rewarded with a nice marathon! Now I needed some towels to wipe egg off my face.

Jennifer Keller arrived at 4:30pm finding 3 Saguaro Astronomy Club (SAC) members present, not counting the honorary member Port A. Jon! And sunset wouldn't happen for another couple of hours.

At about 5pm Matt Spinelli arrived and found the count had grown to 7 people. While waiting for the marathon to start in earnest, Bob Davidson attached a solar filter to his 8 inch DOB, treating many to observing some nice sun spots. Stan also put a solar filter on his 1983 Riverside award winning scope for observers to also view the sun.

By sundown there were 22 people on site waiting; 11 from SAC, 7 from East Valley Astronomy Club (EVAC), 3 from Tucson Amateur Astronomical Association (TAAA), one from Yuma and one from Phoenix Astronomical Society (PAS).

By early evening, Jack "I'm going no matter

what" Jones counted 25 or so people and began to set up his newly purchased 4.5" reflector. He found out what some assembly required means. After assembly he and others were thankful for the clearing skies.

By 8pm there were 16 telescopes set up; the marathon, socializing and observing was getting underway. The clouds were all but gone and were not causing any problems; the breeze was beginning to dissipate encouraging everyone's spirits.

To their credit, those observers without the check off list made do with papers on hand.

The final standings are listed below; but as expected no one observed M74, it was on the horizon at 8:11pm, evening twilight, and below horizon at morning twilight. Rick Tejera planned a telrad hop from Mars hoping to find this elusive one. It didn't work; all he saw was the orangish twilight.

Many observers missed M32, M33 and M77. Bob Davidson and Mark Stephenson were the only ones who bagged M77. Bob, Paul Lind and Wayne Thomas, captured M30 around morning twilight. There were reports of wonderful views of the Whirlpool through Paul's telescope, not to mention the myriad of other spectacular views through all telescopes.

Congratulations to Bob Davidson, Paul Lind, Kevin Bays and Matt Spinelli for finishing first, second and third. Telescope plaques will be presented to these people, as well as certificates to those with 50 or more objects, at their next meeting.

Special congratulations are due to first time marathoners Brian Page with 82, Jennifer Kel-

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(Continued from page 1)

Giving up on deep sky objects during the early going I decided to do some double stars and was quite successful until trying to split Porrima, gamma Virginis. Its 1.8" separation was not split in the 8 inch - a testament to the observing conditions produced by the winds. By 10:30 I decided it was time to lay down and rest for a few hours. By then it was my hope the weather would improve. Getting up at 1:30am the clouds were gone. The wind was still with us but wasn't nearly as bad as earlier in the evening. It was just enough to do some summer Milky Way objects found on the 110 Beyond the NGC list. The small planetary nebula PK 3-4.7 in a rich field was very difficult to observe, but Cr 302 the Antares moving cluster at a whopping 8 degrees was very easy. The globular cluster Palomar 9, also known as NGC 6717, was easily found by nu-2 Sagittarii. The moon popped up around 3:30 and I spent an hour gabbing with those still up.

During the day Saturday the wind didn't seem to want to stop and we were visited by several dust devils. During the afternoon and in between gusts Brian Workman treated several of us to very nice array of sunspots. Just before sunset several of us spotted a spider web on my telescope - in all the wind!

The wind that was predicted to stop did so Saturday evening! By that time the count of vehicles got to 37. This includes several families with well behaved kids. Amongst the arri-

vals were members from SAC, EVAC, TAAA and PAS (Phoenix Astronomical Society), some of David Fredericksen's Phoenix College astronomy students and, again, many others.

While it is difficult to name all, I spent some time looking through several telescopes. Ken Reeves and myself got a chance to view pin point star images in omega Centauri and M51 through Mark Stephenson's 6-inch reflector. Viewed M104 in Jim Deck's 8 inch and several galaxies in Hydra in Brian's telescope.

