



East Valley Astronomy Club

May 2002

www.eastvalleyastronomy.org

Scottsdale, Arizona

Adopt-a-Highway Report

By Martin Bonadio, 2002 EVAC President

On March 30th a group of 12 EVAC members participated in our bi-annual adopt-a-highway trash cleanup along US 60 just west of the Florence Junction at US route 79. The team started at around 8am and continued until about 10:30am. When completed there were 25 bags filled along the 1-mile stretch of road.

My thanks goes out to the following people who participated: Dean Newton, Mort Hanlon, Peter Argenziano, Jack Grbcich, Steve Campbell, Craig and Caleb Dokken, Steven Aggas, Tom Polakis, Derrick Lim, and Bill Dillenges.

Of course as always there were treasures to be found along the way. Along with the always-present adult materials, a patio umbrella (which I reversed and demonstrated it's use as a tripod with), a pressure gauge, and some telescope counter weights were located. Steve Aggas reported the counter weight finding, but never produced the treasure. We're certain that they are being put to good use right now in his home observatory!

Lunch was a treat as always. The group met at Village Inn in Apache Junction. This is the very restaurant that our treasurer, Randy Peterson works at. We don't know why he claimed not to know us, but it might have been the motley looking group of us that loudly entered the establishment. Ok, now I'm kidding of course.

Tom Polakis brought his Televue Pronto and new Hydrogen-Alpha filter. Before and after lunch we had the chance to look at solar prominences around the edge of the sun. This was quite spectacular. Randy invited a few of

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EVAC EVENTS CALENDAR - 2002							
<-- Members only -->							
	New Moon	Meeting	Local	Deep Sky	Gilbert	Other Events	Club Meeting Speaker
May	5/12	5/8	5/4	5/11	5/10	4 & 5 Astronomy Day Boyce Thompson Arb. 24 - 26 RTMC Astro Expo	11 Peter Wehinger (Binoculars)
Jun	6/10	6/12	6/1	6/8	6/14	8 - 15 Grand Canyon Star Party 10 Partial Sol Eclipse	Warren Kutok (Telescopes)
Jul	7/10	7/10	7/6	7/13	7/12		
Aug	8/8	8/14	8/3	8/10	8/9		Steve Coe (Deep Sky)

NOTE : The Local and Deep Sky parties are for members and by invitation only.
The public are welcome to attend the Gilbert Star Parties which are held at the Gilbert Library at Greenfield/Guadalupe, and which start at dusk on the dates shown.

Other events coming up:
 May 4 & 5 Astronomy Day @ Arizona Science Center. & May 11 Boyce Thompson Arboretum
 May 24 - 26, RTMC Astro Expo at Big Bear, CA
 Jun 8 - 15, Grand Canyon Star Party & Jun 10, Partial Solar Eclipse event at AZ Science Center

his employees to take a look also, so fun was had by all. It's quite amazing to see how quickly the prominences change over 30-minute to 1-hour period. I was very impressed. Thanks Tom for bringing that. You have now set the precedence for future adopt-a-highway efforts. Next time we'll do the clean up at night and take some breaks to look at deep-sky treats through your 20" dobsonian!! Again, I'm kidding of course.

Thanks again for all who helped, the adopt-a-highway program is important both because it allows us to do our part for the community, and as well the signs that we have located on the road to and from the junction have brought in several new members and friends these past few years!

EVAC Speaker For May 8

This month's speaker will be Mr. Peter Wehinger from the Steward Mirror Lab in Tucson. His talk is entitled "The large binocular telescope: work in progress." He will present recent images acquired with the 6.5-m telescope at the MMT observatory on Mt. Hopkins, and other images of the Magellan Project at the Las Campanas Observatory in Chile.

If it's clear...
by Fulton Wright, Jr.
Prescott Astronomy Club
for May 2002

Shamelessly stolen information from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find data. When gauging distances, remember that the Moon is 1/2 a degree or 30 arcminutes in diameter.

For the first half of May the planets put on a show in the west at about 8 PM. The players are: Venus (mag -4), Jupiter (mag -2, always the highest and far from the others), Saturn (mag 0), Mercury (mag 1, always the lowest), and Mars (mag 2). Here are some highlights:

Thursday, May 2, Mars and Saturn close
Friday, May 3, Mercury at greatest elongation from the sun
Sunday, May 5, Venus, Saturn, and Mars form a small triangle
Friday, May 10, Venus and Mars very close
Monday, May 13, Moon near Mercury and Saturn

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Tuesday, May 14, Moon near Venus

On Wednesday, May 15, about 3:30 AM you can see 2 asteroids lined up on either side of a star. With a medium (6 inch) telescope look 25 degrees above the east-southeast horizon for Kappa Aquarii (mag 5). Up and to the left is 15 Eunomia (mag 10). Below and to the right (and further away) is 18 Melpomene (mag 10). The distance between the asteroids is slightly less than one degree.

On Sunday, May 26, about 5:00 AM, you can see a penumbral eclipse of the Moon. With your unaided eye look 5 degrees above the southwest horizon for the full moon (you can't miss it). Notice that one edge of it has a slight dark shading.

Not a lot is visible with Jupiter's moons this month. Here are the times of a few events:

- May 2 9:23 PM Callisto appears from Jupiter's shadow (rare)
9:58 PM Ganymede appears from in front of Jupiter
- May 6 8:52 PM Io disappears behind Jupiter
9:51 PM Europa's shadow leaves Jupiter
- May 20 8:51 PM Ganymede appears from behind Jupiter
9:17 PM Ganymede disappears in Jupiter's shadow

SOLAR ECLIPSE on June 10

I am looking for volunteers to help with the public viewing of the partial solar eclipse on Monday, June 10 in the late afternoon. We have two observing sites; one at SCC, the other near the Gilbert Library, at the Riparian Preserve. We have several scopes for the Gilbert site, and are looking for a couple for the SCC site. The astronomy class at SCC is planning to observe the eclipse through our scopes.

