

STAR GAZER NEWS

NEWSLETTER OF THE DELMARVA STARGAZERS

February 2004

WWW.DelmarvaStarGazers.Org

Volume 11 Number 8

At the January Meeting..

Don Surles brought the meeting to order at 7:15 with 20 members and guests attending.

Constellations Tonight presented by Teri Young Theme Southern Polar Constellations

Chameleon - Lizard
Indus- American Indian
Mensa- Table Mountain
Musca- The Fly
Octans- The Octant

Chameleon

Chamaeleon first appeared in Bayer's Uranometria of 1603. Chameleons are family of lizards found in Europe, Africa, and Asia. Madagascar seems particularly blest with them (about 35 species), and it may be these to which the constellation refers. Chameleons can change color, and have toes fused into groups of two and three, teeth attached to the edge of the jaw, and a long tongue. Like its namesake in the animal kingdom, this

Monthly Meeting, Tuesday, February 3

OUR ATMOSPHERE

7.00 p.m. First Presbyterian Church, Smyrna

constellation does not stand out.

The Chameleon. Apparently the chameleon has changed itself into a rhombus.

Chameleon Star Patterns may be seen at <http://www.glyphweb.com/esky/constellations/chamaeleon.htm>

NGC 3195 - <http://www.hawastsoc.org/deepsky/cha/index.html> One of Dreyer's remarkable objects, Caldwell 109 (NGC3195) is a planetary nebula described as fairly bright (no magnitude given, the central star is mag. 15.3), small (.7'x.5'), with little elongation. Most telescopes show 2 fairly prominent stars to the west (right).

Indus

the Indian (American), is completely visible in latitudes South of 15 degrees North from July - September. Indus was invented by Pieter Dirksz Keyser and Fredick de Houtman between 1595 and 1597. Just a century after Columbus' discovery of America, Johann Bayer named this region of the southern sky after the native peoples of the New World. Perhaps the best known of Indus' stars is Epsilon Indi, which lies just 12 light years from the Sun.

Indus Star Pattern and Galaxy View

The constellation Indus represents a broad, thin 'slice' of the southern sky.

<http://www.glyphweb.com/esky/default.htm?http://www.glyphweb.com/esky/constellations/indus.html>

Nearest Stars (distance light years)

Alpha Centuari 4.3, Sirius 8.7,
Epsilon Eridani 10.8, 61 Cygni 11.1
Epsilon Indi 11.4 Procyon 11.3

Epsilon Indi is similar to the sun and during 1978 was one of the stars that was being searched for planets. Also, two other projects were going on at this time: Project Ozma which was looking for radio signals and Project Copernicus which was looking for signs of laser flashes from other planets.

Mensa

Mensa the table is another of Nicolas de Lacaille's creations, this one named for the Table Mountain at the Cape of Good Hope, where Lacaille observed the southern hemisphere skies in the mid eighteenth century. The asterism shows an upside down mountain top. The mountain is seen right-side up in the Southern Hemisphere around midnight in mid-July.

Near the Southern Celestial Pole lies this small faint group of stars, which also contains a part of the Large Magellanic Cloud. Its original full name was Mons Mensae, named after the Table Mountain where de La Caille had his observatory. <http://www.glyphweb.com/esky/default.htm?http://www.glyphweb.com/esky/constellations/mensa.html>

Musca The fly or the Bee depending on which maps you follow.

Johann Bayer originally named this constellation Apis (the bee). Edmond Halley called it Musca Apis (the fly-bee). Nicolas-Louis de Lacaille named it Musca Australis (the southern fly). <http://www.glyphweb.com/esky/default.htm?http://www.glyphweb.com/esky/constellations/musca.html>

Octans The Octant is a rather non-descript constellation which includes the southern polar region. The constellation was devised by Nicolas Louis de Lacaille in 1752. It commemorates the octant, which was invented by John Hadley in 1730. This instrument divides the circle into eight parts which facilitates the making of angular

measurements in both astronomy and navigation. The octant later evolved into the sextant. The full name of the constellation is *Octans Hadleianus*.

