

East Valley Astronomy Club

January 2001

www.eastvalleyastronomy.org

Scottsdale, Arizona

President's Message

By Martin Bonadio

Welcome everyone of EVAC to this brand new year -- 2001.

First order of business: I want to recognize our new officers. They are a great group of people, and I look forward to working with them to continue developing this fantastic club. A thanks goes out to each of you for volunteering your time and your efforts!

Next, I would like to recognize everyone in the club. I think it is prudent that I thank everyone for making me feel welcome and part of something important. When I joined the club a little more than three years ago, I had a wish to share my love of the sky with others like myself. I didn't know what to expect, and was thrilled to find such a top-notch group of people. I think this is the most important part of my message this month because I want to recognize the fact that astronomical interests vary so greatly -- and yet we are all united to share this together. Joe Orman and Rick Scott put it best with their presentation at the December meeting entitled "The Sky We Share". **SUPER SUPER SUPER** job to both of you!!

There are notch Astro-photographers, meteor hunters, and deep sky enthusiasts. There are beginners, casual observers, and professional astronomers as well. I could continue on for the remainder of my article -- but to do so I would have to address the interests of each person in this club -- as your interests are probably that varied!! It doesn't

matter what I want to talk about regarding the sky -- there is someone always around to listen at any level!

During my first star party, I remember setting up my scope at the fringes of a clearing at the Florence Junction site. At that time I didn't know anyone, and was worried that with all these wonderful telescopes in the field no one would want to associate with me. Besides, I asked myself, "who drives 45 minutes out into the desert to setup a 4.5" reflector and stand around in the dark all night?" Boy was I wrong, because it was Don Wrigley

who first approached me and asked, "What are you looking at?" I replied "Andromeda M31". With that Don became quite excited and stated "Oh Boy!! -- that's one of my favorites. Do you mind if I take a look?"... And with that he placed an eye-patch over one eye and stated, "This makes me look like a pirate, argggh". He made me feel like a part of the group, and I had



Christmas Day Eclipse - By: Martin Bonadio

a fantastic time in the desert that night. It was these very moments that lead me here today as I sit and write my first article as club President.

It is my goal as president of this club in 2001 to make every effort to make sure that each and every person enjoys the benefits of the club. I want our new members to feel like I did three years ago – and I want our veteran members to feel the same way too. This comes regardless of who you are, and what your level of experience is. I invite each and every one of you to let me know how we're doing as a club. Send me a report card, and grade us. Are you getting everything you want? Do you have some great suggestions? Would you like to participate? Are there particular topics that we haven't included in our monthly programs and meetings? How can we save money – or spend it better. Do you have some great observing techniques or equipment that you want to tell us about? Would you like to make a presentation at a future meeting? I am personally interested in hearing from you – so drop me an email: mabastro@aol.com, or call me at 480-926-4900.

In January, the board will meet and discuss our plans and issues. In addition, I expect our special interest groups and beginners labs to continue growing. And yes – it won't be long until those next treasure hunts: The Messier Marathon, and Adopt-a-High cleanup. (hehe).

It was people like Don Wrigley, Silvio Jaconelli, Randy Peterson, etc., etc. that prompted me to spend countless hours and dollars to acquire lots of equipment and knowledge (thanks for the knowledge guys – the invoice is in the mail)...

I look forward to our January meeting and beyond. I think that everyone will have a lot to look forward to this year, as we have in the past. As long as those darned clouds would just stay away this time around... (Anyone have a suggestion to fix that problem? I want to hear from you!!)

Clear Skies and Happy New Year!

FROM THE VICE PRESIDENT

By Dave Coshow

Our Speaker for January is Warren Kotok. Warren has been selling, servicing and restoring telescopes for 26 years. He has been doing business as Photon Instruments since 1982 and holding forth at 122 E. Main in Mesa since 1994. Warren is considered the top telescope repairer and restorer in the state. He has also done space research and is involved in several astronomical groups. He will be talking about his past activities and current expertise on new telescopes. He will also answer questions.

We will also be meeting at the Black-Eyed Pea at Indian Bend and Pima at 5:30 pm for dinner and a gabfest before the meeting on the 10 of January. Please call me at 480-730-1132 and let me know if you are attending so I can let them know at the Cafe.

Treasurer's Report for December 2000

By: Randy Peterson

During December, we took in \$725 in dues paid in. That compares with \$580 in dues paid in December of '99. This looks like a good sign, until you also compare October and November of both years. By December of 1999, there were 73 members paid up for the coming year, while this year so far we only have 52 paid members for next year. So January should be a big month for membership sign-up's for the coming year. Some things you can do to make signing up easier: at the January meeting, have your membership form and a check for \$20 all filled out when you come to pay your dues. There will be blank membership forms available on the desk at the front of the room. Of course, we will take cash if you prefer, but please have your membership form filled out completely. Or, you could mail your membership form and your check or money

order to EVAC, P.O. Box 2202, Mesa, AZ 85204-2202 if you wish.

As the year comes to a close, it would appear that we had positive cash-flow in 2000. This would mark the first time in the last three years that we did not have a negative cash flow. If this is true, it is largely because of the many members who get their newsletter by email, which is our biggest item of expense. It is also due in a large part to Silvio significantly reducing our printing costs for the members who do take the snail-mail version of the newsletter. Thanks very much to those able to subscribe to the email newsletter and to Silvio! Our cash balance at the end of December is \$4,408.49.