As the evening progressed, the dust particles precipitated from the atmosphere and the skies got better and better. Unfortunately my goings on stopped around midnight and I called it quits. Many stayed up till all hours of the night and bragged the next morning about how much better the observing conditions turned out.

Sunday morning rolled around and as people got up they packed up and left the site. By the time I departed still there were Rick Rotramel, Kevin Bays from TAAA, Bernie Sanden, Diane Hope sipping a cup of tea and our friends from California. No doubt they got the better of observing conditions Sunday night.

There were many more in attendance, to numerous to mention and many whose names I didn't even know. A number of people came forward with thanks for putting on the star party, regardless of the weather.

Such A Deal

For Sale:

Unobstructed 8-in. reflector (Buchroeder Trischiefspiegler). The contrast of a refractor with no color distortion. Reputation in Tucson TAAA. Fork-mounted, Opticraft drive, Orion

Sky Wizard digital finder and catalog. *80mm optical finder, 7 eyepieces (including Televue Panoptic), 2-in. star diagonal, laser collimator, 8-in. glass solar filter. Over \$5000 in items alone for \$2500. Blair, (520) 474-0591.

Fuzzy Spot, Coma Berenices

By Ken Reeves

This is the time of year for galaxy observing, and Coma Berenices is one of the best constellations for galaxies. Although it is small in size, it contains many objects from the Virgo cluster of galaxies, and if that's not enough, there is the Coma Cluster of galaxies which although is much further than the Virgo cluster (and therefore much fainter), is much richer. In addition to galaxies, there are a few globular clusters, one of which is a Messier object. In all, Coma contains 8 Messier objects, 6 SAC 110 Best of the NGC objects, and 24 Herschel 400 objects.

So with this much to look at, let's jump right in.

NGC 4278 (12h20.2 +29 18): The first galaxy of the evening is somewhat bright, a little small, round, and has a halo with suspected mottling. The object evenly brightens up to the middle, which contains a prominent non-stellar nucleus. To the E is NGC 4283.

NGC 4382 (12h25.5 +18 12): This galaxy is M-85. At 100X, I saw it as pretty bright, pretty big, round and with a bright star to the SE and a star involved to the N. The middle is very bright and contains a non-stellar nucleus. Using averted vision makes the halo grow and shows some possible mottling. A clockwise spiral structure is suspected, but very uncertain.

NGC 4448 (12h28.2 +28 38): This edge on galaxy is somewhat bright, pretty large, and elongated 3:1 WNW/ESE. The halo slowly and slightly brightens toward the middle which contains a non-stellar nucleus. Averted vision makes the halo grow somewhat and may show some sort of mottling. There is a nice string of stars to the N. This object is easy to find next to Gamma.

NGC 4494 (12h31.3 +25 47): Here we have a galaxy, which is pretty bright, pretty small, and shows a slow and even brightening toward the middle with a non-stellar nucleus. There is little elongation if any at all, possibly 1.2:1 E/W. Averted vision makes the halo extend out quite a ways, and may show a star or stelling near the nucleus.

NGC 4559 (12h35.9 +27 58): I saw this galaxy as very large, a little faint, and elongated 3:1 NW/SE. There is a slow and slight brightening toward the middle with no nucleus seen. Averted vision does make the object extend quite a bit. The E side of the galaxy is cut off with some possible glow beyond this dark area. Three real nice stars are involved.

NGC 4565 (12h36.3 +26 00): Many people consider 4565 to be the premier object in Coma. I took some poetic liberties and considered this as a "super-duper object!" It is very bright, very large, and extremely elongated NW/SE. The middle is quite a bit brighter, but

contains no nucleus. The brightness drops off quickly on the SW side, probably a dark lane. To the NE of the galaxy is a star. Averted vision really makes halo stand out. This is an object you could just sit and stare at, it is better than many of the Messier galaxies.