The eclipse starts about 5:20 in the afternoon, greatest eclipse is about 6:33, and it ends about 7:35 pm, when the sun sets.

If you have a solar filter for your scope, join us in providing a view of the eclipse to the public! If you don't have a solar filter, we would still appreciate your support for this event. The next good eclipse (also a partial eclipse) visible from the Phoenix area is on May 21, 2012, so if you think you'll catch the next one, you have a while to wait!

Let me know if you can show up for this event, with or without a solar scope! There will be a signup sheet at the next EVAC meeting, or you can email me.

Randy Peterson
rgpeterson@cox.net (new address)

BACKYARD ASTRONOMER

Binoculars (Part One)

By Bill Dellinger

Where are your binoculars? I ask this question because, while I see a few gazers out there using them, I see many more that aren't. I can't imagine stargazing without them. Even if you have a \$5000 telescope, I feel that an investment of a couple hundred dollars in a binocular will enhance your enjoyment of stargazing tremendously. Why? For one thing, they provide a wide field, right-side up view of the night sky that can be enjoyed by using BOTH eyes. Are you tired of years of viewing a half degree field using one eye, the other annoyingly squinted? Then welcome to the world of binoculars. Mount your binocular on a tripod, pull up a stool, and enjoy panning the heavens as nature intended...relaxed and using two eyes. Take in huge clusters like the Pleiades, M7, M44, or Coma Berenices. Enjoy the best view of a comet that can be had, the 7 degree field (or so) taking in the full extent of the tail. Pan the rich star fields of the Milky Way. (A note here: yes, you can use two eyes with a bino-viewer on your scope but I doubt you'll get a 7 degree field).

The second reason I implore you to consider these little "twin rich-field refractors" is to assist you in finding those faint fuzzies which are playing hide and go seek on you. Sometimes an 8x50 finder just can't seem to sweep up M-whatever easily. It's times like those when a pair of 7x50's can save the day. Though the same aperture, there is something about using two eyes, peering through two 50mm lenses, and a right side up field that can pull in that elusive object where an 8x50 finder failed. And if tripod mounted, they're even more deadly. It's saved my butt many times.

Let's discuss the basics. What does 7x35, 7x50, 10x70, etc., mean? The first number is the power or magnification. It simply means how many times closer the distant object appears or put another way, how much bigger it appears. The second number is the diameter of each objective lens (the big ones up front) in millimeters (25.4mm = 1"). The bigger those lenses, the more light they gather. At daytime, 7x35's work fine. For night applications, the usual recommended glass is the venerable 7x50. They pull in a little more light, a good thing for two reasons. At night stuff out there is dim: stars and deep sky objects. Also, at night your pupils

open to their maximum diameter of about 7 millimeters and it just so happens that 7x50 binoculars offer an "exit pupil" of 7mm to match it. Exit pupil is the cone of light coming out through the eyepieces. It can be found by dividing the aperture (size of the lens up front) by the power. Thus $50\text{mm}/7 = 7.14\text{mm}$ exit pupil. BUT, I feel any binocular can be used and enjoyed for astronomy. It's just that a 7x50, 10x50, 9x63, etc., sized glass is the preferred way to go. Some purists will point out too, that in older people, the pupil doesn't open to 7mm, only to about 5mm-so why require a 7mm exit pupil? This matter is a can of worms. While it's an interesting argument, perhaps with some merit, I think each person must decide what's best for him or her. Keep in mind though, if you go with, say, a 10x50 binocular rendering a 5mm exit pupil, now you're at 10x which means it's more difficult to hold the binocular still. (unless it's tripod mounted of course). Try them all out--what works best for you? Anyway, it's difficult to measure your dark adapted pupil size. I've tried using a Sky and Telescope gismo I have in a dark closet to measure mine but it's difficult because it's too dark to see the device! Pupil size at night for various people is a nebulous matter. I recall a S/T graph that definitely showed a downward trend in pupil size (at night) for people as age increased but there was quite a bit of "scatter" in the graph so I would use caution in deciding whether or not your eye opens to 7mm.

Binoculars usually yield a field somewhere between 5 and 9 degrees, with most 7x units providing a 7 degree field, a nice general purpose sized field. For reference, the bowl of the Big Dipper is 5x10 degrees. The field is typically stated on the binocular in degrees. Sometimes it is shown as "362 feet at 1000 yards" which means you would see 362 feet of a fence, in your binoculars, that is 1000 yards away. You can convert this to degrees by simply dividing the "362" by 52.5 which gives 6.89 or about 7 degrees.

Another important number, especially for eyeglass wearers, is eye relief. This is how far from the eyepieces your eyes can be and still see the full field. As an eyeglass wearer, it's the first thing I note in considering a binocular. If, after folding down the rubber cups-or as in

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newer models, twisting down the cups- I can't see the whole field with my glasses on, I throw them in the garbage. It's deplorable how many binos fail this test. The cut off point seems to be about 18mm-below that you'll probably not see the full field, above it you'll enjoy nirvana: the beauty of seeing a full field with a sharp, dark round field stop framing the view!

