



Sacnews

Issue 281

August 2000

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Bits & Pieces

Minutes of the May 19th Meeting

By Jennifer Keller

With 58 present including TAAA members all the way from Tucson, President Jack Jones started this meeting with a huge thanks to Christine Shupla and the Arizona Science Center for letting us use the Planetarium. Jack invites us all to the Light Pollution Symposium to be held August 25th 7-9 p. m. at the Science Center also. Christine Shupla introduced Steve Dermer and Elizabeth Harris-Morgan, her planetarium helpers. AJ Crayon presented Messier Marathon awards to me coming in with 83 objects observed (yeah me), Telrad Tejera with 94 objects, Jack Jones with 94 objects, Wayne Thomas with 101 objects and Paul Lind with 107. Steve Coe

mentions the next meeting will be show and tell and the July 14th meeting will be Amanda Bosch and her husband speaking on Planetary rings and Galaxy rings. Adam Sunshine invited everyone to attend the 23rd annual SAC Thunderbird Star Party on June 3rd. Steve Dodder gave an overview of the High Energy Astrophysics Workshop he attended in Huntsville Alabama. WOW STEVE! Rick Rotrammel showed a "Folks and Scopes" Video he made at the Sentinel Schwaar Star Gaze April 29, 2000. It made us dizzier than the Mobius Strip Roller Coaster Christine Shupla showed on the dome!

(Continued on page 11)



Christine Shupla (center), poses with Jennifer Keller and Jack Jones at the Arizona Science Center. Our thanks to Ms. Shupla and her staff.

Astronomy 101

That's It???

By Rick Tejera

Most of us got into astronomy due to a fascination with the vastness and grandeur of the Universe. We look up and marvel at those points of light and how far away they are, yet we know so much about them, but at the same time, there is so much we don't know. So we read all the magazines and join a club like SAC. We marvel at the photos of celestial objects in the magazines or the works of astrophotographers like Chris Schur and say "I'd like to see that for myself". We go out and buy a telescope (and hopefully after last month, a few other things) head out to a star party and find our first deep sky object. After searching for while, you find it. Invariably, the reaction is "That's It????".

Most new observers are disappointed at their first glimpse of deep sky objects. After who knows how much priming by Astrophoto's in books and magazines, you expect the object to show the subtle colors and detail you saw in those photos. It comes as a bit of a shock and disappointment to see only a grayish fuzzy spot. Like anything else, deep sky observing takes a bit of practice to really begin to appreciate that fuzzy spot. The first thing to realize is that our eyes see things differently than cameras. The eye collects light and sends it to the brain where our all the colors are processed in to one singular image. I know this sounds like how a camera works, but there is a big difference. The films we use, in essence, capture the different colors on separate layers and combine them into something that fools the eye into seeing many different colors, shades and tints. Some films are more sensitive to different colors and the method of processing the film can also effect the final output. Thus the photographic image and the visual image will appear different.

All this aside, it shouldn't take long for the neophyte visual observer to learn how to see the most detail in those fuzzy spots. I can go back in my observing records and look at observations of the same objects and see how over time I've noticed more detail than when I first looked at the object. The key is patience. Take the time at eyepiece to let the object reveal itself. We've all heard of averted vision, use it. Compare the image using direct and averted vision. I like to start at the center of the object and then work around in quarters. After noting the center I then look at the northern edge, then east, etc. I also try to give my eye a rest after the center of the object. I find looking away from the object and then coming back to it from the edge of the field helps bring out the detail near the edge. Try not to stare at anyone spot too long, our eye responds to movement. It doesn't seem to care if the movement is the object we are looking at or our eye's own movements. Soon you'll start noticing dust lanes, hints of spiral arms, stars resolving you didn't notice before. With enough aperture and power, you may even begin to notice some hint of color. Before long, that initial "That's It???" will become "Wow, Will you look at that!!!".

This is the second article in a series aimed at beginners. As I get inspired, new installments will be published. If anyone has any ideas or would like to contribute to Astronomy 101, please let me know.

Clear Skies
Rick

GPIDA

By Sam Herchak

There's a new "club" in town and we're looking for some motivated people who want to make a difference. More on that later. First a quick report on the annual International Dark-Sky Association (IDA) meeting in Tucson.

I had not planned to attend because I didn't have the whole weekend off from work. But a mirror-making project that involves a friend in Tucson got me to jump on my motorcycle and head down for the day. Sure glad I did! It's one of those events (like RTMC) that make you kick yourself for even thinking of not attending.