NGC 4725 (12h50.4 +25 33): This galaxy is somewhat bright, very large, and elongated 2:1 ENE/WSW. It has a mottled halo which slightly brightens up to the middle and contains a very much brighter and prominent almost stellar nucleus. Using averted vision makes the halo more prominent and shows up the patchiness better.

NGC 5024 (13h12.9 +18 10): Let's take a break from galaxies and move on to the globular cluster M-53. I considered it as pretty big, fairly bright, and well resolved on the edges. There are several strings of stars heading away from the center, especially on the N side. The background is granular which brightens toward the middle. As with many globular clusters, using averted vision makes more stars pop out and makes the halo grow somewhat. I observed that the halo is flattened on the E.

NGC 5053 (13h16.4 +17 42): This is the companion to M-53, and other than both objects being globular clusters, there aren't many similarities. This is a BARF object (Big and real faint). I observed it as pretty large, very faint, very poor in stars, and very loose. About 10 stars pop out when observing with averted vision over a loose granular haze. No concentration toward the middle was noted.

Abel 1656 (12h59.8 +27 59): This is the great Coma Cluster of galaxies. The two brightest objects in the cluster are NGC 4889 and NGC 4874 which should be accessible to most scopes. In the 20" scope from Sentinel on a night I rated 7/10 for seeing and 8/10 for transparency, I drew 24 galaxies as well as two objects that were not galaxies (these turned out to be faint stars).

Herschel 400 Objects

4147, 4150, 4203, 4245, 4251, 4274, 4278, 4293, 4312, 4350, 4394, 4414, 4419, 4448, 4450,

4459, 4473, 4477, 4494, 4548, 4559, 4565, 4689, 4725

SAC's 110 Best of the NGC Objects

4274, 4414, 4494, 4559, 4565, 4725

COMET COMMENTS

By Don Machholz

More comets have been found by the SOHO satellite, while LINEAR has discovered a faint, small comet. No bright comets are in our sky again this month.

This is a slow time of the year, comet-wise. The comet that is expected to be the brightest of the year-Comet LINEAR (C/1999 S4)- is new to the solar system. This means it burned off tons of volatile material while far from the sun, giving the impression that it is a bright comet. It may brighten to only magnitude 5 or 6. Remember Comet Kohoutek!

We have a couple more comets that should be visible late in the year. Comet McNaught-Hartley (1999 T1) may approach magnitude 6 late this year, but it will be far south and within 70 degrees of the sun until then. Periodic Comet Encke will be briefly visible to each Hemisphere late in the year.

SOHO images revealed ten more comets in the past month. Five of them were from images taken in 1999. Nine are from the Kreutz family of sungrazers. Various people found these comets, among them are: M. Oates, D. Biesecker, A. Vourlidis, M. Meyer, T. Lovejoy, J. Shanklin, and K. Cernis.

The LINEAR program recently found a comet that may be of short period. Comet LINEAR (C/2000 G1) is presently only 30 million miles from us but at a faint magnitude 17. That's a small, faint comet!

COMET HUNTING NOTES: How many comets are discovered visually by amateurs each year? In the past 25 years there have been 81 visual discoveries, or 3.24 per year. From 1975 through 1984 there were 33 finds, with 34 comets from 1985 through 1994. The rate slowed a bit during the five years 1995-1999, with 14 finds, or 2.8 per year. It will be interesting to see how this will change in coming years with competition from the automated programs.

This is my last issue of Comet Comments. After twenty-one years of writing this column I am now at the point where it is often difficult for me to write an intelligent, interesting and timely article each month. At the same time there seems to be less need for this type of comet news on a monthly basis. The Internet can substitute for the things I write, and more rapidly too. I want to thank you for being an attentive audience

(Ed Note; As stated in last months issue and here by Don, this will be the last Comet Comments. Unfortunately I did not receive this column in time for publication last month. I want to thank Don on behalf of SAC for providing us with interesting and informative information over the course of this column.

Best of luck and clear skies to you, Don!!

