

East Valley Astronomy Club

August 1998

www.goodnet.com/~rkerwin/evac/evac.html

Scottsdale, Arizona

The Grand Canyon Public Star Party—1998

Bernie Sanden, EVAC
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"Look into the eyepiece and tell me what you see". Stan Spoor, of the Verde Valley, Arizona area, was attempting to draw upon the imagination of the line of viewers assembled at his telescope to observe open cluster M6. Some shrugged as if creatively-challenged, but one fascinated elementary-aged girl studied the smattering of stars intently. "I see a wing, and a body, and another wing...and some antennae." Stan encouraged her. "What does all of that make?" "A butterfly!" she exclaimed, clearly surprised by her own observation. Stan capped it off with "And you know what this cluster of stars is called?...The Butterfly Cluster." The girl ran off to relate the episode to her parents. Stan continued to share the view with the others in line when minutes later the girl returned and tugged on Stan's shirt. "Mister, was I supposed to see grass and flowers, too?"

The South Rim version of the 1998 Grand Canyon Public Star Party held June 13-20th at the Yavapai overlook once again introduced the pristine high-altitude Arizona night sky to thousands of Grand Canyon visitors. Telescopes from 4" to 41" were set up in the parking lot and adjoining observing field to share views of the celestial wonders with the general public.

To me, this is one of the best possible venues for a public star party. Mid-June in Northern Arizona is normally cloud-free by sunset. This year, only one very windy night was hampered by clouds, and even that night was clear during the time most of the public was present. The Grand Canyon is also far from city lights, with insignificant light pollution from Flagstaff, Williams, or Las Vegas. At 7000 ft, the visual magnitude limit exceeds 7 on most nights. Although the high elevation relates to a quick temperature drop after sunset, generally not until well after 10 pm is it cool

enough that more than a light jacket is required. Also, the public is on hand in large numbers, and already in the mood to behold the awe-inspiring universe at night after having just viewed one of the more awe-inspiring gouges in the Earth by day. Most importantly to me, though, the vacationing public are genuinely courteous, unhurried, and grateful, and generally more inclined to take the time to wonder about our universe and expand their understanding of the cosmos.

To that end, various speakers further volunteer their efforts by presenting a twilight talk each evening, just after sunset. The slide shows are geared towards general astronomy, but this year included specific topics such as cosmology, scale of the universe, life cycle of stars, astrophotography, comets, eclipses, and Hubble discoveries. John Dobson's talk is always informative as well as entertaining, and at a vigorous 82+ years of age, John continues to be the guiding force behind National Park public star parties. The talks also serve another purpose—to keep the public captivated until the sky sufficiently darkens. This year, with no evening Moon nor planets visible, this was especially important. Once twilight fades, the real show begins.

EVAC & Other Events: 1998

	Mtng	Local	DS	Other
Jan	14	17	24	
Feb	11	21	28	
Mar	11	21*	28*	21: EVAC Cookout* 28: Messier Marathon*
Apr	8	18	25*	19-26: Texas Star Party 25: Sentinel Star Gaze*
May	13	16	23	2: Astronomy Day 22-25: Riverside TMC
June	10	20	27	13-20: Grand Canyon SP 19-20: Verde Valley AF 27-28: Universe '98 24-25: Stellafane
July	8	18	25	
Aug	12	15	22	
Sep	9	12	19	11-13: Astrofest 18-19: N AZ Star Party
Oct	14	10	17*	16-18: Starry Nights Fest 17: All-AZ Star Party*
Nov	11	14	21	
Dec	9	12	19	

Recall the first time you saw M13 through a large-aperture 'scope in a dark sky. I would venture to guess that over 90 percent of the people viewing M13 through my 'scope made some kind of audible remark ("wow", "yo dude", etc.). M11 and M17 drew similar responses. My soon-to-be-released audio cassette "Grand Canyon Exclamations Part 2—The Night Sky" is a testament to the impression that celestial objects in a dark sky can have on unsuspecting individuals. OK, maybe there's no cassette, but I may bring a tape recorder next year just to capture some these priceless comments. One thing continues to ring true to me: A large percentage of those I meet each year have never experienced a truly dark sky nor quality telescopic views of celestial objects. And few have more than a basic understanding of things astronomical. I feel absolutely privileged to share the wonders of the night sky with them, even if I cannot answer all of their questions. I am delighted to have them ask questions since, as John Dobson points out, the answers to the questions they ask will be the ones they remember. The most gratifying moments to me were fielding at least a dozen questions by children during my Wednesday evening twilight talk.

None of this would occur without the dedicated work of Dean and Vicki Ketelsen, who not only inaugurated the first Tucson Amateur Astronomical Association (TAAA)-sponsored event as an outgrowth of their honeymoon, but continue to organize the event annually. Dean sets up his 'scope nightly, prepares the audio-visuals for the evening talks (while giving at least one of the talks each year), and spends most

afternoons at an overlook sharing binocular views into the Canyon with visitors to publicize the evening event. Dean also helps coordinate the concurrent North Rim Star Party. TAAA member Derald Nye is also a tireless daytime worker, sharing views of Jupiter and Venus during full daylight as he reminds them of the nighttime observing opportunities, then setting up again for the night show.

To try and list all the participants in this year's (South Rim) star party would certainly cause me to omit someone, so I'll specifically mention those from the Phoenix metro area that I recognized. From SAC, member Tom Mozdzen participated in the last three nights and Wil Milan the first weekend (Wil also gave an informative twilight talk the first evening). Steve and Rosie Dodder were a powerhouse duo sharing the sky from the "pit", the observing field away from the constant stream of headlights in the adjacent parking lot. From EVAC, Tom Polakis attended on Friday night to offer views through his 20" Dob, on a recently-acquired tracking platform. I heard that Pierre Schwarr was there as well one night, although I somehow missed him. All in all, there was the usual good turnout from Tucson and other areas of Arizona, as well as California. I believe there were over 50 'scopes set up on several of the nights.