I arrived just as Chris Luginbuhl (US Naval Observatory-Flagstaff) finished his summary of the new IDA Model Code Handbook. It's a total compilation of the individual IDA Info sheets, addressing outdoor lighting from top-to-bottom, and includes a model lighting ordinance. This constantly updated document is only available online at this point, but expect a single file you can download in the future. The file can be found at the following address: www.nofs.navy.mil/about_NOFS/staff/cbl/LC_Handbook_v10.html,

Later Bob Gent (IDA's volunteer Public Relations Officer in Washington, D.C.) spoke of the tremendous amount of media coverage IDA and the light pollution topic received in 1999. From USA Today to Time magazine, the word is getting out. Even the lighting manufacturers are calling to learn more from IDA.

Then David Crawford (founder and Executive Director of IDA) started the business portion of the meeting with great news. Through some hard work by volunteers, IDA captured two grants totaling \$250,000 from the National Science Foundation and the Pauley Foundation. Although the money is spread over several years and comes with restrictions on how it can be used, it easily exceeds IDA's total revenue for 1999.

More good news: The highly energetic and persuasive Elizabeth Alvarez has become Associate Director of IDA. Membership is up to 4,100+ in 71

countries. Coalitions have formed with influential groups such as the Illuminating Engineering Society of North America (IESNA) and the National Park Service (NPS).

After the lunch break, we learned about some new lighting issues. Joan Roberts spoke on "chronotherapy" and how the human immune system follows a circadian rhythm. Look for cancer treatments to take place at night (I believe) in the future. Eunice Waggoner, from IESNA's Aging Eye Committee, talked about how seniors are easily blinded by bad lighting. An alliance with the large and influential AARP is thus a real possibility.

There's more good news. Many more of our counties and municipalities have passed or strengthened ordinances controlling outdoor lighting. More local sections of IDA are forming every month. So what are you waiting for? Get on the bandwagon!

Oh yes, the new club. GPIDA! The Greater Phoenix section of IDA was born just this May and we've already had two meetings. The progress to date is inspiring. There's a GPIDA list-server, a soon to be GPIDA website, and our first Light Pollution Symposium, hosted by the Arizona Science Center this August 25th at 7:00 P.M. Our guest speaker is an expert on astronomy and lighting alike, Chris Luginbuhl from the Naval Observatory. Please come join us and learn what you can do to BRING BACK much of our night sky.

A quick thanks to the small group of people who made GPIDA a reality: Jim Deck, Stanley Gorodenski, Jack Jones, Peggy Kain, and Thad Robosson (SAC). Dale Noss and Bill Peters (EVAC). Christine Shupla (AZ Science Center). And most importantly, the glue that brought us together, Jennifer Keller.

THE DARK SKY; LET'S NOT MAKE LIGHT OF IT!

Fuzzy Spot, Cygnus

By Ken Reeves

One of the birds of the night sky, Cygnus, the swan, is a large and beautiful constellation sitting on the summer Milky Way. The other common name for this constellation is the Northern Cross, although this time of year the cross is lying on its side.

As we look at Cygnus, we are looking down our own arm of the Milky Way (the Orion Arm) and therefore see many rich objects. Open clusters abound here as do emission and planetary nebulae. Don't forget the beautiful double star Alberio which is the head of the swan. It is a color contrasting set which rivals any other double in the sky.

NGC 6811 (19h38.2 +46 34): This open cluster is somewhat bright, very large, rich, and somewhat condensed. I saw 2 levels of stars with about 70 stars counted. There are some real nice arcs and chains with several prominent arcs, one going W from the cluster and another heading NNE. The remaining stars are in groups of 3. Within the cluster itself, there is a group of stars on the W, one on the N, one on the E, and a smaller one on the S. The E and S groups form more patterns than distinct groupings. The more I look at this object, the more I like it.

NGC 6826 (19h44.8 +50 31): The Blinking Planetary was seen in the 10" scope as very bright, very small, no detail at all powers, and kind of green/blue in color. The central star was noticed, especially with averted vision. This is the blinking effect, you look directly at the star and the nebula disappears, use averted vision and the nebula "blinks" in view.

NGC 6834 (19h52.2 +29 25): This little open cluster is somewhat bright and a little condensed. There is a string of 5 stars across the middle running E/W with the middle star being somewhat yellow. Ignoring the string, the cluster is somewhat round with 2 levels of stars and with a total of 17 stars over some possible haze. On SW side is a nice little grouping of 5 stars. This cluster has a very nice unusual shape.

NGC 6866 (20h03.7 +44 00): Another small cluster, this one is pretty bright and somewhat concentrated. The central area has about 15 bright stars, some streamers going away from it, and a couple of other groupings. There is a total of 20-25 stars with irregular patterns in 4 groupings.

NGC 6888 (20h12.8 +38 20): One of my favorite objects in the sky, the Crescent Nebula was seen as very large, somewhat bright with the UHC filter and somewhat faint without the filter. This unusual object is kind of kidney-bean shaped. At the N is a large trapezium of stars. The nebula is brightest near the NW star and radiates

SW. The center of trapezium is darker, with the nebula forming a sort of ring connecting the stars. The whole nebula continues S, but gets quite a bit fainter. Very spectacular and beautiful object, but hard to describe.