Once you decide on the power and lens size, what do you look for when shopping for these bad boys? The most important factors are quality, brand name, and durability. This automatically translates into price. Assuming the "porro-prism" type of binocular used in astronomy, expect to spend \$200 or more to avoid the junk on the market ("roof-prism" type binoculars, favored by birders, start at \$400). Why buy several low end models over the years when you can spend a little more and buy a nice pair once! By brand name, I mean Nikon, Pentax, Swift, Leica, Swarovski, Zeiss, Fujinon, and some Celestron, Meade, Eagle Optics, and Orion models. Whatever you do, for God's sake, stay away from Tasco, Simmons, Bushnell, and department store brands- PLEASE! You also want them to have: "fully multicoated optics", not just "coated" or "fully coated". They should be tripod adaptable. Have good eye relief.

Fold down or twist down eye cups. The prisms inside should be "BAK-4", not the older less efficient "BK-7" type. A field of view to your liking and needs. A smooth operating focuser. Perhaps nitrogen purged (prevents internal fogging-usually only found in very high end binos-not a critical requirement). Sound collimation-they shouldn't strain your eyes when using them. Keep weight in mind, over about 27 ounces, binos start to get heavy. One last piece of advice: if at all possible, try them out before buying them. Even a high quality bino with the above criteria simply may not feel good in your hands. Or you may not like some other ergonomic aspect to them.

I hope this "primer" on binoculars wets your appetite about these double barreled mini-telescopes. Next month I'll talk about some specific pairs I've had experience with and include a list of birding and astronomy binoculars I recommend.

Until then, here are a few references: Everything You Need To Know About Binoculars, Phil Harrington, S&T, June '01, p.68. My Favorite Binoculars For Astronomy, William Cook, S&T, April '97, p.46. The Net: betterview.com, cloudynight.com, binocular.com, www.eagleoptics.com

EVAC Meeting Minutes March 11, 2002

by Tom Polakis, Secretary

The meeting opened with some sketch comedy by Martin Bonadio, Pedro Jane', Silvio Jaconelli, and Tom Polakis. Howard Israel (howmad@aol.com) mentioned that he is heading EVAC's efforts in Astronomy Day, May 4, at the Arizona Science Center, and still encourages volunteers. Gary Finnie (gfinnie@kam-az.com) is leading Mt. Graham trips in June and July. Contact him for details. In upcoming events, note that we are having a star party at the Boyce Thompson arboretum on May 11. Before taking a break, Martin thanked the participants in our semi-annual Adopt-a-Highway efforts.

After the break, Chris Schur showed CCD images of objects including galaxies in Ursa Major, NGC 1999, and the mysterious Waterfall Nebula. Steve Aggas followed Chris with images that included a galaxy field around Abell 994. JOe Orman showed scenic photographs from Organ Pipe Cactus National Monument and pictures of Comet Ikeya-Zhang. Howard Israel showed off some free software for a palm-type computer. It is called Taiyoukei, and has an amazing wealth of features for freeware.

The main speaker was David Burstein from ASU. He was proud to announce that an astronomy text authored by him and six others is now available from W.W. Norton (<http://www.wwnorton.com>). It is named "21st Century Astronomy." Dr. Burstein then held a question-and-answer session with the club.

Tom Polakis - <http://www.psi-az.com/polakis/>

2002 All Arizona Messier Marathon by A. J. Crayon

While this year's event, with 107 possible, wasn't expected to be as well attended as last year with all 110 possible - there was still a surprisingly large turnout. No doubt due to weather and Tom Polakis' timely e-mail posting of Saturday's great weather report. Most came just to observe and visit, but there was the die hard group of Marathoners that weren't to be denied.

Thanks to Jennifer Keller and Jack Jones for canvassing the site between sunset and twilight. They counted 66 vehicles, 75 telescopes and 84 people; including Dave Ingram from the Boeing Astronomers in Seattle Washington and Mark Blackford from the Astronomical Society of New South Wales in Sydney, Australia. Dave made the trip just for the marathon but Mark happened to be in Arizona and learned about the Marathon from the web.

Before twilight everyone was treated to a very slim sliver of a 1.6 day old moon. But, nearer to twilight many marathoners were already on their way finding the brighter entries.

Several observers spent some time with Hazel Lawler and her new 4.7 inch (120mm) f5 refractor - one of the two smallest telescopes. This surprising instrument, with RA and Declination controls, showed very nice star images to the very edge of the field of view. In fact Hazel used this instrument, rather than her 20 inch (500mm), for the marathon!

Speaking of ladies please note there have been a number of them participating in the Marathon over the years, three for this event, and they have been finding more and more each year. So far the SEDS site (<http://www.seds.org/messier/xtra/marathon/hall.html>) doesn't show an individual lady finding all 110 in a marathon. Who will be the first? I can't wait to congratulate her!

The other 120mm refractor belonged to Matt Luttinen; his first marathon but not his first telescope. That goes back to his Edmund 4.25 inch, to which he named "Palomar, Jr." Finding 75 objects is a great start!

Although there wasn't the all night chirping marking bird as in last year's marathon, there were some interesting side distractions. At one time, the dull rushing sound of absolute quietness was interrupted by an automobile alarm sounding off, startling some of us at first but then the humor sank in and there were some muffled laughs. Quickly followed by silence as observers got back to the task at hand.

We also kept an eye out for some late night four wheelers exploring the wonders of the Sonoran Desert as we enjoyed the celestial treats above. Hope they had just as good a time.

This was the first marathon Rick Scott used his 9.8 inch (250mm) Lurie-Houghton, a telescope with all-spherical surfaces and a 2-element corrector lens, at the front of the tube, to adjust for coma and spherical aberrations. This design is excellent for astrophotography and wide field viewing. All who viewed this intriguing instrument would agree the viewing was excellent; now Rick has to decide about the astrophotography?

As twilight approached the marathon was once again interrupted - by Ikeya-Zhang! The comet is still beautiful, no matter how it was observed - naked eye, binoculars or telescope. Its bluish tint was seen in all optical instruments regardless of size.