So what does it mean to me, that I return year after year (five in a row and counting)? I guess it's what you'd expect from a member of HAAA (Hockey, Astronomy, and Hiking Association), —Cont. on p. 5

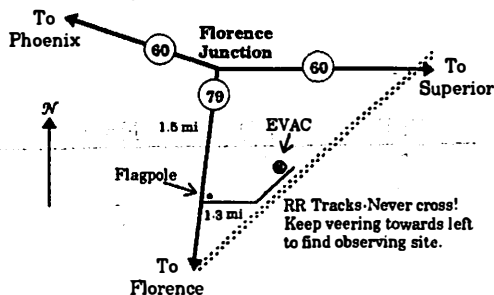
EVAC Star Parties

Local Star Party: Florence Junction Site

General Information: The Florence Junction site is the official site for the East Valley Astronomy Club's Local Star Party, typically held on the Saturday closest to Last Quarter Moon. Florence Junction offers reasonably dark skies within a short drive of most east Valley locations.

Location: N 33° 14' 40" W 111° 20' 16"

How To Get There: Take US 60 east to Florence Junction. At Florence Junction, turn right (south) on SR 79. After 1.5 miles, you will see a tall steel flagpole and a dirt road to the left. Turn left onto the dirt road and continue for another 1.3 miles. Drive with caution as the road is rough in some areas. To the left there will be a large open area.



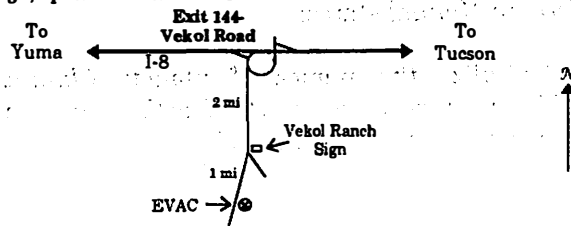
Deep Sky Star Party: Vekol Road Site

General Information: The Vekol Road site is the official site for the East Valley Astronomy Club's Deep Sky Star Party, typically held on the Saturday closest to New Moon. Vekol Road offers dark skies despite prominent skyglow from Phoenix to the north. The site is within 1½ hours drive time from most east Valley locations.

Location: N 32° 47' 55" W 112° 15' 15"

How to Get There: Take I-10 south and exit onto Maricopa Road. Continue through the town of Maricopa to SR 84, about 25 miles from

I-10. Turn right on SR 84, after about 5 miles the road merges with I-8. Continue west and exit I-8 at Vekol Road, Exit 144. Turn left and cross the highway overpass. Before looping back onto I-8 take the road to the left. Go south for 2 mi. At the Vekol Ranch sign bear right and continue south for another mile until reaching a large, open area on the left.










August 1998

A man is a small thing, and the night is very large
and full of wonders

—Lord Dunsany

All Times MST

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26 July Saturn at Western Quadrature	27	28 Moon close to Porrina	29 S δ-Aquarid Meteor Shower	30 Yesterday: Moon near Spica	31  First Quarter 5:05 am	1 August Maria Mitchell, b. 1818
2	3 Uranus at Opposition	4 Venus 0.8° S of Mars	5	6 Tomorrow: Penumbral Eclipse (too faint to observe)	7 SAC Mtng  Full Moon 7:10 pm	8
9	10 Sun enters Leo Moon close to Jupiter	11	12 EVAC Mtng 7:30 pm at SCC Perseid Meteors	13 Moon near Saturn Mercury at inferior conjunction	14  Last Quarter 12:48 pm	15 EVAC Local Star Party Moon near Aldebaran
16 Saturn stationary	17	18 Pluto stationary J. Flamsteed, b. 1646	19 Moon near Mars	20 Moon near Venus Tomorrow: Annular Eclipse (SW Pacific)	21  New Moon 7:03 pm	22 EVAC Deep Sky Star Party
23	24	25 Mercury 3° S of Venus	26	27	28	29  First Quarter 10:06 pm
30	31 Mercury at greatest W elongation	1 September	2	3 PAS Mtng	4	5 Tomorrow: Venus 0.8° N of Regulus
6  Full Moon (near Jupiter) 4:21 am	7	8 Moon approaches Saturn	9 EVAC Mtng 7:30 pm at SCC	10	11 SAC Mtng Moon 0.3° N of Aldebaran	12 EVAC Local SP  LQ 6:56 pm

Celestial Grammar

M. Aaron McNeely, Editor

Should astronomical names such as *earth*, *moon*, and *sun* be capitalized. The answer depends upon which source you refer to.

A tome such as the *Random House College Dictionary* lists the above terms as lower case, although the earth definition states "(often cap.)". The *Gregg Reference Manual* states:

Capitalize the names of planets (*Jupiter*, *Mars*), stars (*Polaris*, *the North Star*), and constellations (*the Big Dipper*, *the Milky Way*). However, do not capitalize the words *sun*, *moon*, and *earth* unless they are used in

Lunar Almanac: 1998

	FQ	Full	LQ	New
Jan	5	12	20	27
Feb	3	11	19	26
Mar	5	12	21	27
Apr	3	11	19	26
May	3	11	18	25
June	1	9	17	23
July	1	9	16	23
	31			
	Full	LQ	New	FQ
Aug	7	14	21	30
Sep	6	12	20	28
Oct	5	12	20	28
Nov	3	10	18	26
Dec	3	10	18	26

connection with the capitalized names of other planets or stars.

Some astronomy authors ignore the above injunction concerning earth, sun, and moon. David Levy, who has a degree in English, in two of his works that I consulted, capitalizes Earth, Sun, and Moon. Guy Ottewell and the *Observer's Handbook* of the Royal Astronomical Society of Canada also capitalize Earth, Sun, and Moon. Other authors that capitalize these designations are: Philip S. Harrington in *Touring the Universe through Binoculars*; Nancy Hathaway in *The Friendly Guide to the Universe*; George Lovi in *Men, Monsters, and the Modern Universe*; Patrick Moore in *The Story of Astronomy*; W. T. Olcott in *A Field Book of the Skies*; Fred Schaaf in *Seeing the Solar System*; Rev. T. W. Webb in *Celestial Objects for Common Telescopes*.