NGC 6960/6974 (20h45.6 +30 43): If the last nebula wasn't enough for you, the awesome Veil Nebula will knock you socks off. This is the western portion of the nebula, and can be seen at low powers without any filters as a very subtle wisp, extending away from the foreground star. Using a UHC filter, the north portion is very obvious while the south side is not quite as obvious, but lots of detail can be seen. 6974 is very subtle even with the filter.

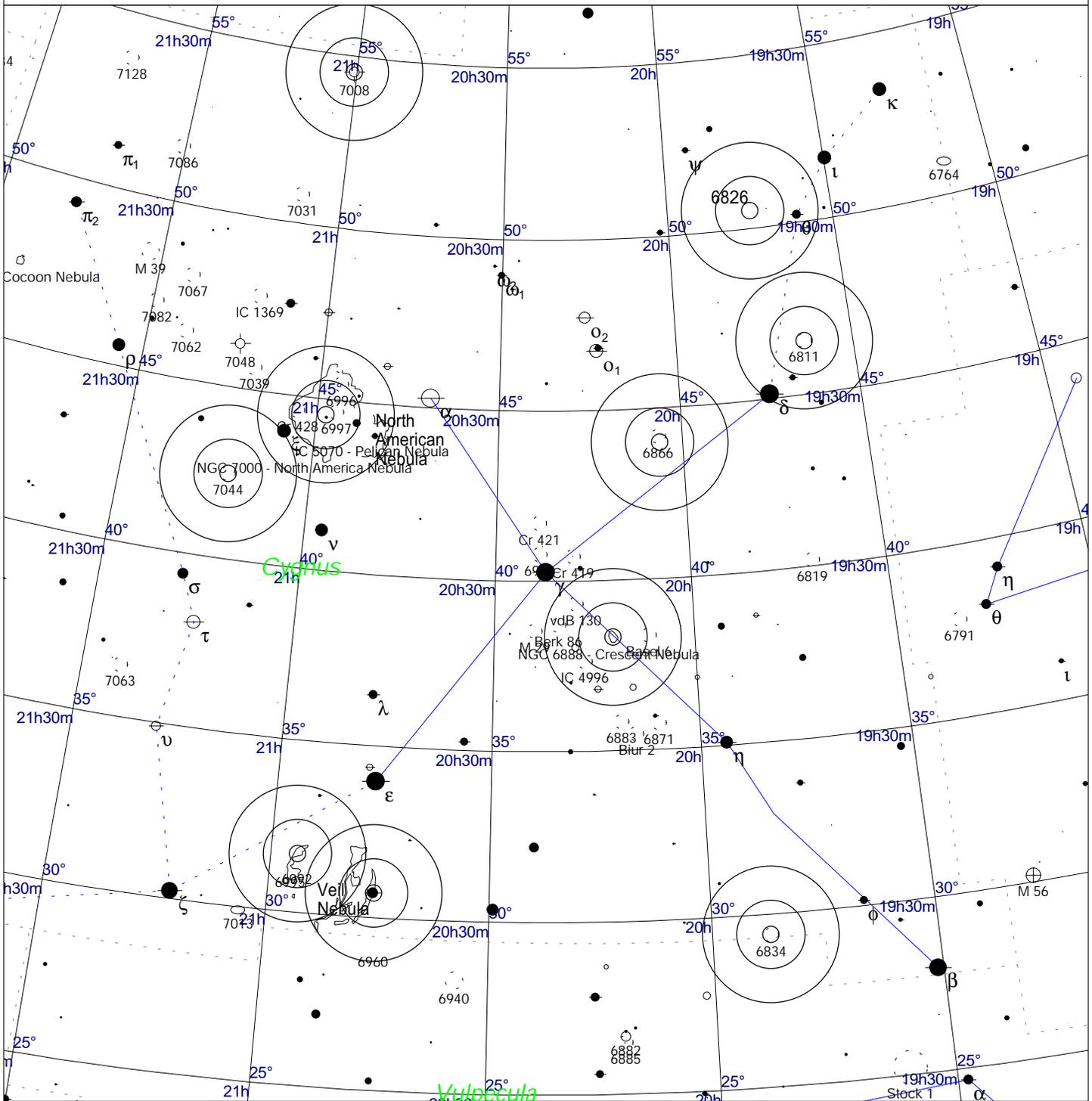
NGC 6992/6995 (20h56.3 +31 42): The eastern portion of the Veil is brighter, and can be seen in 10x50 binoculars. In the scope, it is pretty obvious and pretty bright even without the filter and is seen as a large arc. With the filter, the S end extends quite a bit inward (W). This is a very, very gorgeous object.