Finally, if you experience any problems with your magazine subscriptions, please email or call me, and I will do my best to resolve the problem.

December Meeting Revisited

By: Martin Bonadio

At the December meeting, we were given a special treat. Rick Scott and Joe Orman presented their fantastic "The Sky We Share" slide show to a full house at the SCC Auditorium. My special thanks goes out to each of them for such a tremendous job!!

But that wasn't all! Tom Polakis displayed interesting slides from a recent trip he took to New Mexico. Chris Schur wowed us with his latest CCD images, and added fuel to the fire by comparing them to much longer exposed astro-photos. Great work, Chris. And finally, Laurice Dee updated us on the progress of the Cassini and Galileo missions to Jupiter. What I wouldn't give to be aboard one of them!!

Before and after the meeting Randy Peterson and Martin Bonadio were setup taking membership renewals, greeting guests, answering questions, and just simply gossiping! With meetings like this, I just don't know how I'll keep up with the standards that were

maintained by last years officers. Great meeting everyone!

Beginners Lab

On Saturday, January 13th at 4:00 PM, Martin Bonadio and David Coshov will be hosting a joint beginners lab at a small park area near Martin's house. A few other members will be onsite to help answer questions. Those who have signed up will be contacted in the first week of January, and anyone else that wants to join them is welcome. There will be a map with locations at the next general meeting, or contact Martin Bonadio @ 480-926-4900 for directions.

The Beginners labs are designed to allow new members, or those with new equipment the chance to learn more. Members are participating in an effort to work with new telescope operators in areas such as setup, alignment, collimation, reading star charts, finding their way around the sky, aiming the telescope, and locating planets and deep sky objects. Throughout the year, the officers of EVAC will be looking for more ways to improve these labs. If you have any ideas or want to volunteer your time to help, contact Martin Bonadio.

You Can't Make Them Brighter

by Rick Scott

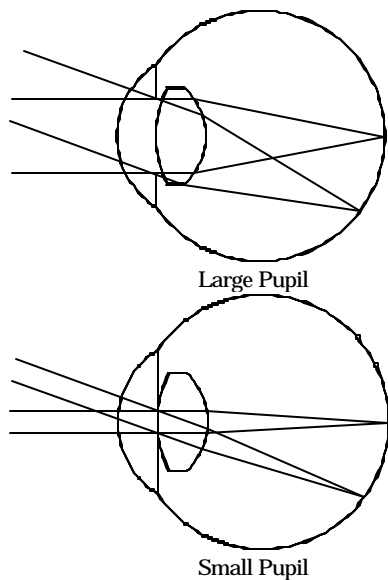
Did you know that when you look at a non-stellar object through a telescope it's usually dimmer than looking at it with your naked eye? It's true. So why do telescopes make these object easily visible? The answer is the telescope makes them bigger, even if it makes them dimmer. This effect applies only to non-stellar or diffuse objects such as galaxies and nebulas or clusters where you can't resolve the individual stars. Stellar objects behave differently which could be the subject of another article.

Most of the diffuse objects are so small your eye can't detect them because they don't illuminate enough retinal cells in the eye. By

making them bigger with a telescope or binoculars, you're allowing the image of the object to illuminate more retinal cells which makes the object visible. If you don't have a large enough telescope aperture, the image of the object will never be as bright as the naked eye brightness. Here's how this works.

Let's start with some basic information on how your eye works. Refer to the following drawings. The light enters the eye through the cornea and passes through the pupil which is the opening of the iris. The iris is a variable aperture opening that controls how much light enters the eye. The light is then focused by the lens to form a sharp image on the retina at the back of the eye. The cornea also helps in the job of focusing the light and it is this part of the eye that refractive eye surgery modifies to eliminate or minimize the need for glasses.

The drawing on the top shows the eye with a large pupil opening which represents the eye at night or in a dark setting. The drawing on the bottom shows a small pupil opening which is appropriate for a day time setting or when looking at a very bright object at night such as the moon through a telescope. In both of these situations, the diameter of the pupil (aperture) determines how much light enters the eye. The dark adapted eye can have an aperture as large as 7mm (5mm when you get older) and is usually about 2mm when outside on a bright day. The two drawings show how the pupil size controls the size of the light beam entering the eye.



The drawings also show that light entering from any given direction as parallel rays is focused to a point at the back of the eye on the retina. Thus, the entire aperture is used for each point on the object we're looking at. This is a critical idea so you can understand that the size of the beam of light entering the eye affects how bright the object appears. If you could force the size of the pupil to vary while looking at an object, you'd be able to vary how bright it looks. Now let's see how this applies to using a telescope at night for dim deep-sky objects.

Imagine you're looking at the sky with your naked eye and your pupil opening is 7mm in diameter. Think of this as using a telescope with a magnification of 1X and an aperture of 7mm (0.276"). That's a very small telescope! Now, let's assume that the object we want to look at requires 100X of magnification to make its image large enough to see detail and we're using a scope with a 305mm (12") aperture. This aperture is referred to as the entrance pupil. A telescope with an eyepiece also has an exit pupil which is the 'optical' size of the opening at the observer end of the eyepiece. The exit pupil size is calculated by dividing the aperture of the telescope (entrance pupil) by the magnification it's being used at. For this example, 305mm divided by 100 is equal to 3.05mm which is less than half of the eye's dark adapted pupil of 7mm. This is effectively the same as having the eye's pupil only opening to 3.05mm!