Authors who do not capitalize earth, sun, and moon include: George Abell in *Exploration of the Universe*; R.H. Allen in *Star Names: Their Lore and Meaning*; E.C. Krupp in *Beyond the Blue Horizon*; Leslie C. Peltier in *Starlight Nights*; Chet Raymo in *365 Starry Nights*; H.A. Rey in *The Stars*; Zim and Baker in *Stars: A Golden Guide*.

Personally I think that this is confusing because earth, sun, and moon seem like they *should* be capitalized. They are the three fundamental celestial bodies that we all associate with.

Another cause of this dilemma may be that earth, sun, and moon are not really names. Jupiter is a name because it refers to the Roman god. Think of it this way, do we ever refer to "the Jupiter" as in "the moon"? What could we name the earth, sun, and moon? Gaia, Sol, and Luna?

The moral seems to be that it is a matter of preference. In other words, do you not want to have to push the shift key unless necessary? Besides, who is to argue with authorities such as David Levy and Patrick Moore?

In Astronomical History

Aug. 8, 1769: Great comet of 1769, discovered by Charles Messier, displays a 90-98° tail.

Aug. 11, 17 1877: Asaph Hall discovers Deimos and Phobos respectively, satellites of Mars.

Aug. 18, 1868: Norman Lockyer discovers helium in the Sun.

Aug. 28, 1789: William Herschel discovers Enceladus, a satellite of Saturn.

Dark of the Moon Table - Aug 1998

OBSERVING NIGHT				OBSERVING NIGHT			
DATE	START OF DARK	END OF DARK	TOTAL DARK	DATE	START OF DARK	END OF DARK	TOTAL DARK
SATSUN	8/2 1:00 AM	8/2 4:07 AM	3:07	WEDTHURS	8/19 8:39 PM	8/20 4:25 AM	7:46
SUNMON	8/3 1:42 AM	8/3 4:08 AM	2:26	THURSFR	8/20 8:38 PM	8/21 4:27 AM	7:48
MONTUES	8/4 2:28 AM	8/4 4:09 AM	1:41	FRISAT	8/21 8:36 PM	8/22 4:27 AM	7:51
TUESWED	8/5 3:19 AM	8/5 4:10 AM	0:51	SATSUN	8/22 8:35 PM	8/23 4:28 AM	7:53
WEDTHURS	none	none	-	SUNMON	8/23 8:33 PM	8/24 4:29 AM	7:56
THURSFR	none	none	-	MONTUES	8/24 8:44 PM	8/25 4:30 AM	7:48
FRISAT	none	none	-	TUESWED	8/25 8:16 PM	8/26 4:31 AM	7:15
SATSUN	none	none	-	WEDTHURS	8/26 8:48 PM	8/27 4:32 AM	6:44
SUNMON	8/10 8:52 PM	8/10 8:19 PM	0:27	THURSFR	8/27 10:22 PM	8/28 4:32 AM	6:10
MONTUES	8/11 8:50 PM	8/11 8:58 PM	1:08	FRISAT	8/28 10:57 PM	8/29 4:33 AM	5:39
TUESWED	8/12 8:48 PM	8/12 10:38 PM	1:49	SATSUN	8/29 11:38 PM	8/30 4:34 AM	4:58
WEDTHURS	8/13 8:48 PM	8/13 11:19 PM	2:31	SUNMON	8/31 12:19 AM	8/31 4:35 AM	4:18
THURSFR	8/14 8:46 PM	8/15 12:03 AM	3:17	MONTUES	8/1 1:07 AM	8/1 4:36 AM	3:29
FRISAT	8/15 8:45 PM	8/16 12:50 AM	4:05	TUESWED	8/2 2:00 AM	8/2 4:37 AM	2:37
SATSUN	8/16 8:43 PM	8/17 1:41 AM	4:58	WEDTHURS	8/3 2:58 AM	8/3 4:38 AM	1:40
SUNMON	8/17 8:42 PM	8/18 2:35 AM	5:53	THURSFR	8/4 4:01 AM	8/4 4:39 AM	0:38
MONTUES	8/18 8:41 PM	8/19 3:32 AM	6:51	FRISAT	none	none	-
TUESWED	8/19 8:41 PM	8/20 4:25 AM	7:46	SATSUN	none	none	-

EOI = End of Astronomical Twilight

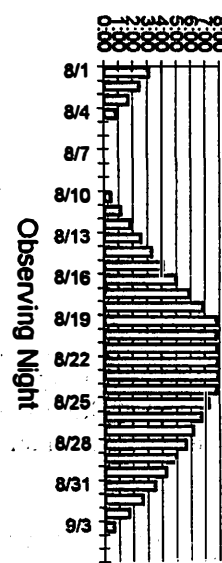
MR = Moonrise

SOT = Start of Twilight

MS = Moonset

NOTE: Applies to Phoenix area (Mtn Std Time)

of Dark Hrs



Dark Hours per Night - August 1998

Bernie Sanders 7/97

—Cont. from p. 2

currently at two members strong. Very little beats relaxing in the Maswick Sports Lounge after an invigorating day hiking in the Canyon, to watch the Red Wings clinch the Stanley Cup, followed by a night under the brilliant Milky Way searching out deep sky wonders. Very little...except maybe to renew acquaintances with other Arizona regulars each year as well as meet new participants, the final day get-together at the home of park ranger Chuck Wahler and family, to again join with TAAA and John Dobson's Sidewalk Astronomers to bring the night sky experience to National Park visitors. But I think, most importantly, what brings me back each year is anticipating an experience such as the one Stan shared with me, the night a star-struck child witnessed a very special butterfly fluttering gracefully among the Milky Way.