13) Octans Star Pattern and Galaxy View
<http://www.glyphweb.com/esky/default.htm?http://www.glyphweb.com/esky/constellations/octans.html>

Solar Activity Presented by Jerry Truitt
Jerry presented this program as a Power Point slide presentation. Jerry first briefly defined Solar Activity as all of the Sun's variable aspects. This includes: geomagnetic storms, coronal mass ejections, sunspots, flares, prominences, all emissions from radio waves to soft xrays. The X-ray solar flares are important because of their effects of the electromagnetic spectrum.

**2004 Club Dues (\$15.00)
FINAL NOTICE**

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and mail to Kathy Sheldon

These occur in wavelengths of 1 to 8 angstroms and are classified in 3 categories as follows:
X-Class Flares are the biggest events and disrupt radio transmission and even cause power outages as well as lengthy radiation storms.

M-Class Flares are medium size events causing brief radio blackouts and radiation storms in the polar areas.

C-Class Flares are the smallest events with few noticeable effects.

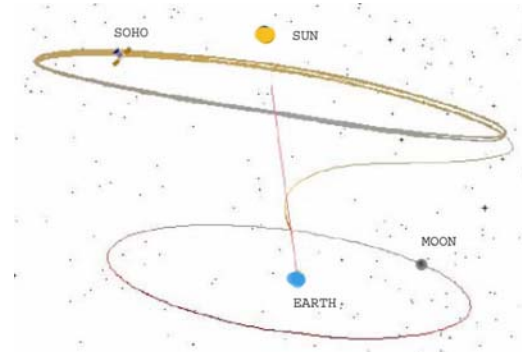
Another very important solar activity of course are sunspots which generally occur in 11 month cycles. Jerry showed charts with the last three Solar Cycles; 21, 22, and the current Solar Cycle 23. These 3 cycles were charted from 1976 through 2003. Solar Cycle 23 peaking in 2000 was so-so, rarely exceeding 200 solar flux. In spite of this, Sunspot 486 in October 28 produced an X17 class flare, the third largest ever produced, October 29 gave an X10 flare and November 4, 2003 produced the most powerful flare ever recorded at X28!

Jerry also had a slide showing all of the SOHO instrumentation. SOHO is the Solar Heliospheric Observatory Satellite launched in 1995.

To provide an uninterrupted view of the Sun, SOHO was placed in a halo orbit around the L1 Lagrange point.

<http://map.gsfc.nasa.gov/ContentMedia/lagrange.pdf>

This orbit is located about 1 million miles from earth on a straight line toward the sun. This is the point at which the gravity forces of the earth and the sun are equal. Below is an image of a schematic view of SOHO's halo orbit:



From the President's Desk.....

January 13, 2004

The headlines tonight are centered around extremely cold temperatures and wind chills, the Mars Rover, man's return to the moon and exploration of Mars, and of course the war in Iraq. Our cold and dry January weather is just a pendulum swing from the extremely wet, cloudy, muggy year that stretched from the fall of 2002 through September of 2003. Remember? We asked ourselves if the rain would ever stop. Remember the foggy nights? I thought I would never see low humidity and cool temperatures again – I remember my continuously soggy shirts. But, zero F, 15% relative humidity, and 25-35 mph winds has guaranteed there is no perspiration clinging to the Surles boy. Brrrrrrrr!

I am so thankful we succeeded in putting Rover on Mars. As I am writing tonight there has been no contact with the Brits' Beagle II and we probably will never know it's actual fate. So far, the results of Rover have not "bowled me over". Maybe NASA is being sooper dooper cautious but I want to see more results than a panorama of the horizon taken from a vantage point only a few inches above ground level. Those are some expensive pictures – about \$200 million each! Why couldn't we release a balloon with a camera and transmitter to gently float over the surface of Mars...we could fill every picture album in Walmart! Question: would a balloon float on Mars? I want to see some real investigation of Mars' stuff. Turn on those experiments and tell us what it will take to grow roses and tomatoes in that soil. Tell us what we need to do to engineer the roses and tomatoes that WILL grow on Mars.