As previously seen in the drawings, the brightness of the image is affected by the size of the entering beam of light. The telescope's exit pupil does the same thing by limiting the size of the beam of light to the size of its exit pupil. In the last example, the size of the beam of light is 3.05mm which effectively stops the eye down to this size. The brightness is proportional to the cross-sectional area of the light beam, which varies as the square of the diameter. In other words, a light beam that is two times larger in diameter will be four times brighter. In the previous example, if the exit pupil could be increased to 7mm, the image of the object will be $7^2 / 3.05^2 = 49 / 9.3025 = 5.27$ times (or 1.75 magnitudes) brighter.

We could use the equation that we used to calculate the exit pupil backwards to find the telescope aperture necessary to achieve a 7mm exit pupil with a magnification of 100X. To do this, multiply the exit pupil by the magnification to find the desired aperture. So, 7mm times 100 is equal to 700mm (27.6"). Wouldn't we all like to have such a large telescope!

Ok, so now we all own 27.6" telescopes, but what if we wanted to make the object bigger now by cranking up the magnification some more. Let's say we push the magnification up to 150X so we could see some more detail. Now the exit pupil is 700mm divided by 150 to give us an exit pupil of 4.67mm. So now our object is bigger, but it's now a little dimmer, but still brighter than we had with the 12" scope. We could go through the same exercise as before and find that we now need a 1050mm (41.3") telescope. Of course we are now in a size range that most of us wouldn't even consider, so we'll just have to accept the slightly dimmer image of the object. The difference in this case is only 2.27 times or 0.9 magnitudes.

So far, I've only shown you how to size the scope for a given magnification to achieve the same brightness as the naked eye. What happens if we make the scope bigger than that to try to make it even brighter? Let's use the example of 100X magnification and use the 200" Hale telescope at the Palomar Observatory which has an aperture of 5080mm. The exit pupil is 5080 divided by 100 which is equal to 50.8mm. Now that's a large light beam and a lot of light! The only problem is that our eye has an aperture of 7mm and only that much of this 50.8mm light beam can get in. Our own pupil effectively stops this large telescope at 700mm, so the image is not any brighter than in the 27.6" telescope and no brighter than the naked eye view!!

Actually, the situation is worse than it seems. If the 200" Hale telescope were a refractor, we'd be done with our calculations, but it isn't. Reflecting telescopes usually have some sort of central obstruction we have to deal with. I don't know what the central obstruction of the Hale scope is, but let's use a small

obstruction of 15% of the diameter of the scope which is 762mm or 30". The size of the obstruction in the exit pupil is calculated the same way as the size of the exit pupil itself. It will also have the same percent of obstruction in the exit pupil, so 15% of 50.8mm is 7.62mm. In this case, the obstruction is larger than our eye's pupil so no light will get through and we don't see anything. If we want to use the Hale scope to best advantage, we should use a magnification that produces a 7mm exit pupil. This magnification is found by dividing the telescope aperture by the exit pupil to give, 5080mm divided by 7mm, which equals 726X.

So why do we build such large telescopes? Well, they're not used for visual observing. The cameras and other instruments normally used have entrance pupils large enough so they don't limit the telescope and can take advantage of the large aperture. The instruments are designed for the scopes they're used on and the designers keep the characteristics of the telescope in mind while in the design phase.

Even in amateur size telescopes, the size of the central obstruction in the exit pupil needs to be accounted for. If it gets large compared to the exit pupil, it will block the light from the central part of the eye and make observing difficult. Some of you have probably seen this when using low magnifications to observe the moon or when trying to use the scope in the day time. The bright object or lighting causes the eye to stop down so the central obstruction is a larger percentage of the eye's pupil.

The bottom line is that you just can't make a dim astronomical object appear any brighter than with the naked eye. You can make it easier to see by making it bigger and maximize how bright you can see it by using a telescope with the right size aperture.

Using Color Filters

By Martin Bonadio

Many of us have them in our eyepiece cases. How often are yours getting used? Mine – I'll admit a few of them still had shrink-wrap around the box!! And so – with no money around Xmas time to get new eyepieces or cool

equipment I was forced to make better use of my existing selection of Astro-weapons.

Here is what I was able to collect regarding the use of color filters. I've tried many of these tips myself and they really do help to enhance details in various Astro-objects. In fact the bigger and smaller scopes seem to benefit the most. My 13.25" Dob suffers greatly on the planets – it's a big light bucket, and I still see spots in my eye from viewing Jupiter last night! On the other end – sometimes-subtle detail is not visible in my 4" refractor until I bump up the magnification and put in the proper filters!!

So here are the tips:

Red: Enhances features on the moon, and reduces sky brightness observing Mercury and Venus during daylight or twilight. Enhances the polar caps on Mars.

Orange: Use with some solar filter to create a more natural color of the sun. This is great for public star parties. Have you ever been asked why the sun is blue?? Hehe.

Yellow: Enhances features on the moon. It also reveals some surface feature on Venus. Use on Mars to darken Martian mares Yellow does a wonderful job bringing out band detail on Jupiter, and on Saturn helps to make the Cassini division more identifiable. Another great choice for star parties!