North Rim Star Party

Bill Dellenges, EVAC

Having had a wonderful time two years ago at the North Rim Grand Canyon Star Party, my wife Lora and I decided to return this year after popping into the South Rim last year. It is a very different experience on the north side. Once again Deloy and Karen Pierce anchored the operation. They are a very enthusiastic and indefatigable team. Each day they're out there doing a public solar viewing session from 10 am to 1 pm on the verandah next to the lodge. He's usually doing something like putting star-finders together to give out to people and Karen's either doing a similar project or sewing—both under large umbrellas to shade them from the sun. Of course when folks come by they drop everything and jump up to man the two solar 'scopes and launch into a sunspot lecture. Deloy also gives a nice slide show/lecture each evening before the star party begins. This year he was nice enough to let me give my slide show talk one night (to give him a break). One other fellow gazer was invited to do the same, but later Deloy told me "That's the last time I'll let him do a slide show!" Thank goodness his graph slides were all upside down, forcing him to bypass them, or it would have been a long night. It was too technical for the cloud attending that night.

Everything at the North Rim is on a smaller scale than the south scene. At most, we get maybe six 'scopes gathered on a night, usually less. But as a result, we bond pretty well and a neat camaraderie develops between us.

The seeing was superb! My C8 was performing like a refractor, the stars were beautiful pinpoints, this no doubt due to the 8000 ft. elevation and maybe a little

extra help from steady air. We stayed for four nights and the first three were perfect. The last night, Tuesday, a storm moved in, knocked over and broke one of Deloy's solar 'scopes in the afternoon and caused a power failure at the lodge that night. It was still off when we left in the morning. The lodge provided free cold food that morning for the guests. With the lights out it would have been great for observing but there were overcast skies above so we lost out there.

This trip, as usual, we did a little hiking including a 2.7 mile (one way) stroll down North Kaibab Trail to the Supai Tunnel, a very nice hike that I recommend.

The North Rim is paradise, we hate to leave. But there is a price to pay. It's an extra 200 mile drive, there is only one restaurant (and one snack bar), so the food situation is a bit limited, and the observing site has two problems: light pollution from the lodge lights (some, but not all, are turned off for us) and access to the site: you must park in front of the lodge and carry your equipment around it, and down a set of stairs to the viewing area. Of course you can forego that hassle and drive out to some other site of your choice but you will be alone there.

Well, there you have it. That's what the north side has to offer. Perhaps one year you may want to give it a try!

Grand Canyon Star Party Recap

Dean Ketelsen

Tucson Amateur Astronomy Association

The years tend to get fuzzier as time goes by, but my feeling is that the '98 Grand Canyon Star Party was just about the best ever! Certainly it far exceeded the previous year when bad weather and trail construction at Yavapai Point seemed to conspire against any sort of astronomy gathering. But this year the weather returned to the excellence we have come to expect at the Canyon over the years. And the crowds returned with a vengeance—we easily averaged 200 attending our slide shows every evening, and I heard rumors of people waiting for half an hour for a look through the huge 41" in attendance. So all in all, except for some gale force winds on the Tuesday evening which shut down the viewing, it was a great week.

The 41" was a pleasant surprise—Dennis Young of Sedona notified me about 10 days before the star party that the 'scope and owner would be attending. It's owner—Mike Clements—was a real character and his telescope was out of the ordinary as well. Mike lives out

of his truck on the road, looking for events such as ours to show folks the universe. The huge 'scope sets up in a couple minutes—the entire bottom assembly rolls down a ramp out of the truck and the side truss that holds the secondary and focuser assembly attaches quickly. While the images could have been sharper, there is no substitute for aperture and some amazing views of galaxies and clusters amazed viewers far into the night. Likewise, Dennis' 28", newly dedicated at RTMC the month before, also was a superb performer. Mike and Dennis pulled at least 2 all-nighters and any lucky observers passing by could have been kept busy for a long time sharing views between the two 'scopes.

But there were a few other amazing telescopes. Mike Spooner from Page brought his 9" refractor again (on the rumors that a 9" Clark would be attending) as well as his excellent 17" Dob as well. Mike has never been afraid to boost up the magnification some, and both 'scopes held up well to that scrutiny. I saw Antares' green companion at about 400X with the refractor, and the view of Epsilon Lyrae's double-double barely fit in the field of view at that magnification! Likewise, his 17" Dob, boosted up over a few hundred power with an OIII filter, gave stunning views of the Omega and Veil Nebulae. The other 'scope that really impressed me was Marilyn Unruh's 16", which provided some impressive views on some galaxies, again with relatively high magnification.

Besides the 'scopes, there were some pretty amazing astronomers too. Richard and Marcie Taylor, of Bakersfield, CA went to a lot of effort to set up their equatorially mounted 18" off the back of their truck every night. He had a little jib crane to help assemble the optical assembly, but the level of effort he expended every night to show off views deserve our commendation. Will and Margaret Devore drove for 3 days from Jacksonville, FL to spend the week with us before driving back. They started out as novices, but between the dark skies and plentiful advice from other amateurs they left us a lot more experienced with hopes to return in the future.

Our astronomer of the year award goes to Derald Nye this year—he set up his 8" 'scope nearly every day at the head of the parking lot giving anyone who cared to look some great views of the moon, Venus, and some particularly excellent looks at Jupiter. Early one morning I witnessed at least 5 cloud bands on the oval disk of the gas giant—and don't forget that this was in daytime! Besides his daytime activities, he also set up most every night and was also one of the twilight speakers. He used a counter to monitor how many "looks" he provided—over 2,550 when combining day and night observing! Derald certainly epitomizes the spirit of volunteerism which makes this a great event. Thanks Derald!

Another award of dubious distinction that I first gave out last year—the studly astronomer of the year award (first given to Dennis Young for hiking south rim to north rim with a telescope) actually had a couple of candidates this year. The runner up award goes to Stan Spoons of Rimrock, AZ. As you read this he is recovering from hip replacement surgery. At the star party he could barely walk, but after getting dropped off by his wife, he biked between the campground and observing site carrying his telescope in a trailer towed behind the bike! The award of studly astronomer of the year goes to Bernie Sanden. While the rangers all tell you that under no circumstances should you hike down to the river and back in one day, Bernie spent 3 days below the rim, making the river and back on two of them, then spending the evening showing off views of the universe with his 'scope and also giving one of the twilight talks. Wow—makes me tired just writing about it!