Maybe we can design a HUMANOID that could flourish on Mars.
 Do HUMANS belong in space? Let me say that I am proud of our space effort and success in the Apollo program – and the Soviet Union was very successful in their program. Remember they developed the heavy lift solid fueled rockets we are using today. They also sent two robotic rovers to the moon, explored the moon for several months, and shipped moon rocks back to Earth. You may be surprised to know that our first Mars robot rover (Pathfinder) was pretty much a copy of the Soviet moon robot from the late 60's. Back to the original question, "Do humans belong in space?" I once thought it would be great if we could establish a

space. And the tragedy of losing another load of astronauts is more than our generation – the same generation that cheered on the Apollo missions and stared in disbelief at Challenger and Columbia – just the possibility of such a tragedy is more than our generation is willing to risk. We **are** willing to use our intellect and wealth to create the robots for continued exploration and the vehicles to deliver them to their targets. But we will demand more than just pictures... Update: the word this morning (Jan 14) is "W will ask for \$1B for moon and Mars missions". I have seen estimates of \$1 trillion for this type of program; so I see this as an election year effort to buy a few votes similar to the "lets legalize illegal immigration" bone he threw to the Hispanic community. With deficits in the \$500B range and only one billion to begin a trillion dollar venture what other conclusion should be reached? Yet another update: today, Jan 16, Rover has left home and is now on Martian soil...Hurray!

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base on the moon and from there develop the machines and fuel required for a Mars settlement. I once thought space exploration was mankind's required duty, that is was our destiny to "Go where no man has gone before". Why should we confine ourselves to this small planet? Bring back Gene Roddenberry!
 We have watched two shuttles loaded with brave men and women disintegrate in our own atmosphere. Rocket science is a dangerous adventure, even here close to Earth, especially when we put humans in the payload. Suppose we can improve our success ratio leaving and entering our atmosphere; we will continue to find ourselves in a very hostile environment outside that thin blue line around our planet. I am beginning to accept the concept that our human body which has evolved under the protection of our atmosphere will not be the same body that explores space...it just costs too much to create a suitable environment to maintain our fragile bodies in

And the war in Iraq? For what reason are we sacrificing 10 service men and women a week, with another 150-200 injured every week (over 10,000 medical evacuations from Iraq to date), and \$1 billion spent with no return on investment every week? We CAN do better and we MUST change this madness. The Iraqi people are growing impatient with our attempts to create a western style democracy in their country that has known only dictators and theocracies for 2000 years. Within months Iraq will be in the control of an Iraqi religious leader – maybe even an ayatolla. Country boys learn early in life that you do not walk up to a hornet's nest and try to extract just one or a few hornets. All the hornets get agitated and act exactly like hornets to rid the nest of the intruder. And the country boy rapidly becomes experienced in the facts and laws pertaining to hornet nests.
 Law #1: leave hornet nests alone.
 Law #2: if you accidentally come within the danger zone leave extremely fast.
 Law #3: if the nest is undesirable and you have to

How to Join the Delmarva Star Gazers: Anyone with an interest in any aspect of astronomy is welcome to Join.

NAME _____
 ADDRESS _____
 CITY, STATE & ZIP _____
 E-MAIL ADDRESS (If any) _____
 SPECIAL INTERESTS OR TALENTS _____

Please attach a check for \$15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Don Surles at 302-653-9445 for more info.

disturb it make sure you kill every hornet before you put your body in the danger zone.

Law #4: each hornet will sacrifice itself to maintain the nest.