The final results appear in table form; but suffice it to say that 107 objects netted first place for eight observers; three found 105 and was good enough for second and one got 104. Looks like 11 got between fifty and 102 and that gets them a certificate. Three were brave enough to turn in lists with less than 50 objects found. Congratulations to all, especially the three!

I managed 52 objects in my 14.5 inch (370mm) Dobsonian, mainly because of taking my time on many of the Messier show piece objects in order for detail observations and drawings to be completed. Near twilight Steve Coe came over and found Snyder-Murakami. The biggest feat here was Steve Coe's ability to find this very very faint comet - a challenge even in the 14.5 inch.

This was the first Marathon with two members from Sun City West Astronomy Club; namely Darrin Strosnider (104) and Al Stiewing (53).

There were a number of observers, myself Steve Coe and Matt Luttinen and about 20 other vehicles, that showed up for a Friday night session. It was enjoyable, but the skies for the Marathon were considerable better!

AJ Crayon acrayon@mindspring.com
 SAC Marathon Coordinator

Jack Jones spicastar@msn.com
 SAC Marathon Coordinator

SAC web site: <http://www.saguaroastro.org>

2002 All Arizona Messier Marathon Standings

April 13, 2002; Arizona City, Arizona.

NUM	NAME	SCOPE	ORGAN.	MISSED
107	Bob Birket	GPS11	EVAC	33 74 77
107	Jim & Delia Brix	16"Dob	TAAA	33 74 77
107	Steve Dodder	C8	SAC	33 74 77
107	Michael Evans	C8	EVAC	33 74 77
107	Tom Mozden	14.5" Dob	EVAC	33 74 77
107	Rick Scott	9.8" LH	EVAC	33 74 77
107	Ken Sikes	10" LX50	n/a	33 74 77
107	Don Wrigley	12.5" DOB	EVAC	33 74 77
105	Mark Blackford	15X80 Binocs	ASNSW	33 74 77 76
105	Wade Holguin	LX200	n/a	33 74 77 76 110
105	Brian Page	9.25" SCT	EVAC	33 74 77 76 34
104	Darrin Strosnider	10" SCT	SSWAC	33 74 77 31 32 110
102	Jim Gutman	unk	EVAC	33 74 77 15 2 72 73 30
96	Howard Israel	unk	EVAC	
92	Jennifer Keller	10" DOB	SAC	
82	Steve Coe	8X42 binos	SAC	
75	Matt Luttinen	120mm ref	SAC	
64	Dean Newton	6" Newt	EVAC	
55	AJ Crayon	14.5" DOB	SAC	
53	Hazel Lawler	4.7" ref	TAAA	
53	Al Stiewing	C8	SSWAC	
52	Joan McGue	8" Dob	SAC	
50	Jack Jones	14.5" Newt	SAC	
41	John Doll	10" DOB	SAC	
21	Mary Keller	Mom's scope	SAC	
13	Beth Holguin	20X80 binos	n/a	
unk	*Dave Ingram	unk	WA	

ASNSW = Astronomical Society of New South Wales; Sydney, Australia

LH = Lurie-Houghton

SSWAC = Sun City West Astronomy Club

WA = Boeing Astronomers, Seattle Washington specifically came here for the MM!

* check off list not received.

Discovery Park In Safford To Resume Tours Of The Mount Graham International Observatory

Discovery Park – located in Safford in southeastern Arizona’s Graham County – will resume tours of its Mount Graham International Observatory (MGIO) beginning Saturday, May 4. MGIO is a division of Steward Observatory – the research arm for the Department of Astronomy at the University of Arizona.

The MGIO is considered one of the best astronomical viewing areas in North America because sky conditions on Mount Graham are among the best in the world. The observatory site is only open to the public during these special guided tours.

Dates: Saturdays beginning May 4 through late fall, weather permitting

Departure Location: Graham County Chamber of Commerce

1111 Thatcher Boulevard – on U.S. 70 at Firth Park , Safford, Arizona

Times: 9:30 a.m. – Check in

10 a.m. – Departure

4:30 p.m. – Return

Admission: \$20 per person – includes lunch

Tour: Visitors are taken by van to an elevation of 10,500 feet in the Pinaleno Mountains, where a guide tells of the rich geology, history and diversity of life in the area. Once at the summit, a sack lunch is served, followed by the guided tour of the observatories. Vans return to the Chamber of Commerce at approximately 4:30 p.m.

Highlights: Vatican Advanced Technology Telescope – used by the Vatican Observatory Research Group and the University of Arizona.

Heinrich Hertz Submillimeter Telescope – used by all State of Arizona and German institutions and is made available on a limited basis to astronomers from other institutions.

Large Binocular Telescope – when completed, will be the world’s most powerful optical telescope.

Tour Restrictions:

- Tour participants must be at least eight years old
- There is a minimum of two people required to reserve a tour
- Reservations are required

Suggested Items:

Visitors are encouraged to bring a light jacket or sweater – as temperatures are cooler on the mountain – sunscreen, a hat, sunglasses and a camera. Comfortable closed-toe walking shoes are recommended and those who tend to get motion sickness should bring medication for the trip up and down the curvy mountain road.

Reservations/ Information: Graham County Chamber of Commerce

(520) 428-2511 or (888) 837-1841

Media Information: Klute Communications

(480) 951-6525 – Scottsdale Office

(520) 742-3515 – Tucson Office

(480) 951-6559 – fax

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Finding Himalia

By Rick Scott

Himalia is the only moon other than the Galilean moons of Jupiter that is visible in an amateur size telescope. It is much farther from Jupiter than the other moons with an orbit around Jupiter that takes just over 250 days to complete. Himalia is small, only 170km in diameter with a visible magnitude of about 15. Because it's so dim, the best time to look for it is when its orbit takes it as far as possible from Jupiter as seen from Earth. It also helps to have clean and well baffled optics.