There were some spectacular daytime visual treats as well. After the windstorm Tuesday evening, Wednesday dawned as one of the most amazingly clear days I have ever seen at the Canyon. After spending several months there (spread over several years) it was easy to notice how extraordinary it was, and noticed by several other observers as well. Additionally, the heavier spring rains really provided a bountiful display of Cliff Rose. Normally, these almost grotesque-looking plants offer a couple yellow blooms but this year some were literally covered with blossoms. And the bike rides out on the west rim trail provided pleasant smells as well as visual treats as a result.

The star party allows us regulars the chance to catch up on friends we have made in the past. It was great to see John Dobson return for his 4th consecutive year. In my first visit to the Canyon, I ran into him and the San Francisco Sidewalk Astronomers with some of their big 'scopes. John gave the twilight talk that night and I recall seeing M13 through the big 24" after standing in line for what seemed like forever. Thanks to him this star party had a great start, and I am glad that he comes to help out in this continuation of his public crusade. It was also great to spend time with David and Elinor Levine, former TAAA members who moved to west Texas a few years back. David spent some long days at the rim with his Questar helping recruit new observers for the evening observing.

Well, the statistics are in—Arizona led in astronomer attendance with 28 (13 from Tucson, 9 from Phoenix). California had a respectable performance with 14, 5 from Texas and 3 from Florida. There were another half dozen or more from other scattered states. The twilight talks are extremely important in entertaining potential observers until it gets dark enough to observe. Many thanks to those who helped with the effort

including Wil Milan, John Dobson, Bernie Sanden, Tim Black (who deserves special recognition for giving his talk in the Tuesday gale with 3 guys holding down the screen), Darin Stephens, Andrew Cooper, and Derald Nye.

It was a memorable year and I could go on, but probably won't. The star party is a great time and I hope it becomes more popular among TAAA members. I am interested in passing off some of the work of the star party so will likely put out a call for volunteers next spring. In the meantime, I expect the star party to continue in nearly its present form. Next year's dates are currently scheduled for 12-19 June, 1999. Of the people I polled for dates, there seemed some interest in including the crescent moon, so the star party will go from about a day before new to a day before first quarter. In addition, Mars will be very nearly at opposition, so there should be some good early evening objects to attract people's attention. I hope to see you there!

Enriching Your Observing

Tom Polakis, EVAC
polakis@aprintmail.com

It wasn't long ago when I scoffed at those who used their break time at the star party to discuss computers. I've changed my ways. After a recent double star observation and subsequent follow-up work, I took pause to reflect on how much this tool has increased my perspective on the night sky and prevented an otherwise inevitable burnout on visual observing.

Let's take a look at the case of a double star in Libra. Using MegaStar, a great charting software package, I filtered the double star list to include only those with stars brighter than magnitude 7. This led to a pair named Struve 1962. Being a fan of equal-magnitude doubles, I took a look. On a warm night at Vekol Ranch, they both appeared identically bright, yellow-white, and an easy split at 80x. The data box in MegaStar indicated magnitudes of 6.5 and 6.6 with a separation of 11.9". Their combined, unresolved light brings the perceived brightness to the unaided eye to an easily visible 5.8 magnitude.

After returning home, I logged into the Internet to learn more. The Hipparcos and Tycho star data catalogue has been placed on the Vizier Service page (<http://vizier.u-strasbg.fr/cgi-bin/VizieR>). This service allows the user access to hundreds of astronomical catalogues at the click of a mouse. The Hipparcos and Tycho catalogues are designated as I/239. Typing in the coordinates and specifying a 1' radius around this position, data was returned for both

stars in the double system. Among the most interesting data for gaining astronomical perspective are the magnitude and parallax. The northern component shines at 6.45 magnitude and has a parallax of 40.14 thousandths of an arcsecond. For the southern component, these values are 6.56 and 44.21.

Logging of the 'net and bringing up a spreadsheet, the real scoop on the two stars is available. The parallaxes tell us that the northern and southern components lie at 81 and 74 light-years away, respectively. Couple this with the magnitudes and the intrinsic brightnesses of the stars falls out. There are no superlatives here. The two stars are very sun-like; the northern component is 13% brighter than the sun and the southern component is 16% fainter. Back in the Hipparcos catalogue, we learn that the two stars are both of spectral type F6. Again, very sun-like. The catalogue also indicates that their proper motions differ enough that they are probably not coupled in orbit.

The stars are 7.4 light years apart, which is similar to the separation between the Sun and our brightest star, Sirius. Dwellers on a planet encircling one of the components would see the other star as a bit fainter than 1st magnitude. Of course our Sun would appear as a 6.5-magnitude star, right at the limit of vision.

The computer has really opened up the hobby. If the stars are beginning to appear like nothing more than points on a celestial sphere, it's time to get some perspective.

Just What is Averted Vision, Anyway?

Jeff Medkeff, Rockland Observatory
medkeff@c2i2.com

Astronomers often employ an observing technique called "averted vision", the art of looking slightly to the side of a faint object being studied. This works because, we are told, there are more rods slightly off the optical axis of our eyes. But there is a great deal more to it than that, and with some understanding of the physiology of the eye, it will be seen that there are right and wrong ways to use averted vision.

It is true that the density of rods peaks well outside the center of vision. Since the rods are the eye's faint light detectors, it stands to reason that this peculiarity of physiology is what makes averted vision work. The density of the rods at a point 20 degrees off the center of vision reaches about 160,000 rod cells per square millimeter. This is a greater density than the peak density of the cones—the eye's bright light and color

detectors—on the fovea (the center of vision), where cones only reach about 140,000 cells per square millimeter.

The point of greatest density of the rods does not correspond to the point of greatest sensitivity, however. The area of greatest sensitivity has been shown to vary considerably from observer to observer, but it is never as far as 18 degrees from the center of vision. The reason for this has to do with the manner in which the retinal cells are "wired" to the brain.