Another story to illustrate the futility of our involvement in Iraqi affairs has to do with a horse and a scorpion. Both found themselves on the wrong side of a deep river. The horse could swim but was blind and he knew a single sting from the scorpion would be deadly. But, he needed the scorpion to sit on his head and provide navigation. The scorpion could not swim but had excellent vision; the river would certainly drown him if he attempted a crossing by himself. So the two decided to make a pact and attempt a river crossing. The scorpion sat between the horse's ears and gave directions and all seemed to be going well. The crossing would have been successful except the scorpion decided to sting the horse in midstream. The surprised horse asked just as he was becoming limp from the sting, "Why did you sting me? Don't you know we will both die in this river?" And as the scorpion was swept from between the horse's ears and was drowning, he replied "I am sorry, but it is my nature to sting". Back to amateur astronomy and lowered blood pressure. Please don't pass up the opportunities to get your scope out during these clear and cold nights. Bundle up, get the arctic boots and gloves and a warm hat...and do some serious stargazing. You will be healthier. The clear, cold, and damp night air is better for you than your stuffy, polluted and dried house air. And the exercise you get will defer the progression of your Buddha physique. The winter nebulas and planets Jupiter and Saturn are about as well positioned for our viewing as they will ever be. Comets? Kent Blackwell says we should observe Comet Linear C/2002T7. Coordinates are approximately 0 hours RA and +20 degrees Dec for Jan 17 – that should be somewhere about half way up the Andromeda side of the Great Square of Pegasus. A quick trip outside at 8:00 PM tonight shows the comet will be closing in on the northwestern horizon shortly after dusk by the time you get this letter. Per Kent, there are two other comets in this area: C/2001 HT 50Linear at 0 RA and +8 Dec, and 43P/Wolf-Harrison at 0 RA +13 Dec.

Zodiacal light...say what! I'll leave the explanation of what it is up to you and your Observer's Handbook; there will be a quiz at the next meeting. But, if you are curious about this atmospheric phenomenon look for it in the west after twilight during the second and third week of February. Of

course you will need a good view of the western horizon and it should not include any city light. A camera on a tripod with a 50mm lens will confirm and document what you think you are seeing. Stay tuned for improvements for Delmarva Star Gazers conceived, engineered, and delivered by Star Gazers for the enjoyment of us all. And stay tuned for more information from Rover and it's twin, Opportunity, which will be arriving on Mars very soon.

See you at the Church or Tuckahoe. Don...

Club Activities

Club Meetings- We meet in the First Presbyterian Church in Smyrna, DE (653-8000) on the first Tuesday of each month from 7-9 PM. From US 13, turn west at Wendy's and go one stoplight on Commerce Street; the church is on the right directly across from the Fire Hall.

Future Meetings..The annual meeting dates for 2004 are: January 6, February 3, March 2, April 6, May 4, July 3 Picnic at Tuckahoe, August 3 No inside meeting;event to be scheduled, September 7, October 5, November 2 and December 7.

The regular meeting format includes discussion of club activities, observing highlights and an advertised presentation.

We solicit suggestions for topics and presenters.

Club Observing... Observing is (usually) scheduled for the Friday nearest the New Moon to maximize the hours of deepnight without the moon in the sky. Unless otherwise stated, the monthly observing site will be at the baseball field in the camping area at Tuckahoe State Park.

The observing days for 2004 are:

January 16, January 23, February 20, March 19, **April 14-18 (Stargaze X)**, April 23, May 14, June 18, July 16, August 13, August 20, **September 15-19 (No Frills IX)**, October 15, November 12, and December 10.

The cloud or rain date for the monthly Friday observing will be the following Saturday, but don't trust the weather man!

Go outside and look for yourself or check the CNN weather link on our web page. If you still can't decide, call Don Surles (302) 653-9445 or Lyle Jones (302) 736-9842.