NGC 7000 (20h58.8 +44 20): The North American Nebula is a very large object that can be seen naked eye as a slightly brighter part of the sky. Use the lowest possible power you can for this object. At 35X, it was barely visible without filter, but putting the UHC filter in really made it pop out, especially the "Caribbean sea", absolutely beautiful. The Pacific side of the continent is not as obvious. Its neighbor, the Pelican nebula (IC 5067-5070) also shows up, but the shape is not discernible. Actually, the North American and the Pelican are part of the same nebula, separated by a foreground dark nebula.

NGC 7008 (21h00.6 +54 33): This is a tough planetary to get to. I saw it as somewhat bright and pretty large for a planetary. There is a double star to the S of the nebula, and a star on the E side is involved. The central star is faintly seen. The nebula is somewhat elongated N/W and slightly annular. Now my notes get confusing, first I say the brightest part on the E, then I say the N is brightest and the E is faint. The nebula does respond somewhat to UHC filter, but shows only a little bit of texture.

NGC 7044 (21h12.9 +42 29): The final object is an open cluster, which is fairly large and pretty faint. A bright star is on the edge, with 11 stars over a very definite haze. Using averted vision brings out a lot of speckling in the haze, which is best described as many threshold stars over a granular haze. I estimated that 20-50 stars pop out with averted vision.

Fuzzy Spot Cygnus



STARS ● <3 ● 5.5 ● 3.5 ● >6 ● 4 ● 4.5 ● 5		SYMBOLS ● Multiple star ⊕ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ⊕ Open cluster ○ Other object ☉ Galaxy ⊕ Planetary nebula □ Bright nebula ⊕ Quasar		Stellar Limiting Magnitude 6.0 Deep Sky 12.0 Herchel 400 Objects: 6826, 6834, 6866, 6910, 7000, 7008, 7044, 7062, 7086, 7128 SAC 110 Best NGC: 6819, 6826, 6960, 6992, 7000, 7027
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Local Time: 17:19:43 7-Jul-2000

UTC: 00:19:43 8-Jul-2000

Sidereal Time: 11:53:29

Location: 33° 39' 56" N 112° 49' 10" WRA: 20h22m18s Dec: +40° 49' Field: 32.0°

Julian Day: 2451733.5137

Seeing Double

By Thad Robosson

Did you know that the simple act of measuring double stars could yield some important scientific facts? Currently, the only way of pinning down a star's mass is if it has a companion and the orbit of the companion is known. (Technically, BOTH stars have an orbit, relative to the individual components' mass.) Professional astronomers will use more advanced means to divulge the information of some very close pairs, as their orbits are much quicker and therefore promise quicker results. This leaves the wider pairs unattended, and ripe for amateurs to contribute useful scientific observations that could add to the short list of known orbits. Here are some methods that amateurs can utilize to measure doubles.

Filar Micrometer... this is a special eyepiece that has 3 wires inside and a PA dial around it. 2 of the wires are parallel to each other, and the 3rd is perpendicular to the others. The 2 parallel wires are adjustable in separation and this separation measurement is what is used to determine the distance between two objects, such as double stars, or the diameter of a planet. This is how a lot of "old timers" are doing measures. **Pros...**Once the screw constant (what a given wire separation represents in actual separation in the sky) is figured out, it is fairly low maintenance as long as the scope or eyepiece doesn't change. Math is fairly light. **Cons...**The unit is costly, tricky to build and should be used with an accurately aligned, permanently mounted equatorial scope. Dialing in the screw constant can be a time consuming task.

Diffraction Grating Micrometer...A grid of evenly spaced slats is placed on the business end of the 'scope. These slats create "ghost" images, and the trick is to line up these images. A PA dial on the outside edge of the grating is read off and some math brings about the PA and Separation. **Pros...**Unit is easy to make, and not expensive. Measures can be quite accurate, and is easier on the eye for some.

Cons...Math. You will need several gratings of various sizes to cover the different separations, and you will need to dial these in. Also, the grating effectively reduces your 'scope's aperture by half, making faint stars difficult.

Reticle Eyepiece...This eyepiece has an image etched in the glass at it's field stop. You place the stars under the image and use the scale in the image to determine PA and separation. **Pros...**This method is fairly direct, with not a lot of math involved.

Cons...It is not quite as accurate as other methods, and

the eyepiece can be moderately expensive.

Transit Method...This method uses a thin wire stretched across the field stop of any eyepiece one cares to modify. First the pair's PA is measured, and then the wire is set 90d to the PA and the pair is allowed to drift across the wire. The time between the first component contacting the wire and the second component contacting the wire is taken.

After several of these PA measures and timings, you can reduce your data and determine the separations.

Pros...Requires virtually no investment, except for an old high power eyepiece, and a decent stopwatch that will time to 1/100 a second. Perfect eyesight is not necessary. Many observers actually defocus the image to make it easier to determine when the center of the star hits the wire. **Cons...**Math, lots of it, as in, break out your old algebra and trigonometry textbooks type math. Also, takes lots of practice. Unless your technique is good, your data may produce poor measures.