The first time I tried to look for it was at the All Arizona Star Party in October 2001 around three in the morning. The sky was very transparent that night and I was able to see stars dimmer than I have ever done with my scope before. More on how I determined that will come later in this article. Jennifer Keller was at my scope sharing in the search for this elusive moon and was able to see these dim star too.

I normally use "The Sky" from Software Bisque for planning my observing and in helping me find objects, but it only has the Galilean moons for Jupiter so I used Red Shift (version 3 at the time) which I also had on my computer. Red Shift is very cheap (about \$40) and is excellent for solar system objects. Version 3 didn't use the Hubble Guide Star Catalog (GSC) so it's limited in the number stars it could show. I needed to have many of the dim stars in the area around Himalia to identify it, so I set up the two programs to display the same area of the sky and at the same scale. By doing this I was able to use the ALT-TAB key combination to quickly switch between the two programs and see where Himalia was in the star field displayed by "The Sky".

After locating the correct star field, it was possible to see something extremely dim quite close to the position where Himalia should have been, but it seemed dimmer than 15th magnitude in comparison to nearby stars. Clicking on the stars in "The Sky" showed that the dimmest stars in the GSC around this area was just brighter than mag 14, and the object near Himalia's position was more than a magnitude dimmer. So now what do I do?

I did some follow up activities after that first search to find Himalia. The first thing I did was to pull up a photo of the star field from the Digitized Sky Survey (DSS) to look for any stars that we may have seen as the moon. And yes, there was a faint star in that position. So now I needed to identify that star to see if it was bright enough for us to see in my scope. I also purchased the latest

version of "Red Shift" (version 4) because it uses the Guide Star Catalog (GSC) and therefore has many more stars to help in identifying the correct star field. To my surprise the new version showed Himalia in a different position as compared to version 3, the version I had at the All AZ Star Party. Now the true position was something I needed to resolve.

For my next step in solving this puzzle, I ran the Horizons Ephemerides program available on the JPL web site and found that the position shown in the new version of Red Shift has the correct position. If you haven't figured it out yet, we weren't even looking in the right place! I still wanted to know how bright the star was that we thought was the moon, but it isn't in the GSC so I had to find another resource. It shows up in the DSS photograph, but that doesn't provide me any data on the star.

"The Sky" can read the USNO database files from the Naval Observatory Flagstaff Station, so I went to their web site and downloaded the 250MByte file that has stars down to the 21st magnitude for the area of the sky where Jupiter was that night. It took about an hour and forty-five minutes to download the file. After setting up the computer to display the USNO database, I used another great feature of "The Sky". "The Sky" can display a photograph overlaid on its computer generated star field to help in identifying objects. I used this feature to overlay the Digitized Sky Survey photograph on top of the USNO stars. The USNO database was made by scanning the Palomar Observatory Sky Survey (POSS) plates and it was obvious from the computer display that the database has a star for every star that could be seen in the photograph. This is a truly amazing tool available for our use and should not be overlooked.

Using this setup on my computer, I was able to find the star in the USNO database at mag 16.5 which, for me at least, agrees well with the difficulty in seeing the star. This is the faintest star I've seen in my scope and shows how good the sky was that night. It's just too bad we were looking in the wrong place. I also checked a recent Sky & Telescope article on the moons of the outer planets. The map they had for Himalia also agreed with version 4 of Red Shift and the Horizons program. After doing this research, I believe that someone using nothing but the Sky & Telescope article will never be able to tell the moon from the field stars.

So now I knew what resources to use in planning future attempts to find Himalia (or any other faint obscure solar system object). The following are the steps I used to plan my follow-up observations:

1. Use the JPL Horizons Ephemerides program to get the J2000 astrometric coordinates and the apparent coordinates for the time I was planning on observing Himalia.
2. Download the Digitized Sky Survey photograph centered at the apparent coordinates.
3. Add Himalia to the database for "The Sky" using the J2000 astrometric coordinates. "The Sky" will then process the J2000 coordinates to the proper location for the observing time entered in the Horizons program.
4. Overlay the photograph with the USNO database in "The Sky".
5. Use "The Sky" to see exactly where in the photograph Himalia will be for that observing session.
6. Mark up a printout of the photograph with the location of Himalia and magnitudes of various field stars for use at the eyepiece.

This system has worked very well for locating where to look and to have star magnitudes to check the limiting magnitude for that observing session. Checking the dimmest stars I could see allows me to determine if Himalia could be visible or not for that night.

With the system now developed, I looked for the Himalia at the December local star party, the January and February deep sky parties, and at the Sentinel-Schwaar star party. I was just able to glimpse it in February and got a positive observation at Sentinel, but it was sure dim. This observing project taught me a lot about the resources available to us and how steady and transparent the atmosphere has to be to find such an elusive object. Now it's your turn, I'd love to hear if you can find it and how small a scope you can do it with. I use a scope with an aperture of 9.8 inches.

Here are the web site addresses for the on-line resources I used:

JPL Horizons Ephemerides program: <http://ssd.jpl.nasa.gov/horizons.html>

Digitized Sky Survey: <http://stdatu.stsci.edu/dss>

USNO Database: <http://ftp.nofs.navy.mil/projects/pmm/catalogs.html>

Software Bisque ("The Sky"): <http://www.bisque.com>

Maris Technologies ("Red Shift"): <http://www.redshift.maris.com/index.php3>

How Many Miles Per Tortilla Do You Get?