Green: Again – this one can help with the darker lunar features, and I believe helped to bring out what might have been clouds on Venus in my larger scopes. Try it on the red spot of Jupiter when it transits to make it more obvious.

Blue: Like the other filters – it really does help with certain features on the moon – Blue is especially good at allowing you to get more detail from the shadows during young moons (1-8 days old). I also think that I detected some cloud detail in Venus (seen as contrast variation in my larger scopes). Try it on the belts of Jupiter to make them stand out, and watch how they festoon and twist out of a straight line in a larger scope! Wow! This filter also may help display a contrast change within the rings of Saturn at high power (> 250x).

Violet: I haven't had the chance to try this – but this filter is apparently great on the polar caps of Mars. Since Mars won't get close enough to take advantage of this for a while – I suggest putting this on your wish-list for later. However, I will say that I could detect a tiny bit of improvement in Saturn's rings. It appears as if the ring structure outside the Cassini is brighter than inside. An optical illusion perhaps? Needless to say I don't suggest using a Violet filter on smaller telescopes – it blocks out way to much light on my 4" TV 101.

Bonus!!! Nebula Filters: All I can say is that you should consider either a UHC or O-III filter. There have been many times that a nebula pops right out of a field when I use them. There are some really dramatic cases. Try it on M42 (Orion Nebula) from your backyard. It's like waving a magic wand!! A few months ago, I tried a 2" O-III on my 25mm Panoptic in my TV-101. I was able to see the entire Veil nebula with this little scope. And I'll swear that the view was as pleasing in that scope as it's ever been in my larger scopes!! Bravo.

I hope you found these useful – I'll try to continue sending you my tips in the future!! Let me know if you have any requests or want more information. Clear Skies – Martin:
mabastro@aol.com

The STARDUST, NEAR Shoemaker, Ulysses, and Voyager Missions

By: Laurice Dee, Ph.D., Ambassador

NASA-JPL Solar System Ambassador Program

December 2000 - January 2001

In my last article, I shared information about both Galileo and Cassini and their concurrent observations of Jupiter and its Galilean satellites. Cassini has brought back magnificent images of Jupiter and its Galilean satellites and has taken numerous scientific measurements of the Jovian system with its suite of fine instruments. Be sure to take the time to see the website,

<http://www.jpl.nasa.gov/cassini/>, to enjoy the neat images and interesting data.

As of this writing, Cassini has been experiencing a problem with one of its maneuver systems (i.e., one of the reaction wheel assemblies stopped functioning) that has affected its ability to point for data collection. Scientific observations have been halted while the flight team investigates to determine the cause. Hopefully, the problem can be solved in just a few days so that Cassini can resume scientific observations before it makes its close approach to Jupiter on 30 December 2000. Please check the website for updates.

Although both Galileo and Cassini are currently experiencing the highlight of their missions, they are not the only ones that experience the highlight of their solar system exploration this year. Exciting events are taking place for at least four missions during the end of this year and early next year. I will cover each one of them briefly and provide their websites. The websites will allow you to know more about these missions. Hope all of you get to learn something new and interesting about each of these four missions!

STARDUST

The website is: <http://stardust.jpl.nasa.gov/>.

STARDUST has been in space since 7 February 1999 when it was launched from Cape Canaveral Air Station in Florida. During its current cruise phase, the spacecraft has been collecting particles that flow into our solar system from interstellar space. It is on its mission to collect cometary dust from Comet Wild-2, and the collection will take place in 2004. The Sample Return Capsule will be dropped off by the spacecraft in 2006. In the meantime, STARDUST will complete its first loop around the Sun very soon when it makes its close approach to Earth on 15 January 2001 for gravitational boost for the next two loops around the Sun.

NEAR Shoemaker

The website is: <http://near.jhuapl.edu/>.

The NEAR Shoemaker spacecraft is currently orbiting Eros to study the physical

and chemical properties of its surface. The artificial satellite of Eros has been taking breathtaking images of the asteroid from various altitudes and even came down as close as 30 miles from the surface to study the surface in detail. What is so remarkable about this mission is that the spacecraft failed to get into orbit of the asteroid after arriving a couple years ago but was able to make it on Valentine's Day of this year! The spacecraft will eventually land on the space rock after the completion of its mission next February.

Ulysses

The website is: <http://ulysses.jpl.nasa.gov/>.

Ulysses has been traveling out of the ecliptic plane since it received its gravitational boost from Jupiter in the early 90's that altered its trajectory. The spacecraft has already completed its loop around the polar regions of the Sun, and its data were transmitted during a quiet period of the Sun's 11-year cycle, when solar flares were not abundant. Ulysses is finally back for another trip around the Sun. It is currently flying over the south polar region of the Sun and will reach the north polar region late next year. Ulysses became the first spacecraft in the history of solar system exploration to have flown over the polar regions of the Sun twice. The spacecraft will have a very interesting experience studying the Sun during the peak period of the Sun's 11-year cycle, when the atmosphere can be quite unstable with plenty of solar flare ejection.