Delmarva Star Gazer Officers 2003-2004

President.....Don Surles 302 653 9445
Vice President.....Lyle Jones 302 736 9842
Secretary.....Keith Lohmeyer 410 482 6077
Treasurer.....Kathy Sheldon 302 422 4695

Observing Deep-Sky Objects in Canis Major

By Kent Blackwell

As we prepare for the coldest months of the year, stargazing hardly comes to mind as a fun thing to do, yet some of the cleanest, clearest and most crisp air occurs in January and February. I actually prefer winter observing. It's easier to dress warmly than it is to combat the insects of summer.

Some of the most beautiful stars are in the winter sky, and what single star outshines them all but brilliant Sirius in Canis Major? I once projected Sirius on a white sheet of paper some 30 feet away from my 25"scope! I thought I'd write about a few of the deep sky objects visible in this constellation, since it culminates (when it's near the meridian) about 10:00pm in the middle of the month. Many of the objects I've chosen are quite easily seen in small telescope, but I've included a few challenges as well

M 41 - Certainly this is the most conspicuous of all deep-sky objects in Canis Major. In fact, it's easily seen naked-eye in a dark sky. Look about a thumb's distance below Sirius. You might even use your thumb to block the light of Sirius when locating M 41. Don't forget to view it with binoculars, but it's best with a moderate size telescope and low power. Even at somewhat high power (150x) you'll see a scattering of stars running in every direction. In his latest book, "The Messier Objects" Stephen James O'Meara sees the stars form the shape of a fruit bat. O'Meara has many colorful and flowery descriptions of how objects appear to him but it'll take a vivid imagination to see what his visions conjure up for various objects. Therein lies the fault in this book, plus his over-exaggeration of the brightness of many Messier objects. He even suggests the Pleiades nebulosity is visible naked eye!! For more scientific and accurate reading of Messier objects I still prefer Kreimer & Mallas' "The Messier Album". Don't get me wrong, if I have a choice between a romantic vs. scientific writing style I tend to lean towards the romantic, but Omeara's descriptions are just too far out for my taste.

Kreimer & Mallas' book is a great little treasure, and quite usable at the telescope. Regardless of what you see when you "connect the dots" of stars in M 41 be sure to view it with as many instruments as you can. It's one of the loveliest open clusters in the sky, and with Sirius lying so close one of the easiest to locate. My earliest notes mention viewing it with a new pair of binoculars given to me one 1967 Christmas night. I still remember how enraptured I was with this wonderful object, and this was near my home in downtown Norfolk, VA. My how light pollution has changed things in the year 2004.

NGC 2196 - I chose this and NGC 2283 (see below) because of how close they are to Sirius. Its kind of fun to see if you can find these galaxies so close to that brilliant star. NGC 2196 is even closer than NGC 2283, in fact it's less than a degree to the southeast. I see it as quite bright, and very small, even at 150x. Be sure to use high enough power to place Sirius well out of the field of view. I'd be interested if anyone can see it with an ETX-size telescope. Now that's a challenge!

NGC 2204 - This open cluster appears just a bit SSE of a 6th magnitude star. You can find it quite easily by drawing a line from the stars Sirius & Mirzam. Extend that imaginary line just about 1/3 the distance further west. My 4" Unitron shows N2204 as a beautiful nebulous patch of stars.

NGC 2207/IC 2163 is included for those with apertures larger than 6". These galaxies are interesting because they're an interacting pair. Actually the last time I observed NGC 2270 was in the 1970's with a 4" telescope. At that time my notes don't indicate seeing IC 2163. It would be interesting to hear from anyone who is able to see IC 2163.

NGC 2283 is very easy to locate, being just a degree or so south of Sirius. The problem is it's quite faint, and also lies in a tiny little cluster of stars. You won't be sure if the glow you see is

this cluster or the galaxy. My earliest observations of it are with a 12-1/2" Newtonian. A real favorite of mine, and I'd be very interested in hearing from anyone who can spot it with a smaller aperture. Call or email me if you see it.