One common problem with all these methods is determining if the results are accurate. Professionals will use "standards", which are stars of known and fixed PA and Sep. By measuring these pairs, and comparing the date derived, one can find how accurate the measures are. Robert Argyle of the Webb Society has forwarded these standards to me...

Name	RA	Dec.	m1	m2	PA	Sep in "
Delta Boo	15 15.5	33 18.9	3.5	8.7	78.00	104.90
Theta Ser	18 56.2	04 12.2	4.5	5.4	103.70	22.37
Beta Cyg	19 30.7	27 57.6	3.0	5.1	54.30	34.45
Iota Cnc	08 46.7	28 45.6	4.2	6.6	307.40	30.48
Alpha CVn	12 56.0	38 18.9	2.9	5.5	228.70	19.37
STF1627, Vir	12 18.2	-03 57.0	6.6	6.9	195.70	20.03
Zeta Psc	01 13.7	07 34.7	5.6	6.5	63.10	22.84
Delta Ori	05 32.0	-00 18.0	2.2	6.3	359.30	52.20
Zeta Lyr	18 44.8	37 36.3	4.3	5.9	149.70	43.20
20 Gem	06 32.3	17 47.0	6.3	6.9	211.00	19.88

My descriptions here are not nearly enough to get you started, but I would be happy to forward you what information I have in my library. And as always, if you would like to share observations, need info, or would like to chat about this column, please contact me at.... tmrob@primenet.com

August 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 August 2000

- Aug. 6th** First Quarter Moon at 0602 mst.
- Aug. 10th** Deimos, The outer satellite of Mars is discovered in 1877 by Asaph Hall
- Aug. 11th** **SAC General Meeting at Grand Canyon University. 1930.**
- Aug. 12th** Perseid meteor shower peaks
- Aug. 14h** Full Moon at 2213.
- Aug. 16th** Phobos, the inner satellite of Mars is discovered by Asaph Hall 6 days after Deimos in 1877.
- Aug 19th** **SAC Star party at Flat Iron Mountain. Sunset 1911, Ast. twilight ends 2040, moonrise 2204**
- Aug. 19th** Birth of Milton Humanson. He worked with Edwin Hubble on the movement of galaxies.
- Aug. 21st** Last quarter moon at 2351.
- Aug. 25th** **First GPIDA Light Pollution Seminar. Arizona Science Center, 1900.** See Article on page 3.
- Aug. 26th** **To heck with the Monsoon Star Party and Novice Session at Cherry Rd.** See article on page 8.
- Aug. 29th** New Moon at 0319 mst.