Voyager

The website is:

<http://vraptor.jpl.nasa.gov/voyager/voyager.html>

The twin Voyager spacecraft (Voyagers I and II) were both launched in the late '70s and flew past the planets in the outer solar system: Jupiter; Saturn; Uranus; and Neptune. They both brought back a wealth of images of these planets and collected spectral data on their atmospheres. The gravitational pull of Jupiter propelled the spacecraft out of the ecliptic plane (i.e., Voyager I - north of the ecliptic plane and Voyager II - south of the ecliptic plane). The happy news is that both spacecraft are still healthy and functioning well, and they

are still monitored by the flight team at Jet Propulsion Laboratory (JPL) in Pasadena, CA. Voyager I became the first man-made object to have flown the farthest in the solar system, and both Voyagers I and II should reach the outer boundary of the solar system which leads to interstellar space in a few years.

Stay tuned for my upcoming reports on how both Galileo and Cassini are doing at the Jovian system and how Cassini makes out in its close approach to Jupiter!

The EVAC Library Magazine Collection

By Rick Scott

This past year, the club received some generous magazine donations from a number of people. I finally purchased a small bookcase with club funds and organized and cataloged the magazines. We have *Astronomy* and *Sky & Telescope* issues as shown in the following tables. If you would like to borrow some issues, just let me know and I'll bring them to the next meeting. You can call me at (480)821-5721 or email me at rmscott@home.net.

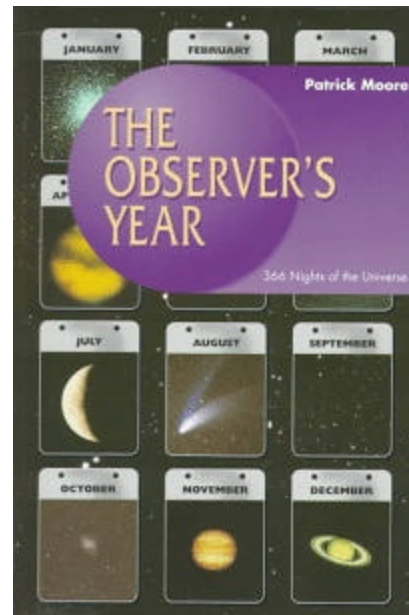
Sky & Telescope Magazine												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1961											X	
1962												
1963												
1964												
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1976						X	X				X	X
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1980	X		X			X		X	X	X	X	X
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1982	X	X		X	X	X	X	X	X			X
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1984	X	X	X	X	X	X	X	X	X	X	X	X
1985	X	X	X	X	X	X	X	X	X	X	X	X
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1988	X	X	X	X	X	X	X	X	X	X	X	X
1989	X				X			X	X	X		X
1990	X	X	X	X	X	X	X	X	X	X	X	X

Astronomy Magazine												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1978	X	X	X	X	X	X	X	X	X	X	X	X
1979												
1980	X	X	X	X	X			X	X	X	X	X
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1982		X	X		X	X	X	X		X		
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1986	X	X	X	X	X	X	X	X	X	X	X	X
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1990	X	X	X	X	X	X	X	X	X	X	X	X
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1993				X								
1994												X
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1996	X	X	X	X	X	X	X	X	X	X	X	X
1997	X	X		X	X	X	X	X	X	X	X	X

Library Focus

by Joe Orman

This month's review: ***The Observer's Year: 366 Nights of the Universe*** by Patrick Moore (part of the Practical Astronomy Series edited by Patrick Moore).



This book is a calendrical trip through the sky with a revered icon of British astronomy, Patrick Moore. Each day is given its own short essay; many of these take the reader on a star-hop through a constellation that is best observed at that time of year. Among the treasures we are guided to are nebulae and galaxies, double and variable stars; these include Messier objects and selections from Moore's complementary Caldwell Catalog (his full name being Patrick Caldwell-Moore).

Sprinkled throughout the book are non-seasonal objects such as the moon and planets, and side notes on significant space-exploration anniversaries and upcoming sky events through the year 2003.

Rich in mythology, history, and scientific detail, this book makes good armchair reading as well as a useful observing guide. The eloquence of Moore's writing is testimony to the high standards of the British educational system.

I do have a few small quibbles. Not all of the objects discussed in the text are shown on the accompanying star maps. And there are scattered typos; one table is labeled "The Southern Triangle" instead of "The Summer Triangle," which is an especially unfortunate error since Moore himself claims to have coined the latter term! But the most troubling inaccuracy cannot be attributed to editorial oversight, since Moore repeats it several times: *"Remember never to look directly at the Sun through any telescope or binoculars, even with the addition of a dark filter. Irreversible damage to the eye is certain to result. The only sensible way to look at sunspots is by the method of projection."* This unnecessarily alarmist warning is very outdated, given the safe and reasonably-priced filters that are readily available today.

But these minor points do not detract from a handsome and valuable book. Moore's relationship with the sky is obviously that of an old and familiar friend, and his book is an enjoyable reminder that the universe holds more than enough wonders to fill an entire year.

This and many other books may be checked out free of charge to EVAC members. Browse the library at the next meeting, or contact club properties manager Rick Scott at rmscott@home.com or (480) 821-5721.

2001: A Year of Sky Events

by Joe Orman
(Joe.Orman@motorola.com)

Mark your calendar for these interesting planetary alignments, conjunctions & meteor showers in the year 2001. Times are calculated for Phoenix; other locations may differ. Most will be easy to see with the unaided eye, some very challenging -- take a look!