Rick)

June 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	

Schedule of Events for June 2000

- June 2** The 200 inch Hale reflector at Mt Palomar officially opens in 1948, New Moon 0514 MST
- June 3** **Public Observing Session at Thunderbird Park, in Glendale, Contact Adam Sunshine for more Information at (623) 780-1386 or ashunshine@netzone.com**
- June 8** Birth of G.D. Cassini, Discovered four of Saturns satellites and the division in the rings that bears his name, in 1625, First Quarter Moon, 0829 MST
- June 9** Mercury at greatest eastern elongation (24 deg.), 0600 MST
- June 16** **SAC General Meeting, 1930, Grand Canyon University, This is our annual swap shop meeting so dust pff the stuff you don't need anymore and make few bucks.**
- June 16** Full Moon, 1527 MST
- June 17** Birth of the Third Earl of Rosse, 1800
- June 20** Summer Solstice occurs at 1848 MST
- June 22** **Deep Sky Sub Group Meeting at the McGraths House**
- June 24** **SAC Star Party at Flat Iron Mountain, Sunset 1944, Ast. twilight ends 2126, moon-rise, 0056**
- June 24** Last Quarter Moon, 1800 MST
- June 26** Birth of Charles Messier, Need I say more? , in 1730
- June 29** Birth of George Ellery Hale, Pioneered the construction of the 200 inch telescope at Mt. Palomar (June 3), He unfortunately did not live to see his dream become reality as he died in 1938

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ler with 83 and Mark Stephenson with 104. Brian admitted to having enjoyed himself immensely. Both Jennifer and Mark admitted to practicing for the marathon in advance, well in advance.

Amongst those observing and socializing were Jerry Belcher, Joyce Crawley, Pat Davidson, Stan Gorodenski, Glenn Nishimoto, Ron Simon, Ken Sykes, Lance Wozniak and John Yount. Glenn supplied camaraderie, support, coffee, olives and cookies. He even offered eyepieces for those in need. Did you get any sleep Glenn?

Afterwards, Rick Tejera announced, "If you didn't go, you missed a good marathon."

Observers not placing for awards were Jon Milan and Ed Piggott who, none the less, enjoyed the outing and are looking forward to more of the same - but with better meteorological conditions.

Marathoners at other Arizona sites included Randy Peterson, Steve Dodder, Jim Deck, Andrew Cooper and in Sierra Vista, the Huachuca Astronomy Club.

2000 All Arizona Messier Marathon Final Standings

No.	Name	Telescope	Club	Missed Objects
108	Bob Davidson	8" DOB	EVAC	74 33
107	Paul Lind	14"f5 DOB	SAC	74 77 33
106	Kevin Bays	8" DOB	TAAA	74 32 33 110
106	Matt Spinelli	8" SCT	EVAC	74 77 30 110
104	Mark Stephenson	6" refl	PAS	74 33 31 32 110 30
101	Wayne Thomas	20"f4.7 DOB	SAC	74 77 88 91 49 61 104 3 75
94	Jack Jones	4.5" refl	SAC	
94	Rick Tejera	8"f6 DOB	SAC	
83	Jennifer Keller	10"f4.5 DOB	SAC	
82	Brian Page	8"f5 Newt	EVAC	
50	Freddie Franqui	8"	EVAC	
30	Jon Milan	5" SCT	EVAC	
20	Ed Piggott	8" SCT	TAAA	

Thunderbird Park Public Observing Session

Once Again SAC will host a Public Observing Session at Thunderbird Park in Northern Glendale. The date is Saturday, June 3rd, from 1900 till whenever.

You might be tempted to say that there is not a lot worth showing at a public party since the

moon is new and there is only one planet, please reconsider. Among the easy objects up that night will be Mercury, Alcor-Mizar, M51, M3, M13, M92, M81-82, and Gamma Leonis to name a few. If your not at the Grand Canyon, here's your chance to do some astronomy that

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Seeing Double

By Thad Robosson

Hello all, welcome to May's edition of Seeing Double. As in any type of astronomy, it is the observer who determines to what degree an observation takes place. Some people may only hunt down the more colorful pairs, while others take very exacting measurements of quite obscure couples. But however you decide to enjoy the dancing points of light in the grand ballroom of the sky, some simple info will allow an observer to take decent notes, if only in their head.