To Heck With the Monsoon Star Party & Novice Group

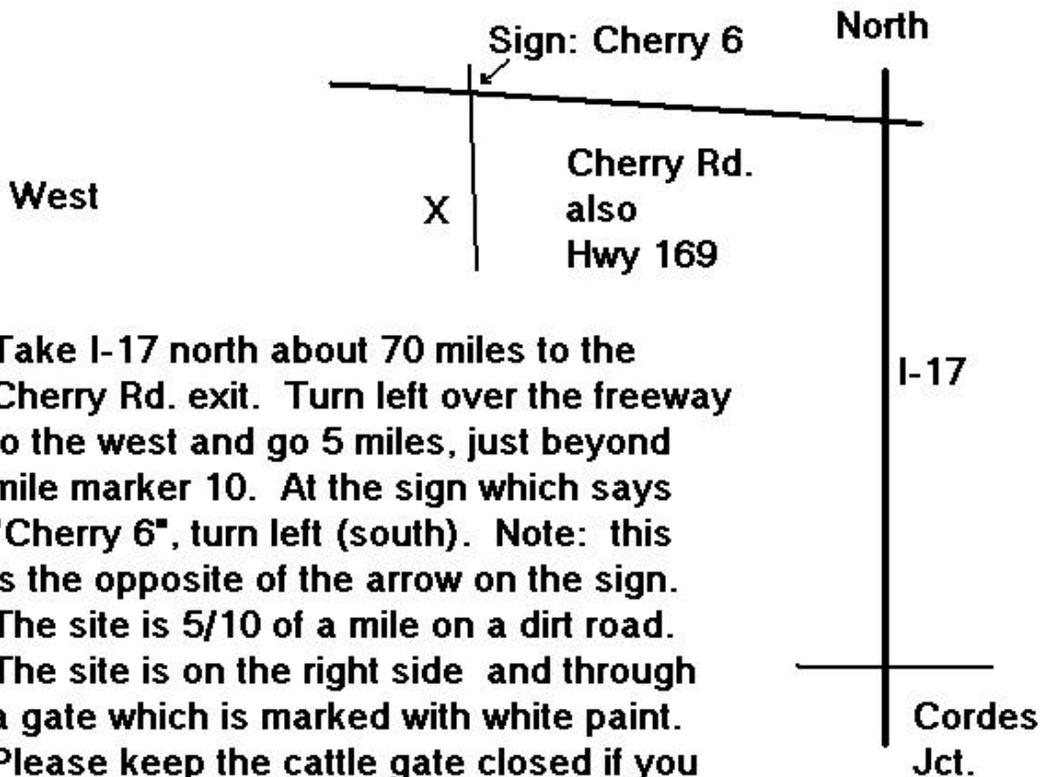
By Steve Coe

Ok, it rains in Arizona during the Summer, so what. Let's go up North, get cool and maybe the clouds will go somewhere else. Some tips for the Novice Group: 1) This is an Arizona dirt road during the storm season, don't try and use the road if it is raining or the road is still wet from a storm. This road has ditches to either side and it is easy to get stuck. This road is passable with a sedan, but go slow on the dirt road, it has some natural speed bumps. 2) Bring warm clothes, this site is at 4400 feet elevation and it will get cool (50's F.) as it gets late.

Saturday, Aug. 26, 2000
Cherry Rd. West site
Sunset-7:01 PM
Moonrise-2:40 AM

3) Leave early enough to get to the site while the Sun is still up, it is about a 90 minute drive from central Phoenix. That way you will not bother folks with your headlights and you will have plenty of time to set up your telescope. 4) Make a Summer Observing list. Cygnus, Sagittarius, Scorpius and Ophiuchus are excellent from this site. This is an opportunity to find Messier or SAC "Best of the NGC" objects for an award. 5) Bring your binoculars. There are lots of Milky Way objects that look terrific in binoculars. See you there!

Directions to the Cherry Rd. Observing Site



Take I-17 north about 70 miles to the Cherry Rd. exit. Turn left over the freeway to the west and go 5 miles, just beyond mile marker 10. At the sign which says "Cherry 6", turn left (south). Note: this is the opposite of the arrow on the sign. The site is 5/10 of a mile on a dirt road. The site is on the right side and through a gate which is marked with white paint. Please keep the cattle gate closed if you are the last to leave.

Reflections

Flat Iron Mountain June 24-25th

By Steve Coe

I counted 19 vehicles at the site around the end of twilight. It was nice to get somewhat cooler (probably 90 deg. F) by 10:00 or so.

I really enjoyed the view of the Double-Double (Epsilon Lyrae), both close pairs were split without doubt. The star images at 320X in the 6" f/6 Maksutov-Newtonian were textbook perfect. Each star was a tiny bull's eye, the Airy disks absolutely symmetrical.

At the other end of the magnification scale, the North America nebula was easily recognized with the 35mm Panoptic and a 2 inch UHC filter.

I also enjoyed the views through Bob Gardner's 15X45 image stabilized Canon binoculars. I am so used to viewing while my hands move a little, that seeing an image of M 7 or the star clouds of Sagittarius with no movement was fascinating. You just push a button on top of the body of the binocs and the image stabilizes. Fascinating.

Several folks saw some nice meteors, but my head always seemed to be looking down at a star map or in the wrong direction to catch many shooting stars.