How are batteries, gasoline, and tortillas alike? They all store energy. Of course, the energy they store is used in very different ways by different things. Cell phones can't run on gasoline and people can't run on batteries! But, even so, the energy stored in these different ways is really the same stuff!

We could compare the amount of energy stored in different kinds of fuel, and see, for example, how much gasoline it would take to operate a person (we don't recommend trying this!) or how many tortillas it would take to operate an automobile (we don't advise this

either!).

Speaking of tortillas, when we start figuring up how much energy different kinds of substances can store, we find that food is very efficient. For fun, we could compare how many tortillas it would take to operate an automobile, a space shuttle, a very small and advanced robotic spacecraft, and you.

You are already familiar with automobiles and space shuttles. The spacecraft we will compare these with is called Space Technology 5. Three of these tiny craft will be launched into Earth orbit to test out their advanced,

See TORTILLA cont'd on pg 11

miniaturized, energy-efficient technologies.

So, how many tortillas would it take to operate each of these energy-users for one day? Space Technology 5—4.4 tortillas; human—14-20 tortillas; space shuttle—2,904 tortillas; automobile—12,192 tortillas! Now you know why cars are called tortilla guz . . . er, gas guzzlers!

Learn more about how energy is stored and enter a Space Place contest. All you have to do is design your own spacecraft using tortillas or create an original recipe using tortillas. To enter the contest, go to spaceplace.nasa.gov/st5/st5_tortillas1.htm .

This article, written by Diane Fisher and Eric Elkins, was provided by the Jet Propulsion Laboratory, California Institute of Technology in Pasadena, CA, under a contract with the National Aeronautics and Space Administration's New Millennium Program.

Caption: Space Technology 5 will fly three birthday-cake-sized spacecraft to test advanced, miniaturized, energy-efficient technologies in space.

GEMINI AND CANCER FROM THE BACKYARD WITH A 6" TELESCOPE

By Silvio Jaconelli

This is the next in a series of articles I am writing about backyard observing with modest aperture, in this case 6". I am back to the Zodiacal constellations, and I am combining Cancer with Gemini since Cancer is a rather dim constellation with not too much for suburban sky conditions. A rough star chart is attached. At this point I must give the usual caveats that the views expressed in this article are based on my experiences with my equipment and with my physical limitations - your results may well differ!

CASTOR

Castor is the northern star of 'The Twins' and shines at 1.9 magnitude, which is dimmer than 1.2 magnitude Pollux. Castor is a double star with components of 1.9 and 2.9 magnitude with a separation of 4". Around 100x is required to resolve the pair. Not so well known is that Castor is actually a triple star - the 3rd component lies some 70" to the south and shines at 9th magnitude. This star is a red giant (I am unable to see the reddish tint with 6" aperture), and is actually an eclipsing variable which dims by half a magnitude every 29 hours. You cannot mistake this star - in the eyepiece it is the faint star nearest to Castor.

ETA

Let's drop to the foot of Gemini, on the Castor side, to Eta.. This seemingly ordinary star is worthy of a couple of comments. Firstly, it is a pulsating variable with a magnitude range from 3.2 to 3.9 over a period of 233 days. Secondly, it was here in the same eyepiece field of view that Herschel discovered Uranus in the year 1781.

M35

Now to our first Messier object of the tour, the 5th magnitude open cluster M35. This cluster is visible with the naked eye from a dark sky site, and is easily seen through binoculars from town. Like most large open clusters, I found that low magnification works best as this very nicely frames the entire cluster in the eyepiece. I found that 50x worked best for me. At higher powers you are able to resolve more stars, but I seemed to lose the overall perspective of the object. Half of a degree to the southwest lies NGC 2158, a 9th magnitude open cluster that I easily see from the desert using 12" of aperture, but which I have never been able to see from the city - has anyone ever seen this from

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GEMINI cont'd from pg 11

town? I find this object amazing - it is 16,000 light years away, close to the outer rim of the Milky Way galaxy, which is 6 times further away than M35, has the same absolute brightness as M35, and by pure coincidence just happens to be in the same line of sight with M35.

38 GEMINI

Let's now cross over to the other foot of Gemini, the Pollux side. Approximately 1.5 degrees east-north-east of Xi is the interesting double star 38 Gemini. It's components shine at magnitudes 5 and 8, and the separation is around 7 arc seconds, making it resolvable at around 50x.

ESKIMO

Moving up the Pollux side of the constellation, we come to Delta, which has two fainter (but still naked eye visible) stars just off to the south and east. The eastern star is 63 Gemini, and through a low power eyepiece this star will be seen to be the brightest star in a horseshoe shaped asterism. Keeping low power, move another half a degree to the southeast, and you will see what looks like a wide double star, except that one of the components has a distinctly fuzzy nature - that fuzzy star is actually the Eskimo Nebula. This object takes magnification very well - my best views with 6" aperture was at over 300x, when the nebulous nature of the object shows up best. This nebula has a 10th magnitude central star. While at the horseshoe asterism, check out the really neat (and wide !) double star just off the tip of one side of the horseshoe - the fainter companion has a very distinct blue tinge to it.

PLUTO

While in this neighborhood, take another look at Delta, which shines at magnitude 3.5. It was in a low power eyepiece field of view of Delta that Pluto was discovered in 1930 at the Lowell Observatory in Flagstaff.

ZETA CANCRI

Let's move into the constellation Cancer.