IC 2165 - I thought since almost every other type of deep sky-objects is discussed in this article, I might include a planetary nebula. My only notes on this were on January 16, 1997 with a 16" telescope, where I noted it was bright, but extremely small. Sure enough, it's about 10th magnitude, but only 9" in size. Use low power at first, then step up to at least 100x. Those with nebula filters might try the "blinking" trick; that is hold the filter between your eye and the eyepiece and quickly remove it. By flashing the filter back and forth the planetary nebula will appear to blink, as other stars in the field of view appear to almost disappear. Once you find it try using about 30x per inch of aperture for a better view.

PK 229-2.1 - Ok, if you were able to see IC 2165 try this even more difficult planetary nebula. In the 25" it's faint, but not terribly so. It is, however very stellar. The only way I could see it was to use an OIII filter and the blink method described above. The nebula forms the apex of a triangle with two stars of equal brightness. Good luck on this difficult object.

NGC 2327 - An interesting nebula extending north from a faint double star. It reminds me of the more famous NGC 2261 in Monoceros (Hubble's Variable Nebula) because of the wedge-shaped extension. Most sources list it as a bright diffuse nebula but I question that. Emission nebulae "emitting" their own light generally look considerably brighter in the telescope when using specific line, or nebula, filters. NGC 2327 does not brighten; therefore I suspect it might be a reflection, rather than emission, nebula. When you find it look at the faint star just a bit eastward, in the same field of view. It, too is nebulous, fainter and more difficult.

NGC 2359 - This emission nebula is absolutely stunning in a large telescope, especially if fitted with a Lumicon OIII nebula filter. I find it odd that it is seldom listed in observing guides, especially since it's visible in almost any telescope. Just to see how small an aperture could see it I fitted an OIII filter over the objective of my 1.5" finder and managed to see it! Having several nicknames, the one most aptly suited is "Thor's Helmet". In a large telescope the helmet is easily visible, as are both horns of the helmet. Try stepping the magnification up to about 150x once you find this magnificent object.

NGC 2360 - An open cluster just off the head of Canis Major, and only minutes east of a 5th magnitude star. Visible in a 40mm finder, NGC 2360 is simply gorgeous in a 3" or larger telescope. You'll see a beautiful scattering of 11-13 magnitude stars, making it magnificent in any size telescope. I find it surpassed only by M 41.

NGC 2362 - Located at the tail of Canis Major is this wonderful open cluster surrounding 4th magnitude star Tau Canis Major. Tau is suspected of being a member of this less than a million years old cluster, making it one of the youngest star clusters known. If Tau is indeed a member, it's easily one of the most brilliant stars in our galaxy. Once you find the cluster try using high power and look for the two small, faint companions just east of Tau.