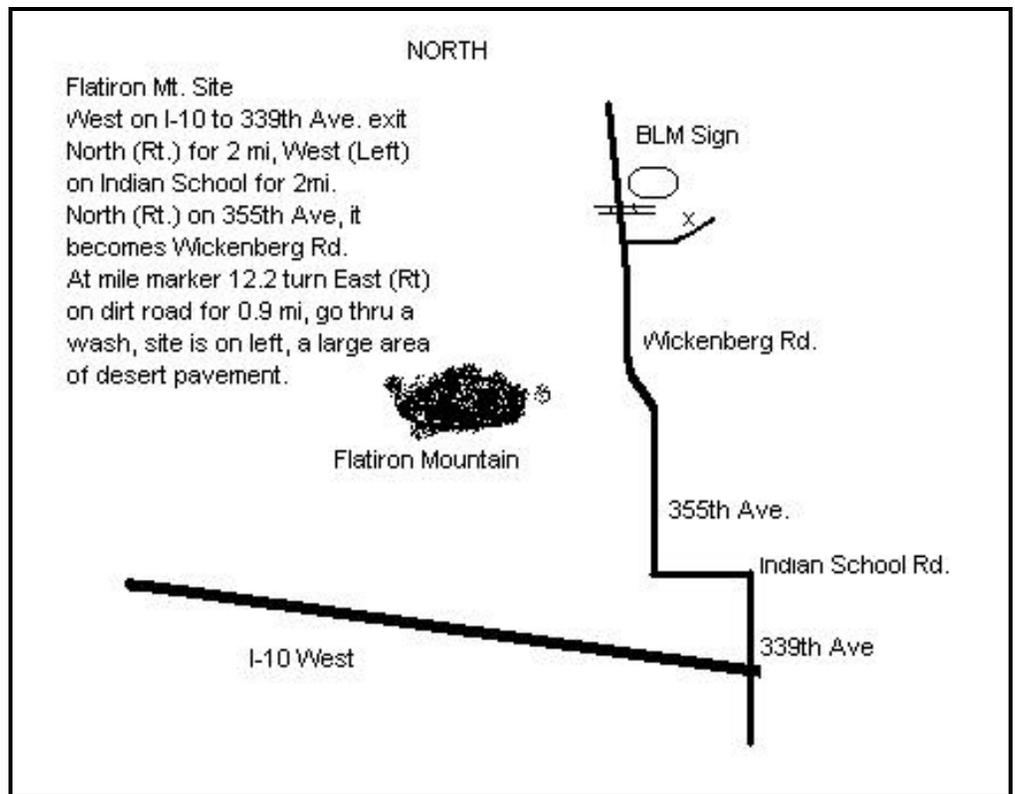
Flat Iron Confusion

It seems that there is some confusion as to finding the Flat Iron Mountain Site. At the June Star party several people missed the dirt road that leads to the site. We could see them looking for us on the more northerly road.

To Clarify: The dirt road you want to take is 12.2 miles from Indian School Rd. The turn is about 135 deg so you actually turn back on yourself a bit. It is marked with a pile of white painted rocks.

If you take the wrong road you will be traveling

next to a fence. This is a sure sign you took the wrong road. Go back and look for the rocks