Draw a line from Castor to Pollux and extend it two and a quarter times, and the brightest star in the vicinity will be Zeta Cancrī, one of the most interesting double stars in the sky. At 75x it can be resolved into its two major components of 5.4 and 6.0 magnitude with a separation of 6" - no challenge here. However, the primary star itself is a double star with magnitudes 5.6 and 5.9 with a current separation of around 1". I say "current separation" because the 5.9 magnitude companion has an extremely fast orbital period around the primary of just under 60 years. This year, the three stars form a perfectly straight line, but in the next year or so you will see the closer companion begin to move ahead of the other two components - one of the very rare times that the proper motion of a star can be observed. So now is the year to begin sketching this triple star with a view to seeing how soon in the future that changes in their relative positions can be observed. As for the closer components, I was able to get a 'figure 8' at 300x, and a clean split at 450x. Don Wrigley's 6" f/10 refractor split this triple star with consummate ease.

M44 - BEEHIVE CLUSTER

Another Messier object, M44, also known as the 'Beehive', also known as Praesepe, also known as the 'Manger'. The same comments for M35 above also apply here - a large bright open cluster that is best seen at very low powers. It is brighter than M35 - 3rd magnitude, which makes it naked eye visible from a dark sky site. In fact, it is impressive through binoculars, where it is easily seen between Gamma and Delta. It is this position between Gamma and Delta that the name 'Manger' comes from - it looks like the cluster is in a manger, the manger comprising the two bright stars.

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M67

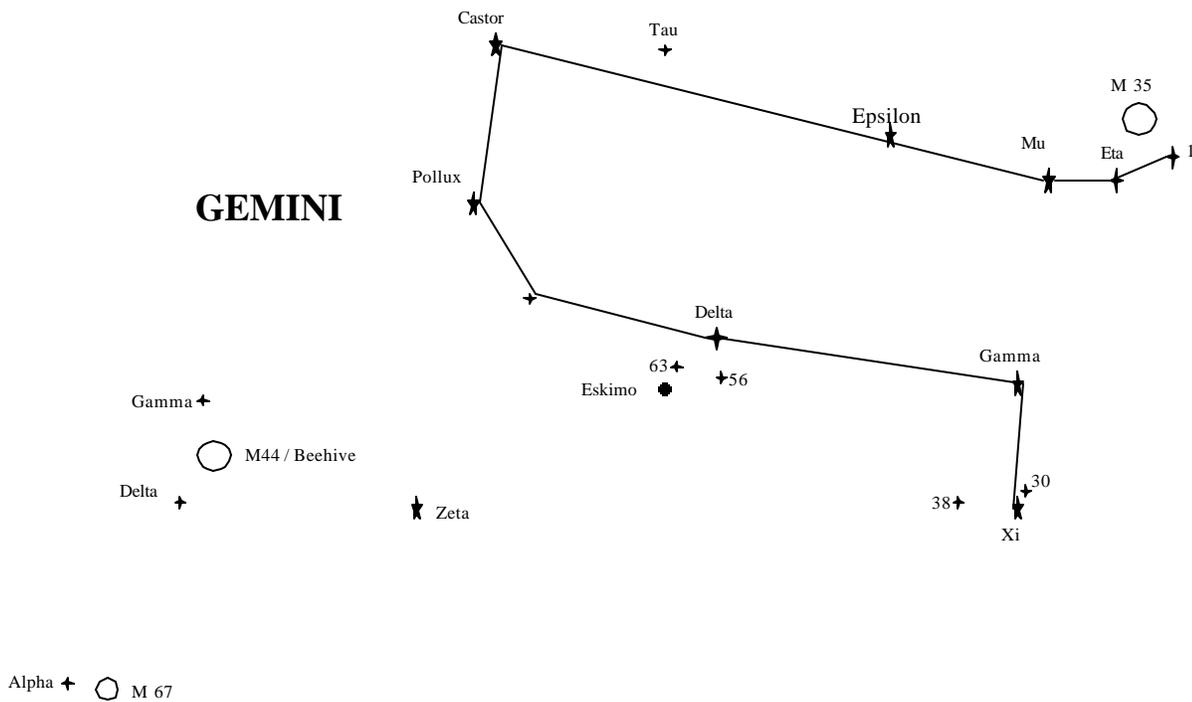
Now let's go to Gamma and Delta, and extend the distance just a little over two fold - we should be within eyepiece view of our next Messier object - M67, a faint open cluster that lies 2 degrees due west of Alpha Cancri. This cluster shines at only 7th magnitude, and magnification higher than 100x tends to wash out the image from the suburbs, so I found the best views to be again around 50x.

CONCLUSION

Summer is approaching and our viewing opportunities will begin to lessen - so let's make use of our observing time, even if it is only an hour or two from the back yard !

ADDENDUM

I have mentioned in earlier articles about the excellent views obtained by mirrors ground by Mike Spooner, and I have been asked by several people for his contact address. For anyone interested, Mike can be contacted at spooner@page.az.net



Sky & Telescope Magazine

A few months ago an article in the EVAC newsletter told about how *Astronomy Magazine* now has a one year AND a two year subscription price for club members, of \$29 and \$55 respectively. Sky and Telescope has just come out with the following Q&A:

What will THE CLUB PLAN do for me? Participating members receive a subscription to *Sky & Telescope* for \$30, a 25% discount off the regular subscription price. They also get a 10% discount on Sky Publishing books and products plus occasional special discounts on specific Sky products.

Can I pay for my subscription with a credit card? Yes! [But note, that *Astronomy Magazine* does NOT allow this - Randy]

What if I already subscribe to *Sky & Telescope* at the regular price? You can renew your subscription at the club discount through your club treasurer. Your subscription will be extended by one year.

What happens when the renewal notices come to me in the mail? You give your payment with your renewal notice to the club treasurer. He/she is responsible for sending the payment to Sky Publishing.