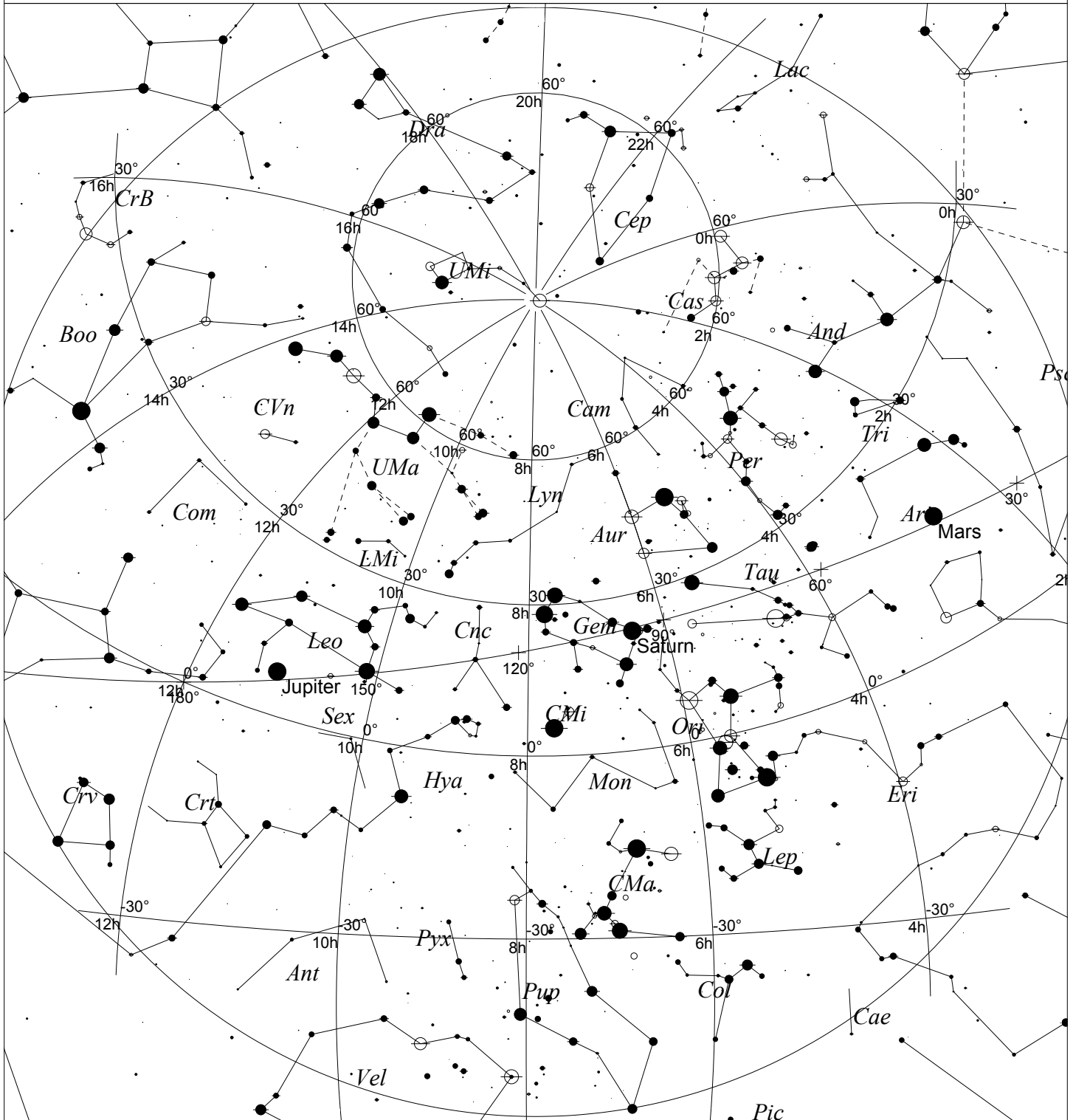
NGC2380 - this galaxy lies 2-1/2 degrees SE of NGC 2362. It appears fairly bright, and very round. In fact it looks more like a distant unresolved remote globular than a galaxy.

vdB 96 - Just north of NGC 2362 lies this very, very faint reflection nebula. To me it looks like a faint version of the Merope Nebula in the Pleiades. I see the brighter portion extending north and east from the 3 primary stars associated with it. vdB is surely reserved for apertures 10" and larger.

Though Canis Major is not a huge constellation it nevertheless contains some marvelous deep sky objects due to its proximity to the Milky Way. If you have some particularly interesting objects you've observed let me know, or better yet write an article for an upcoming Star Gazer News newsletter.