- **January 5** (evening): Saturn 2 1/2 degrees above gibbous moon, Jupiter 8 degrees to left, very high in SE after sunset.
- **January 25** (evening): Mercury 4 degrees to upper right of crescent moon, very low in WSW after sunset.
- **January 28** (evening): Venus 6 degrees to right of crescent moon, in WSW after sunset. Mercury low in WSW.
- **February 15** (morning): Mars 2 1/2 degrees to lower right of last-quarter moon, high in SE before sunrise.
- **March 1** (evening): Jupiter, Saturn both 5 degrees away from first-quarter moon, making triangle, very high in WSW after sunset.
- **March 20**: Spring equinox (6:31am MST). Sunrise straight east (6:32am, azimuth 89.5 degrees), sunset straight west (6:40pm, azimuth 270.8 degrees). Always use proper eye protection when viewing the sun.
- **March 28** (evening): Saturn 3 degrees to upper right of crescent moon, Jupiter 10 degrees above, high in W after sunset.
- **March 29** (evening): Jupiter 3 degrees to lower right of crescent moon, Saturn 10 degrees below, high in W after sunset.
- **April 7** (morning): Full moon sets straight west at sunrise (sunrise 6:08am, moonset 6:10am).
- **April 25** (evening): Crescent moon between Jupiter and Saturn, in W after sunset.
- **May 6** (evening): Mercury 3 1/2 degrees to upper right of Saturn, very low in WNW after sunset.
- **May 14-16** (evenings): Mercury 3 degrees to right or upper right of Jupiter, low in WNW after sunset.
- **May 19** (morning): Venus 5 degrees to upper left of crescent moon, low in E before sunrise.
- **May 24** (evening): Mercury 5 degrees to lower right of crescent moon, low in WNW after sunset. Jupiter very low below.

- **June 17** (morning): Venus 6 degrees to left of crescent moon, in E before sunrise. Saturn very low in ENE.
- **July 12** (morning): Mercury 2 degrees to lower right of Jupiter, very low in ENE before sunrise.
- **July 15-18** (mornings): July 15: Saturn 3/4 degree to upper left of Venus, Aldebaran 3 degrees to lower right of Venus, in E before sunrise, Jupiter 3 degrees above Mercury low in ENE. July 17: Moon 1 degree to right of Saturn. July 18: Moon between pairs of planets.
- **July 17** (daytime): Occultation of Venus by crescent moon, very high in sky (disappears 10:33am, reappears 12:02pm).
- **July 19** (morning): Mercury only 9 arcminutes to lower right of moon, very low in ENE before sunrise. Jupiter, Venus and Saturn to upper right.
- **July 25** (morning): Jupiter-Venus-Saturn equidistant alignment, each 10 degrees apart, in E before sunrise.
- **August 5-6** (mornings): Jupiter 1 1/2 degrees to left or upper left of Venus, in ENE before sunrise. Saturn 20 degrees to upper right.
- **August 13-16** (mornings): Venus-Jupiter-Saturn alignment, moon in different position along line each morning, before sunrise.
- **August 15** (daytime): Occultation of Jupiter by crescent moon, in W (disappears 1:35pm, reappears 2:37pm).
- **September 10** (morning): Occultation of Saturn by last-quarter moon, very high in sky (disappears before sunrise 5:01am, reappears in daylight 6:29am).
- **September 12** (morning): Jupiter 1/2 degree to right of crescent moon, very high in E before sunrise.
- **September 15-21** (mornings): Sep 15: Crescent moon, Venus & Regulus make triangle in E before sunrise (moon 5 degrees from both). Sep 20: Regulus 3/4 degree to lower right of Venus. Sep 21: Regulus 3/4 degree to upper right of Venus.
- **September 22**: Fall equinox (4:04pm MST). Sunrise straight east (6:16am, azimuth 89.2 degrees), sunset straight west (6:25pm, azimuth 270.6 degrees). Always use proper eye protection when viewing the sun.
- **September 24** (evening): Mars 2 degrees below first-quarter moon, in S after sunset.
- **October 15** (morning): Venus 6 degrees to upper right of crescent moon, low in E before sunrise.
- **October 23** (evening): Mars 3 degrees to right of first-quarter moon, high in SSW after sunset.
- **October 29 - November 4** (mornings): Mercury 1/2 degree to left of Venus, very low in E before sunrise.
- **November 3** (evening): Saturn 3 degrees to upper right of gibbous moon, rising in E after sunset.
- **November 5** (evening): Neptune 2 degrees to upper right of Mars, high in SSW after sunset.
- **November 17-18** (nights): Leonids meteor shower. Just past new moon. Shower radiates from constellation Leo, which rises in E around midnight. Best time to look between midnight and dawn.
- **November 21** (evening): Mars 4 degrees to right of first-quarter moon, high in SW after sunset.
- **November 26** (evening): Uranus 1 degree to right of Mars, high in SW after sunset.
- **November 30** (evening): Occultation of Saturn by full moon in twilight, just after rising in ENE (disappears 5:44pm, reappears 6:08pm).
- **December 3** (morning): Jupiter 1 1/2 degree from gibbous moon, high in W before sunrise.
- **December 13-15** (nights): Geminids meteor shower. New moon. Shower radiates from constellation Gemini, which rises in NE around 7pm. Best time to look between midnight and dawn.
- **December 14** (afternoon): Partial solar eclipse, starts 1:22pm, maximum 2:25pm (25%), ends 3:28pm, in SW. Always use proper eye protection when viewing the sun.
- **December 20** (evening): Mars 5 degrees to upper right of first-quarter moon, high in SSW after sunset.
- **December 28** (early morning): Occultation of Saturn by almost-full moon, high in W (disappears 1:29am, reappears 2:41am).
- **December 30** (morning): Jupiter 1/2 degree to left of full moon, low in WNW before sunrise.