In the fovea, each cone is connected to a single ganglion cell, which in turn is hooked up to a nerve fiber that eventually joins the optic nerve. As we move away from the fovea, each ganglion cell starts to service several cones or rods. Eighteen degrees from the fovea, 100 rods might be connected to a single ganglion cell. At some point on this line extending outward from the fovea, the number of rods per ganglion cell is such that the eye operates at peak sensitivity. For most people, this point is somewhere between 8 and 16 degrees from the fovea.

But so far we have only been considering the sensitivity of the eye as a function of an image's angle from the fovea. One might suppose that it makes a difference if we avert our vision to the left or right, up or down, or at some angle. And it does matter. The most effective direction to avert our eyes is that required to place the object on the nasal side of our vision. Simplified, this means if you are a right-eyed observer, you shift your eyes to the right; if a left-eye observer, you shift your gaze to the left. Whichever eye you use, you avert your gaze in that direction.

By using this most efficient portion of the retina, you will experience a gain of some four magnitudes or more over your direct vision! The effect of this is not insignificant. It means the detection or not of many stars and most details in deep sky objects.

It is important not to avert your vision the opposite direction—that is, if right eyed, you should not use averted vision by shifting your gaze to the left. This will place the image on the blind spot, right where the optic nerve connects to the retina. Nothing will be seen in such a circumstance, no matter how bright!

This poses an interesting dilemma for binocular observers and for those who use binocular viewing attachments on their telescopes. Averting one eye to its optimal position puts the image on, or nearly on, the blind spot on the other eye. This is counterproductive; the advantage of the binocular system is its use of two eyes. Inadvertently disabling one eye makes no sense. The solution is simple, and astronomers have been saying it for centuries: look up!

The second most efficient direction to avert your gaze is upward—look in the direction of the top of your head, so that the image is below your center of vision. The area of the retina in use here is somewhat less sensitive than the optimal horizontal location, but only slightly so. Doing this does not put the image in the blind spot of either eye, and considering the gains to be had from binocular vision, this will likely prove as efficient (or more so) under such conditions as using the optimal monocular method.

If you choose to avert your gaze downward, you will find your averted vision slightly less sensitive again. In actuality, the retina is every bit as sensitive here as it is if you avert your vision upward, but it is sensitive over a much smaller area. Thus, it is harder to consistently rest the image on the "sweet spot".

Some observers will notice that their most sensitive areas are slightly to the side and down, or in other ways not exactly as eye physiology would suggest. In my case, I find averting to the right and slightly up (I am right eyed) is best for me. There are large variations in the way our eyes are made up—in fact, our retinas are even more distinctive than our fingerprints. Almost nothing can be said categorically about vision, but we can say what will apply in the majority of cases. It is well known that experienced observers see much more detail, and many fainter objects, than beginners. I believe that this is caused in part by the observer learning about the individual characteristics of his or her eyes over the course of many nights of observations.

Next time you are out with your binoculars or telescope, take some time to explore these different areas of your vision. It might be quite apparent what is the most promising averted vision method for you. And if it happens to be something other than what medical science predicted, don't let that stop you from doing it your way. They are, after all, your eyes, and only you know what you can see with them.

Jeff Medkeff has been an amateur astronomer for nearly 20 years. He is an enthusiastic and prolific observer, especially of solar system objects, and has been writing about amateur astronomy sporadically for 12 years. He operates the private Rockland Observatory of Sierra Vista, Arizona, which is dedicated to astronomy education and journalism. In 1997, Medkeff was appointed an assistant coordinator within the Association of Lunar and Planetary Observers' Solar Section.

The NGC/IC Project

M. Aaron McNeely, Editor
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(Reprinted from the April 1997 EVAC Newsletter)

Bob Erdmann supplies the Internet services for EVAC and was the Main Speaker for the April 1997 meeting.

Bob Erdmann, known for his work on the Arizona Database, a compendium of all catalogs of non-stellar celestial objects, provides the Internet services for the NGC/IC Project. The Project consists of professional and amateur astronomers, and their goal is to reobserve the entire New General Catalog and the two Index Catalogs of J.L.E. Dreyer.

Bob started his presentation by providing an overview of the history of Dreyer's astronomical catalogs. In 1888, Dreyer published the New General Catalog, a pole-to-pole compendium of non-celestial deep sky objects derived from visual observations. The bulk of the NGC was provided by William Herschel, who conducted 2500+ observations in a systematic attempt to survey the entire sky visible from England. William's son, John Herschel, reobserved his father's catalog and added to it while observing the southern heavens from the Cape of Good Hope in South Africa. Dreyer became involved in astronomy through his position as one of Lord Rosse' observers. Lord Rosse was a famous Irish astronomer who erected a 72-inch telescope at his home in Parsonstown.

As Dreyer assembled the NGC, he drew upon the work of many other astronomers; individuals such as Swift, Tempel, Caroline Herschel, Messier, Stephan, and d'Arrest. Dreyer's task was to "normalize" a myriad of observations from a large population of astronomers undertaken with varying degrees of optical quality. His standard was to describe each object as if it had been viewed with John Herschel's 20 ft focal length reflector. Dreyer often had to decipher the observing notes from these different astronomers. His compilation of the approximately 7000 objects in the NGC is a remarkable achievement. There are a few errors and inconsistencies in the catalog, but it is a testament to Dreyer's genius that he created a work of such endurance that it is still known and used by all astronomers. It is also noteworthy to observe that Dreyer, working in the late 1800's without the benefit of computers, created a work that, in its accuracy, greatly exceeds the efforts of those who have recently had a hand at re-editing the NGC.

One of the major goals of the NGC/IC Project is to re-identify each object in the New General and two Index Catalogs and provide accurate positions. Another goal is to identify and correct the errors in the NGC and IC.