Two pieces of information can describe how a pair of stars will appear in relation to each other, the separation (sep) and the position angle (PA). The separation (measured in seconds of arc) is the distance between the two, and the PA tells at what angle the companion is to the primary.

When discussing PA, North is 0 degrees, East 90, South 180, and West 270. (If you look up with North above/behind your head and go counterclockwise, you will hit the cardinal points in the correct order.) This is useful to an observer; if you simply watch the stars drift in the eyepiece, (provided the drive is off, and you are compensating for inverted images) you will always know which way East and West are. It is then fairly easy to determine the PA within 20 degrees or so.

Approximating separation takes a bit of prac-

tice. The appearance of separation changes with the eyepiece, so it helps to know how much field is viewable through your different eyepieces. This is easy to figure out...point the 'scope at an equatorial star, move the star to the Eastern edge of the view, and time how long it takes for that star to cross the thickest part of the field. This time divided by 4 equals your field of view. Knowing the FOV helps an observer to make an approximation of separation for wider pairs. (I'll cover closer pairs in the future.)

To help you become familiar with the above information, A Few easy Doubles are given in the chart below.

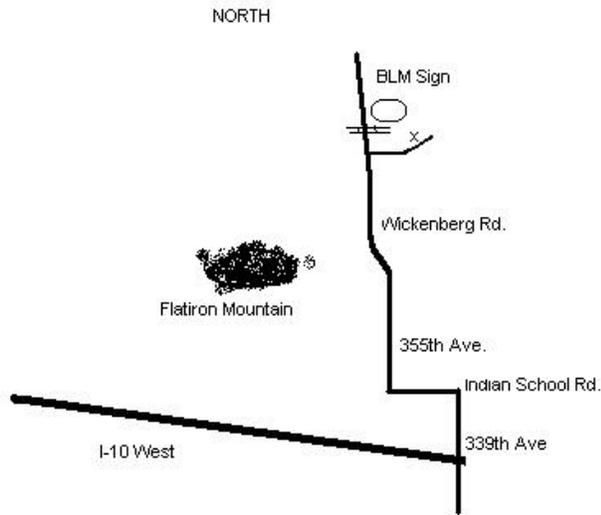
You can see that just by looking up the PA and Sep, one can have a good idea to how a double may appear. For example, the companion of Tau Leo is almost due South of the primary and Gamma Leo is a fairly close pair. You also may notice that Mizar's separation is about a quarter of that of 16/17 Draco. But of course, practice makes perfect, so get the scope out and point it at these. You'll be surprised at how much sharper your observing skills can become with this basic information.

I invite you to discuss any observations, questions, or this column. I can be reached at tmrob@primenet.com

Star	Const.	RA	Dec.	PA	Sep.	Mag.
Mizar	Uma	13h 24m	54d 56m	151	14.7"	2.2/3.8
16/17	Draco	16h 36.2m	52d 55m	194	90"	5.1/5.1
Tau	Leo	11h 28m	2d 51.5m	176	91.1"	5.5/7.0
Gamma	Leo	10h 19.9m	19d 50.9m	123	4.4"	2.5/3.5