If it's clear...

By **Fulton Wright, Jr.**
Prescott Astronomy Club

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.

On Sunday, **January 7**, in the evening, you can see 2 satellite shadows on Jupiter. Here is the schedule of events:

- 7:16 PM Io moves in front of Jupiter (no shadows yet)
- 7:35 PM Ganymede's shadow falls on Jupiter (1 shadow)
- 8:13 PM Io's shadow falls on Jupiter (2 shadows)
- 9:26 PM Io moves from in front of Jupiter (still 2 shadows)
- 9:44 PM Ganymede's shadow leaves (1 shadow)
- 10:24 PM Io's shadow leaves (no shadows)

On Sunday, **January 7**, at 8:33 PM, you can see the Moon occult a 3rd magnitude star. With a small (3 inch) telescope look 55 degrees above the east horizon for the almost full Moon. It may take a bigger telescope to see the star emerge from the sunlit limb of the Moon at 9:49 PM.

On Monday, **January 8**, early in the evening, you can see Titan (magnitude 8) near a star (magnitude 7). With a small (3 inch) telescope look for Saturn about 6:30 PM 55 degrees above the southeast horizon. Titan and the star will be about 30 arcseconds apart. During the next few days Saturn moves by this star, the closest approach being January 9 (1.4 arcminutes).

On Sunday, **January 14**, in the late evening, you can see 2 satellite shadows on Jupiter.

Here is the schedule of events:

- 7:20 PM Ganymede moves in front of Jupiter (no shadows)
- 9:05 PM Io moves in front of Jupiter (no shadows yet)
- 9:25 PM Ganymede moves from in front of Jupiter (where are the shadows?)
- 10:08 PM Io's shadow falls on Jupiter (1, at last)
- 11:15 PM Io moves from in front of Jupiter (1 still)
- 11:38 PM Ganymede's shadow falls on Jupiter (2 at last)
- 12:19 AM Io's shadow leaves (down to 1)
- 1:46 AM Ganymede's shadow leaves (the show is over)

On Friday, **January 26**, about 6:40 PM, you can see a loose grouping of solar system objects. Look above the west-southwest horizon for: Venus, bright, 35 degrees up the Moon, thin crescent, 15 degrees up, and Mercury, dimmer, 7 degrees up.

Skycamping Worldwide: A Passion for Skies

By: **Margaret McCrea**

Skycamping Worldwide has posted its 2001 calendar on our website www.skycamping.com. Whether you're interested in touring some of the best observatories at work today, want to meet and go observing with interesting folks from other clubs, want to visit an interesting new place, or just want to get out from under the clouds and see some stars, there's something just for you.

You can go to both the Kennedy Space Center and Highland Star Party in Florida in January - - and meet students and professors from The Astronomy Group at Florida Tech. We'll see the launch of the space shuttle Atlantis (if it happens) and we'll be in Florida during the inauguration (if it happens!)

There's also a fine trip during spring vacation to Tucson, fit for avid observers and their families, in two parts: four days of astronomical Tucson, and two days of All-Arizona Messier Marathon.

Be sure to check out our proposed schedule for other trips, and let us know if you have ideas or interests, comments or suggestions. You could help design a trip! Skycamping Worldwide: A Passion for Skies
Tel: 503.260.1865 Fax: 503.239.7211
<mailto:mags@skycamping.com>
<http://www.skycamping.com>

Proposal of New Club Forming

By: **Chuck Crawford**

Under the auspices of Earth/Space Scientific Research Institute, Inc. a new astronomical and geological club is proposed for membership. This club will be predominately concerned with observational astronomy and planetary/terrestrial geology from a participation and educational standpoint.

Monthly meetings will be set for the Saturday nearest the full moon thus not interfering with existing clubs and their activities. The name of the club is suggested to be the Arizona Astronomy/Geology Society and dues are proposed to be \$ 20 for each year and prorated throughout the remainder of a year. Since this is a "child" of ESSRI, a 501(c)(3) non-profit corporation, dues are fully an IRS deduction as well as any other fair market valued equipment or monetary donations made to the club through ESSRI.

An organizational meeting is scheduled for 7:00 PM on Saturday, January 6 in the clubhouse of Alta Vista Apartments located at 1444 North Recker Road in Mesa, AZ. All interested parties are urged to attend, as we will develop the constitution, overall operations, officers, and future plans and activities of the club at that time. This represents an opportunity to devise a club from the ground floor as to what you as a member would want it to be. Among suggested activities are professional Astronomy and Astro Geology speakers as well as noted amateurs in both fields. Also, field trips both in state and out of state to Astronomy and Geology sites as they may be interrelated; annual Christmas and mid-year (Summer Solstice) parties; participation in joint star parties locally, statewide and in neighboring states; community star parties and educational presentations by the membership; university, museum and other institutional educational programs for members; the potential use of professionally equipped observatories by

members; and, a myriad of other activities as may be suggested by the founding members.