These inconsistencies have been noted by observers since the initial publication of the catalog. Since the objects in these catalogs were all discovered by famous astronomers, the moral imperative of the Project is to assign to these individuals their true historical stature by explicitly detailing their discoveries. Dr. Harold Corwin, Jr. of CalTech, the organizer of the Project, has amassed copies of all of the original observer's notes. The Project members begin with these notes and work forward in time. Some of the members also observe each object with a 16-inch reflector and describe its appearance. Other members include Jason M. Adamick, Brent Archinal of the US Naval Observatory, Bob Bunge, Steve Coe of SAC, Murray Cragin, Brian Cuthbertson, Glen Deen, Steve Gotlieb, Wayne Johnson, Jenni Kay of Australia, Rusty Lederman, Alister Ling, Brian Skiff of the Lowell Observatory, Wolfgang Steinicke, and Malcolm Thompson. Bob Erdmann provides the Project's web site and will post the latest information as it appears. The web site (www.ngic.com) will provide a searchable database, the precise position for each object in current coordinates, the "paper chase trail" of the original observers notes, and Digital Sky Survey images of each object. Users of the web site can assemble a nightly observing list of objects and can even directly enter their observations.

There have been other attempts to correct the errors in Dreyer's catalogs. The best known was published as the Revised New General Catalog (RNGC) by three graduate students working over the course of three summers. When funding ran out, they were forced to publish. Their work, for which they earned Ph.D.s, has caused more problems than existed initially. For example, the editors assigned RNGC numbers to plate defects in the Palomar Sky Survey! Another major error was in their detailing of William Herschel's original observing codes. Herschel used a system of upper and lower case letters to explicitly describe his observations. Anyone knowing the code could easily decipher Herschel's descriptions. The editors of the RNGC published all of Herschel's codes with upper case letters. All of the errors of the RNGC popped up in the next effort, Roger Sinnott's (Sky Publishing) NGC 2000. Sinnott also ran out of time and was forced to publish an incomplete product. NGC 2000 compounded the 20-30% error rate of the RNGC and gave all of this a veneer of expertise (Interestingly, Dreyer's error rate was around 14%). Naturally, these catalogs are used in other astronomical publications such as celestial atlases and software. The NGC/IC web site provides a list of the errors in the RNGC and Uranometria 2000. Bob Erdmann claims that, learning from the mistakes of these previous attempts, the Project has no concrete deadline, it will be finished when it is finished and will probably take about 10 years.

Bob Erdmann provided an enlightening presentation of information that should be disseminated among the astronomical community. In its painstaking search for truth, the NGC/IC Project is performing a great service for all astronomers.

EVAC Meeting Highlights

June 10, 1998

Donald J Wrigley, Secretary
donwrig@juno.com

Northern Arizona Star Party—1998

Gary Frey, Prescott Astronomy Club
gfreynpo@primenet.com

Northern Arizona—in astronomical terms, synonymous with high altitude and *dark*—is the serious amateur astronomer's destination of choice on September 18 and 19, 1998. Hosted by the 100+ member Prescott Astronomy Club, near the poorly-lit town of Chino Valley, this event has a lot to offer—even if El Nino overstates its welcome.

Activities and events include:

- Two nights of observing
- Vendor booths
- Telescope display
- Swap shop
- Afternoon speakers
- Telescope display and voting
- Astrophoto display, judging

What to bring? Your telescope(s), camera, camping gear (unless you like motels) and miscellaneous equipment (like sky maps and the obligatory red flashlight). Camping sites are unimproved, with no water or electricity. Porta-johns will certainly be available. There are a few motel rooms left in Chino Valley (2 miles) and plenty in Prescott (20 miles, though there are some closer). Restaurants are available in Chino Valley and Prescott, though you may want to bring your own food for camping. Electrical power is not available at the observing site. The skies are suitable for long-exposure astrophotography.

For more information contact:

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NASP Registrar
PO Box 1114
Mayer, AZ 86333

gfreynpo@primenet.com

NASP Webpage: www.pgx.com/nasp

The meeting was called to order at 7:37 pm by president Sheri Cahn, with 70 members in attendance, including 8 guests/new members. Sheri made announcements of upcoming events, including the All-Arizona Star Party, to be held on Oct. 17th, and the SCC Star Party to be held on a weeknight in October. The date is yet to be set, but it is hoped that by having the event on a week night there will be more SCC student attendance than in recent past, and we are told that the college plans to publicize the event.

There were no show-and-tell presentations, but there was a fascinating poster display about VEEGA (Venus-Earth-Earth-Gravity-Assist), the gravity assist method used by project Galileo to achieve a low cost journey to Jupiter, presented by Laurice Dee, Ph.D., ambassador for the Galileo project. The display included a number of Galileo images and a chart of the spacecraft's circuitous journey.

The guest speaker for the night was Dr. Roger Windhorst, professor and associate chair in physics and astronomy at ASU. Dr. Windhorst's presentation featured a slide show and discussion of some of the latest Hubble Space Telescope images. An analysis of the deep space images leads to the startling conclusion that very distant galaxies are much smaller than nearby galaxies. Furthermore there are practically no elliptical galaxies at distances beyond a red shift of one. In fact, most of the very distant galaxies appear as faint blue irregulars. As distances increase the irregular galaxies appear more red, apparently due to redshift. The explanation for this has to do with the fact that, as we look deeper into space, we are also looking back in time. It now appears that the large spiral and elliptical galaxies that we see in such large numbers in nearby galaxy clusters, formed as a result of collisions between irregular galaxies (a conclusion that has been predicted by computer simulations). By peering back far enough in time and space we observe a much younger universe where spirals and elliptical have yet to be formed. The galaxies that do exist, though small and irregular, are very "hot" or energetic, with much of the energy output in the ultraviolet range. Due to the expansion of the universe these ultraviolet wavelengths are stretched out or "red-shifted" during their 8 to 12 billion light-year journey into longer wavelengths: visual blue at first and then red.

EVAC on the Internet

EVAC Homepage

www.goodnet.com/~rkerwin/evac/evac.html

E-mail Mailing Lists

EVAC-mls is a mailing list for club announcements and quick notification of astronomical events.