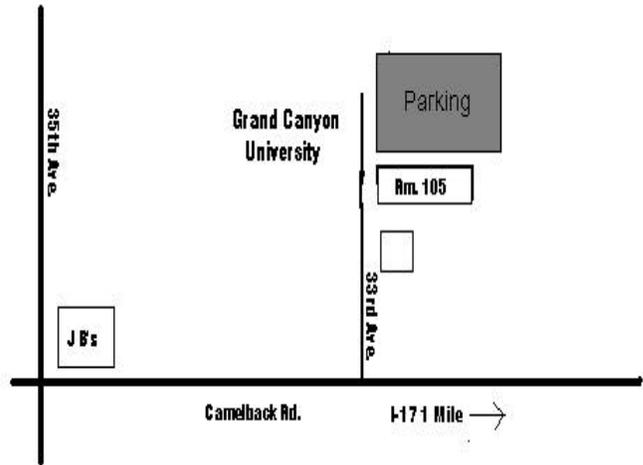
Directions to SAC Events

Flat Iron Mountain Observing Site



Travel west on I-10 until you get to the 339th Ave. exit, the Rip Griffin's Truck Stop is at this exit. Go north (right) on 339th Ave. for 2 miles and then turn west (left) on Indian School Rd. Go 2 mi. and then turn north (right) on 355th Ave. This road becomes Wickenberg Road along the way. You will pass Flatiron Mountain on the left, hence the name of the site. At mile marker 12.2 you will turn east (right) on a dirt road. If you go too far on Wickenberg Road, there is a cattle guard and a Bureau of Land Management sign immediately along the road to let you know, you went too far and missed the turn. Note your odometer reading when you turn onto the dirt road, the site is 0.9 miles off the pavement. The dirt road goes through a wash and the site is on the left after you have travelled through the wash. It is a large area of desert pavement on the left side of the road. The trip is all on hard surface roads, until you turn onto the dirt

SAC General Meetings



Exit I-17 at Camelback Rd. Head west to the entrance of Grand Canyon University at 33rd Ave. Turn right into the university. We meet in Fleming Hall which is the second building on your right, in room 105. Meeting are at 1930 on the Friday closest the full moon. Board meetings are held 1 hour prior to the general meeting and are open to all members.

Deep Sky Sub Group Meeting

The Deep Sky Subgroup Meets at John & Tom McGrath's house: 11239 N 75th St, Scottsdale, (480)-998-4661.

Scottsdale Rd North to Cholla St. Cholla St. east to 75th St. on the southeast corner.

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weekend. For more info, contact Adam Sunshine at 623-780-1386 or by email to asunshine@netzone.com.

Directions to Thunderbird Park:

Get to the 59th ave exit on the Loop 101 by whatever means is fastest for you. Head north on 59th Ave. for about 1 1/2 miles. The road will begin to wind through the two mountains

that make up the park. The entrance is on the left. Go past the natural amphitheatre to the right and follow the road to the observing site. Adam will put up SAC signs at the entrance and along the way. Hope to see you there.

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
4030 E Windrose Dr
Phoenix AZ 85032-7435

Such A Deal, Part II

FOR SALE:

PIERRE SCHWAAR NEWTONIAN TELESCOPE: 6", f 4.9, 29.2 focal length
CELESTRON C 90 1000mm f/11 mirror lens
INCLUDES: TELRAD

EYEPIECES: Celestron 24mm Ultima Series, fully Multi-Coated, University 16mm Multi-coated, Vixen 9mm long eye relief (20mm) fully multi-coated, University 2.8X Klee Barlow multi-coated, (2) Celestron Polarizer
DOSKOCIL SPONGE LINED EYEPIECE CARRYING CASE, SPONGE LINED CARRYING CASE FOR SCHWAAR TELESCOPE

CELESTRON CARRYING CASE FOR C90
CALL JOHN AT (602) 997.9980
CELLULAR (602) 339.2716

FOR SALE:

10" F/6 Meade Research Grade Newtonian reflector. Rotating rings, 8x50 finder. Mirror has been re-figured by Pierre. I used it extensively for Solar and Planetary observations and photographs for ALPO. \$700
Paul Maxson 623-975-9232
SunSpot@Cybertrails.com

SAGUARO ASTRONOMY CLUB

5643 W. Pontiac Dr
Glendale, AZ

Phone: 623-572-0713
Fax: 623-572-8575
Email: Saguaro Astro@aol.com



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