Kent Blackwell, 1169 Old Kempsville Road

SKYMAP FOR FEBRUARY 2004



<p>STARS</p> <ul style="list-style-type: none"> ● <1 ● 3.5 ● 1.5 ● 4 ● 2 ● 4.5 ● 2.5 ● >5 ● 3 	<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☉ Galaxy □ Bright nebula ◻ Dark nebula ⊕ Globular cluster ⊙ Open cluster ⊕ Planetary nebula ⊙ Quasar △ Radio source × X-ray source ○ Other object 	<p>TUCKAHOE STATE PARK, MD FEBRUARY 20. 2200 HOURS EST</p>
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Local Time: 22:00:00 20-Feb-2004
Location: 38° 58' 0" N 76° 56' 0" W

UTC: 03:00:00 21-Feb-2004
RA: 7h53m49s Dec: +38° 57' Field: 182.0°

Sidereal Time: 07:53:48
Julian Day: 2453056.6250

Moondark for February: [Mail From Mars](#)

What tourist would journey far from home without a [camera](#)? You certainly wouldn't travel 120,000,000 miles without one, and [JPL's Mars rovers](#) and orbiters haven't disappointed us. Although as I write this Spirit is in "critical condition" crippled by some sort of undetermined anomaly, there are hopeful signs now that communications have been reestablished. NASA hedged its bets with another chance, known as [Opportunity, scheduled to touch-down tonight](#).

The postcards we've received so far from the Mars rovers (and their orbiters) have been the perfect wrap-up to a year of spectacular views of the Red Planet. It was just [last August](#) that amateurs, along with many of the public, gazed on fiery planet at its closest approach to Earth in thousands of years. [Robotic rovers](#) have given us a totally different perspective, one from the surface of the planet itself. Mars is not just a tiny planet orbiting the Sun out there somewhere. From the ground it looks more like the Arizona desert than an alien planet. Maybe [water](#), and maybe microbial life, aren't so far fetched after all.

These inspiring and thought provoking images have been shown widely in the [media](#). Remarkably, lander images are taken with a [1-megapixel cameras](#). By today's standards, that's not much. Far higher resolution, 3-megapixel digital cameras are low-end, consumer-grade items sold almost everywhere. High-end cameras now sport 5 or 6 megapixels and wealth of picture modes and imaging options. Not that the rover's cameras would be cheap: their optics are of superb quality and the chip (and pixels) are four times larger than earthling's. Rather than a three-color mask on the CCD chip in your camera, color imaging is done with a sequence of images through filters.

The [Pancam](#)'s stunning, ruddy color images and panoramas have garnered the most attention. Stitching together snapshots into a wide-angle pan is easy: once care is taken to provide adequate overlap between adjacent pictures, software (often supplied in the camera's box) will assemble the panorama automatically. The 3D images, viewed through red-blue glasses, give depth to the photos from Mars. Although Spirit's [pancam](#) has two (that is, stereo) cameras on the mast, you can do it yourself with one camera: just shift it laterally between shots and bring them into your favorite image processing program. Instructions on how to produce your own 3D image are available on the web: do a [google.com search on "anaglyph"](#), a technique, interestingly enough, invented not long after photography itself.

My favorite images so far have been from the unprecedented close-ups from the [Athena microscopic imager](#) camera. Amazingly, the closer you look, the more Mars looks like Earth. Which two of these close-up images of "sand" are from Mars? The rest are from Earth's seashores. From a browser view, the Mars' images are linked to a JPL press release page. Other locations will be revealed by moving your mouse over the image.



While I'm enough of a scientist to appreciate the [hard data](#) coming from the sensors and probes, it's the images that really bring Mars home to me and many others. Although \$820,000,000 cost of these two missions is a lot of money by any standard, this comes to less than \$3 per person in this country. Aren't such missions a great investment in our future, whether or not it includes visits by [manned spacecraft](#)? Postcards, panoramas and microscopic details are the best way to visit Mars for now. Except, of course, through your own telescope from your own backyard: Mars next comes to opposition in November 2006.

Moondark is written by [Doug Miller](#), published at the [Moondark web site](#), and printed in the [Delmarva Star Gazers' Star Gazer News](#). This document was last revised on 25 January 2004. Text and images copyright © 2004 by Douglas C. Miller, All Rights Reserved. This material may not be reproduced in any form without prior permission.