To indicate your interest and attendance or for further information contact me at astroc@mindspring.com or by telephone at 480-985-8824.

For Sale

Perfect for astrophotography beginner or veteran, as well as doing normal photography:

Konica TC (small body, light weight) 35mm Autoreflex camera w/matched 50mm f17 lens, Vivitar close focus auto zoom 35-105mm lens, Vivitar close focus auto zoom 100-300 mm lens, cable release, adaptor rings (for telescope), eyecup attachment, complete instructions, Marsand case, all in excellent like new condition. \$ 575 firm Chuck Crawford @ 480-985-8824

EVAC & Other Events: 2001					
	New Moon	Meet	Local	Deep Sky	Other
Jan	1/24 th	1/10	1/20	1/27	New Officers ----- Board Meeting - 1/12 ----- Beginner's Lab - 1/13
Feb	2/23	2/14	2/17	2/24	
Mar	3/25	3/14	3/17	3/24	3/24 Messier Marathon
Apr	4/23	4/11	4/21	4/28	
May	5/23	5/9	5/19	5/26	
Jun	6/21	6/13	6/16	6/23	



East Valley Astronomy Club

Membership Form

Please complete the information requested. Return at the next club meeting or to the address below, with a check made payable to EVAC for the appropriate amount due. *IMPORTANT!* Please note that ALL memberships expire on December 31 of each year.

1. Check one of the following: New Member Renewal

2. Select appropriate dues options:

Send To:

New Member select month joining:

- \$20.00 January - March
- \$15.00 April - June
- \$10.00 July - September
- \$ 5.00 October - December

EVAC Treasurer
P.O. Box 2202
Mesa, Arizona 85214-2202

Member Renewals (current Members ONLY!)

- \$20.00 Annual Renewal (January - December)

Magazines: Provide renewals notices with payment.

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

Name Badges

- \$7.00 Each

_____ **Total Enclosed**

3. Complete requested information below. Please Print.

Name:

Address:

EVAC on the Internet

EVAC Homepage: www.eastvalleyastronomy.org

E-mail Mailing Lists

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

To join, send E-mail with the "Subject: subscribe" to EVAC-mls-request@psiaz.com

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

To join, send E-mail with the "Subject: subscribe" to EVAC-Board-request@psiaz.com

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-request@psiaz.com

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.

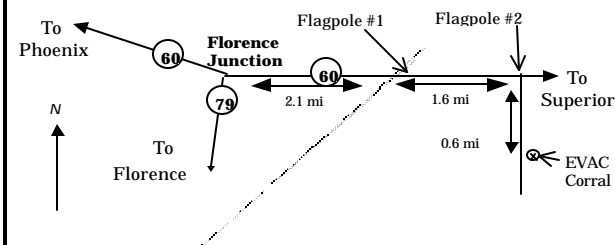
EVAC Star Parties

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 right before a gas-line sign.

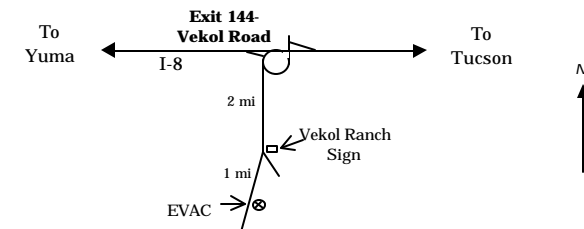


Deep Sky Star Party: Vekol Road Site

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.



EVAC Officers

PRESIDENT
Martin Bonadio
(480) 926-4900

VICE-PRESIDENT
David Coshov
(480) 732-1132

TREASURER
Randy Peterson
(480) 947-4557

SECRETARY
Tom Mozdzen
(480) 497-5703

PROPERTIES
Rick Scott
(480) 821-5721

NEWSLETTER
Jim & Chris Kline
(480) 857-1209

East Valley Astronomy Club—2001
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. 85214-2202. (480) 947-4557 Email: rgp14159@aol.com

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

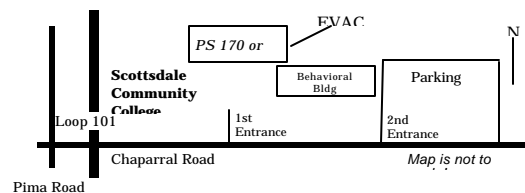
Address Changes: Contact Randy Peterson. PO Box 2202, Mesa, AZ. 85214-2202. (480) 947-4557. Email: rgp14159@aol.com.

Newsletter: Contact Jim & Chris Kline. (480) 847-1209. 1209 W. Palo Verde Dr., Chandler, AZ 85224. Email: jkline29@home.com Contributions may be edited. 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 notify Jim & Chris of your delivery preferences.

EVAC Library: The library contains a good assortment of books, downloaded imagery, and helpful guides. Contact Rick Scott for complete details, (480) 821-5721

Book Discounts: Great savings through Kalmbach and Sky Publishing. Contact Randy Peterson, rgp14159@aol.com

EVAC Party Line: Let other members know in advance if you plan to attend a scheduled observing session. Contact Stan Ferris, (480) 831-7307.



East Valley Astronomy Club

Jim & Chris Kline, Editors
1209 W. Palo Verde Dr. Chandler, AZ 85224

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Reminder: Next EVAC Meeting
Wednesday, January 10, 2000