EVAC-Board is for EVAC business. All club members are welcome to participate.

AZ-Observing is a fairly general mailing list about observing in Arizona. Included are star party information, who is going, as well as the latest observations and astronomical events.

To join, send E-mail with the Subject: Subscribe to the "-request" mailing address at psiaz.com. For example, you would send the request for AZ-Observing to AZ-Observing-request@psiaz.com.

July 8, 1998

The meeting was brought to order at 7:35 pm by club secretary Don Wrigley, standing in for president Sheri Cahn. After the introduction of officers and board members, the following list of upcoming events was announced to the approximately 60 members and guests present:

July 18th—Local Star Party at Florence Junction

July 25th—Deep Sky Star Party at Vekol Road

August 12th—Next EVAC Meeting at SCC

Under new business, a representative from the Prescott Astronomy Club spoke about the upcoming Northern Arizona Star Party to be held on September 18-19th and hosted by the Prescott club. The event will be held near the dimly lit town of Chino Valley. There will be a registration fee of \$10.00/person (\$30.00/person after 8/1/98) and there will be tent sites and RV sites available for \$10.00 and \$20.00 respectively. The Saturday events will feature guest speakers, door prizes, and astrophoto awards. For further information Email Gary Frey at gfreynpo@primenet.com.

Also under new business, it was pointed out that a slide projector had been donated to the club by a member several months ago and this donation has yet to be acknowledged in the newsletter. I wish to apologize for this oversight and on behalf of the club extend a warm EVAC thank-you to Evan Pomerantz for his generous donation, which has saved EVAC the expense of purchasing a new one at a cost of over six hundred dollars.

The show-and-tell portion of the program included another poster display by Laurice Dee who is ambassador for the Galileo project. This month's display included an 11 question "Pop Quiz" handout sheet about the Galileo project.

Our main speaker was amateur astronomer Jeff Medkeff from Sierra Vista. Jeff shared some of his drawings with us as well as a number of useful and enlightening observing tips.

Don't Forget: August's EVAC meeting will consist of member show and tell and a swap meet, so bring all of your cool astronomy stuff to sell!

Astro Quiz*

Match the following Messier Objects with their popular names:

- | | |
|----------------------------------|------------|
| a.) Black Eye Galaxy | _____ M1 |
| b.) Crab Nebula | _____ M8 |
| c.) Dumbbell Nebula | _____ M11 |
| d.) Gemini Cluster | _____ M13 |
| e.) Great Nebula | _____ M16 |
| f.) Hercules Cluster | _____ M17 |
| g.) Lagoon Nebula | _____ M20 |
| h.) Little Dumbbell Nebula | _____ M24 |
| i.) Omega Nebula | _____ M27 |
| j.) Orion Nebula | _____ M31 |
| k.) Owl Nebula | _____ M33 |
| l.) Pinwheel Galaxy | _____ M35 |
| m.) Pleiades | _____ M42 |
| n.) Praesepe | _____ M44 |
| o.) Ring Nebula | _____ M45 |
| p.) Small Sagittarius Star Cloud | _____ M51 |
| q.) Sombrero Galaxy | _____ M57 |
| r.) Star Queen Nebula | _____ M64 |
| s.) Trifid Nebula | _____ M76 |
| t.) Whirlpool Galaxy | _____ M97 |
| u.) Wild Duck Cluster | _____ M104 |

Editor's Corner

M. Aaron McNeely, Editor
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I want to thank the following people have made this issue possible: Bill Dellinges, Bob Erdmann, Gary Frey, Bob Gent, Dean Ketelson, Jeff Medkeff, Tom Polakis, Bernie Sanden, Bill Smith, and Don Wrigley. Thank you to everybody.

*Astro-Quiz Answers: b, g, u, f, r, i, s, p, c, e, l, d, j, n, m, t, o, a, h, k, q.



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Don't Forget: Swap Meet at August 12 Meeting!

- Contents:**
- Grand Canyon Star Party
 - Celestial Grammar
 - Enrich Your Observing
 - Averted Vision
 - NGC/IC Project
 - N-AZ Star Party
 - Astro-Quiz

Next EVAC Meeting — August 12th 7:30 pm

Valued member since 3/16/97



East Valley Astronomy Club
M. Aaron McNeely, Editor
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Phoenix, AZ 85018

East Valley Astronomy Club—1998

Scottsdale, Arizona

EVAC Homepage—<http://www.goodnet.com/~rkerwin/evac/evac.html>

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MEMBERSHIP & SUBSCRIPTIONS: \$20 per year, renewed in December. Reduced rates to *Sky & Telescope* and *Astronomy* available. Contact Kathy Woodford, P.O. Box 213, Apache Junction, AZ 85217, 602/857-3438. Email—ariz.kat@juno.com

CLUB MEETINGS: Second Wednesday of every month at the Scottsdale Community College, 7:30 pm. Normally Room PS 170 or 172 in the Physical Sciences Building. See map below.

NEWSLETTER: Mailed out the week before the monthly Club meeting. Send contributions to M. Aaron McNeely, 4402 North 36th Street, #22, Phoenix, AZ 85018, 602/954-3971. Email—amcneely@primenet.com. Contributions may be edited for length or clarity.

ADDRESS CHANGES: Contact Bill Smith, 1663 South Sycamore, Mesa, AZ 85202, 602/831-1520. Email—bsmithaz@aol.com

EVAC LIBRARY: The library contains a good assortment of books, downloaded imagery, and helpful guides. Contact Enrico Alvarez for complete details, 602/837-0486.

BOOK DISCOUNTS: Great savings through Kalmbach and Sky Publishing. Contact Don Wrigley, 423 West 5th Avenue, Apache Junction, AZ, 602/982-2428. Email—donwrig@juno.com

EVAC PARTY LINE: Let other members know in advance if you plan to attend a scheduled observing session. Contact Robert Kerwin, 602/837-3971. Email—p24493@email.mot.com