Comet LINEAR

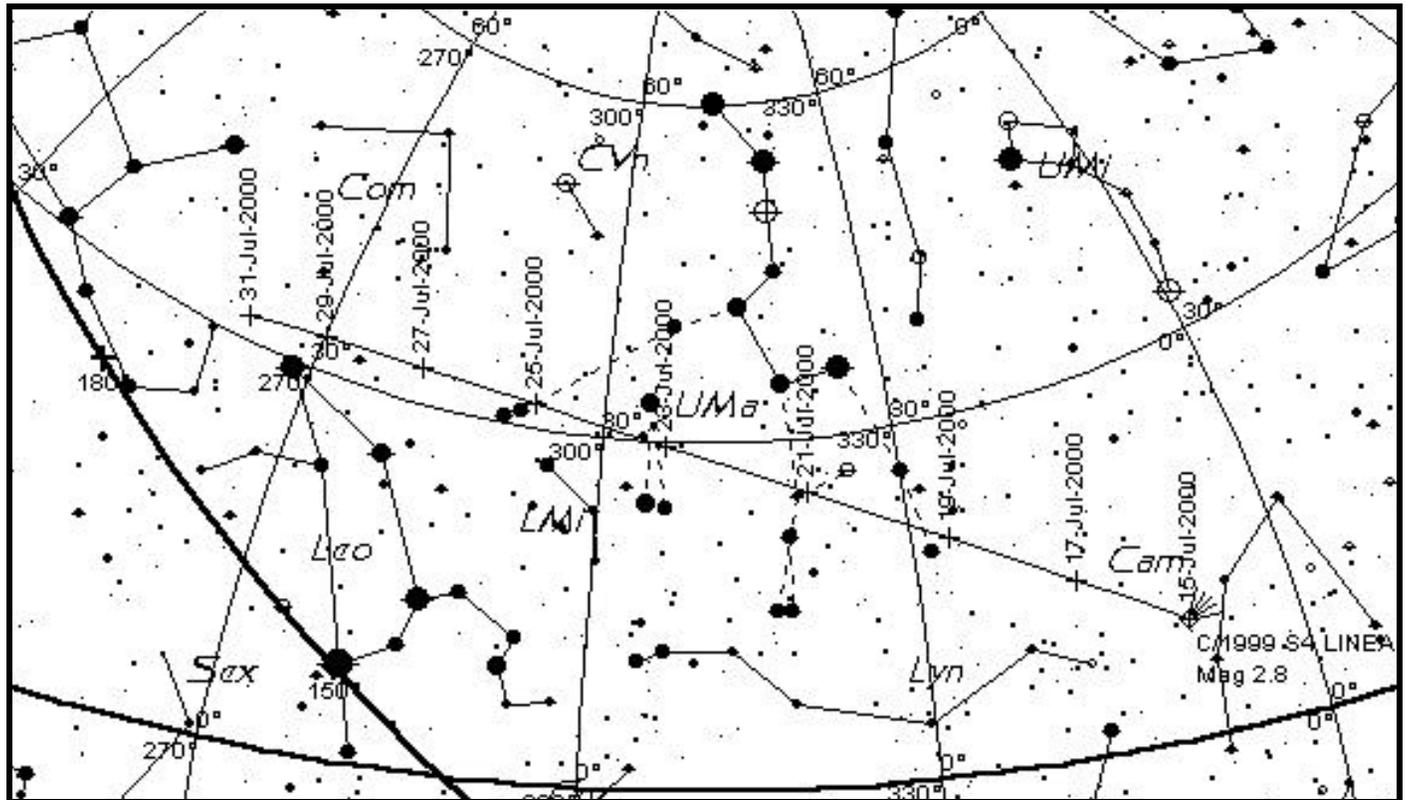
By Rick Tejera

Although this is the August issue most of you will have it by mid July. Thus I thought I'd include information on comet C/1999 S4 (LINEAR). The comet has been eagerly anticipated as it is expected to reach naked eye visibility by mid-July. As this issue goes to press, SAC members Brian Workman and Wil Milan have reported finding it telescopically and both indicate it is brighter than anticipated. They both say it is proving to be an object worth the wait.

I'm printing a chart showing the comets position at 2100 from July 15 through the end of the month. The comet should be well placed for viewing in the evening during it's naked eye run. I've also included an ephemeris showing it's altitude and azimuth, for binocular users. Here's hoping LINEAR lives up to it's hype as the last great comet of the millennium.

Ephemeris of comet C/1999 S4 LINEAR

Date	Azimuth	Altitude
15-Jul-00	351° 43' 01"	+08° 33' 39"
16-Jul-00	348° 21' 45"	+10° 51' 41"
17-Jul-00	344° 25' 00"	+13° 15' 35"
18-Jul-00	339° 49' 54"	+15° 41' 29"
19-Jul-00	334° 35' 31"	+18° 03' 46"
20-Jul-00	328° 44' 08"	+20° 15' 07"
21-Jul-00	322° 22' 26"	+22° 07' 32"
22-Jul-00	315° 41' 42"	+23° 33' 47"
23-Jul-00	308° 56' 36"	+24° 29' 12"
24-Jul-00	302° 22' 34"	+24° 52' 47"
25-Jul-00	296° 12' 49"	+24° 47' 03"
26-Jul-00	290° 36' 23"	+24° 16' 54"
27-Jul-00	285° 37' 36"	+23° 28' 06"
28-Jul-00	281° 16' 59"	+22° 26' 11"
29-Jul-00	277° 32' 28"	+21° 15' 43"
30-Jul-00	274° 20' 39"	+20° 00' 14"



President's Message

By Jack Jones

Star parties are one of the main delights of Amateur Astronomy, and the Grand Canyon Star Party was a four-night delight for me. Some of our members made it the maximum, an eight-night delight! This annual event will now forever be a part of my Astronomy life, just as the Riverside Telescope Makers Conference is to others and me. The Canyon staff and the many visitors were wonderful and both treated us very well. It was also an opportunity to get a behind-the-scenes look at Canyon activities, get to know the Canyon better, and do things we wouldn't ordinarily get to do as tourists. The luncheon we sponsored was successful and added to our Club's image and renown. I thank all who participated in the GCSP and the organizers who invited us and made it happen.

Has anyone else noticed this dreadful fad lately of mounting glaring floodlights on poles in seemingly every parking lot in town? This is ignorance at work! Just as we pursue safety in our city, so must we also pursue sane light-

ing methods for our streets, homes, and businesses. We must strive to eliminate and prevent bad lighting in our cities and countryside if we want Amateur Astronomy to thrive and survive for our children and us.



We have a great symposium coming up on Light Pollution and Lighting that will address this problem. Our keynote speaker will be Christian Luginbuhl, a man we now have the rare opportunity to hear speak and get acquainted with. We will also have the Illuminating Engineers Society of North America to pose our powerful and probing questions to. It's like a bonus meeting for the Club this year, so definitely plan to attend. This time it will be at the Arizona Science Center in the giant Imax Theater. Mark your calendar for Friday, August 25 at 7:00 p.m. Check at www.azscience.org for directions. While you're there, check out our fledgling Greater Phoenix International Dark Sky Association (GPIDA) web site at www.gpida.org!

(Continued from page 1)

Christine Shupla gave a most incredible presentation of what this Planetarium can do; then showed "We are Not Alone" which was narrated by Leonard Nimoy. Steve Coe then introduced Dr. Jeff Hester as our guest speaker who spoke on Origins: A Universe of Process and Change. A highly informative talk and a good Astronomy 102 to follow Steve Coe's Astronomy 101 talk we had in November. Afterward 20 of us met at Friday's Front Row Sports Grill at Bank One Ballpark to observe the full Moon rising over home plate.



Jack (Jefe) Jones presides over the Meeting at the Arizona Science center.

The Science Center will kindly host the first GPIDA Light Pollution Symposium on Aug 25th. Plan on attending.

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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