Why do I have to go through the club treasurer? Why can't I renew myself? Sky Publishing has to verify that THE CLUB PLAN participants are still members in good standing of their clubs before we [S&T] can grant the discounted subscription.

Once I've subscribed, can I extend my subscription by more than one year? No, we [S&T] prefer that you only renew for one year at a time.

How do I get the 10% discount on books and products? When you order, tell our [S&T] customer service reps that you are a participant in THE CLUB PLAN and give them your club's name.

Can I order books and products at the 10% discount if my club participates in THE CLUB PLAN but I don't subscribe to *Sky and Telescope* myself? No, you yourself must be a participant in THE CLUB PLAN in order to receive the discount.

What happens if I leave the club? You cannot renew your subscription at the club discount unless you are a member in good standing of a club which participates in THE CLUB PLAN.

East Valley Astronomy Club Membership Form

Please complete this form and return to the club treasurer at the next club meeting OR mail to EVAC, P.O. Box 2202, Mesa, AZ 85214, with a check or money order made payable to EVAC.

IMPORTANT: ALL memberships expire on December 31 of each year.

New Member Only - select month joining:

- \$20.00 January – March
- \$15.00 April – June
- \$10.00 July – September
- \$25.00 October – December & next year

Membership Renewals:

- \$20.00 January – December

Name Badges:

- \$7.00 each

Name: _____

Magazines: if renewal, customer # _____

(New) (Renewal)

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

Newsletter delivery option, check one:

- E-mail (saves club postage/printing)
- U.S. Mail

Total enclosed \$ _____

Name: _____

Address: _____

Phone # (____) _____

E-mail _____

URL: _____

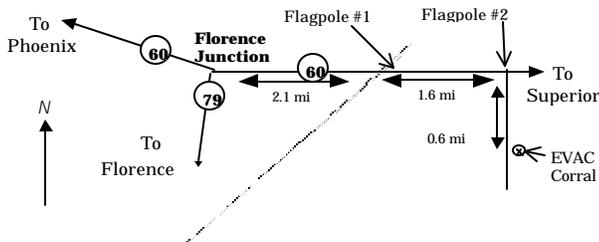
EVAC Star Parties

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. (Report gunfire or illegal activity: 800/352-3796; Land use permit number: 26-104528.)

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

How To Get There: Take US 60 east to Florence Junction. Go past Florence Junction. 2.1 mi past FJ are railroad tracks, and on the right will be a flagpole. Do not turn there. Continue on for another 1.6 miles until you find the second flagpole on the right. This is your turn. Turn right, and continue on the dirt road for 0.6 miles. The corral is on the left, just before a gas-line sign.

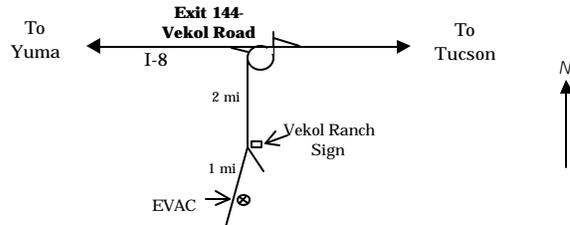


Deep Sky Star Party: Vekol Road Site

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 sky glow 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 dirt road to the left. Go south for 2 miles. At the Vekol Ranch sign bear right and continue south for another mile until reaching a large, open area on the left.



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East Valley Astronomy Club—2002 Scottsdale, Arizona

EVAC Homepage—<http://www.eastvalleyastronomy.org/>

Membership & Subscriptions: \$20 per year, renewed in December. Reduced rates to *Sky & Telescope* and *Astronomy* available. Contact Randy Peterson. PO Box 2202, Mesa, AZ. 85214. Email: rgpeterson@cox.net

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

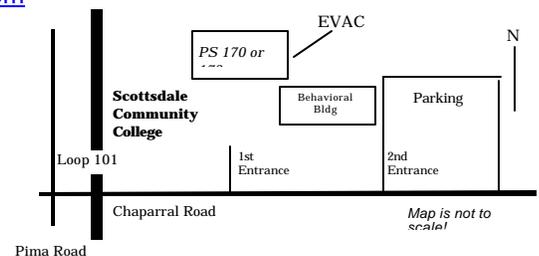
Address Changes: Contact Randy Peterson. Email: rgpeterson@cox.net or PO Box 2202, Mesa, AZ. 85214.

Newsletter: Contact Don Wrigley or Kathy Woodford, 423 W. 5th Ave, Apache Jct, AZ 85220. The Newsletter is mailed out the week before the monthly Club meeting. An electronic version is available in Adobe PDF format in lieu of a printed copy. Please send your contributions to Silvio Jaconelli SilvioJ@msn.com or Don Wrigley DJWrigley@earthlink.net. Contributions may be edited.

EVAC Library: The library contains a good assortment of books, downloaded imagery, and helpful guides. Contact Gary Finnie for complete details gfinnie@kam-az.com

Book Discounts: Kalmbach and Sky Publishing offer a 10% Discount to EVAC members on books and other items from their catalogs! When ordering, notify the person on the phone that you would like the "Club Discount." When ordering by mail, there is a line to subtract the 10% club discount.

EVAC Party Line: Let other members know in advance if you plan to attend a scheduled observing session. Contact Dave Coshow (480) 730-1132.



Deadline for the June Newsletter is May 31st



**East Valley
Astronomy Club**

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EVAC on the Internet

EVAC Homepage: www.eastvalleyastronomy.org

E-mail Mailing List:

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 AZ-Observing@freelists.org

Although EVAC is a private club not open to the public, we do encourage potential new members to initially join us at our club meetings and/or star parties to help them determine the suitability of the club to meet their needs.

**Reminder: Next EVAC Meeting
Wednesday, May 8, 2002**