Harford County Astronomical Society

Bel Air, Maryland
www.harfordastro.org

Volume 34 Issue 5 *May 2008*

Public Star Party (Open House):
Saturday, May 17, 2008, At Sunset
At the Observatory

General Meeting:
Thursday, May 22, 2008
7:00pm - Business Meeting

8:00pm – Presentation:
"Astrophotography 101 – The Bare Basics."
Presented by Phil Schmitz
At the Observatory

Club Calendar for 2008:

Open House/Public Star Party	Meeting Night
June 14	June 19
July 12	July 17
August 9	August 14
September 13	September 18
October 11	October 16
November 8	November 13
December 6	December 11

Please check the website for possible schedule updates and changes:

http://www.harfordastro.org

http://astroleague.org/

http://nightsky.jpl.nasa.gov/

In This Issue:

Astronomy Day is Saturday, May 17

Saturday, May 17 is our open house this month. It is also the day we are celebrating Astronomy Day with the public.

We will be starting early with some Night Sky activities at 5 PM. Come help with this event! If you haven't been to the observatory for a while, come by and see what we are doing.

For more information, please contact Grace Wyatt at dgracew@comcast.net

HCAS Business Meeting

Minutes of April 17th, 2008

1. President Tom Rusek opened the meeting at 7:16 PM.

2. The minutes of the March 2008 meeting were published in the last newsletter. The group approved the minutes as published.

3. Treasurer's Report: Tim Kamel reported that the club's bank balance was $5194.20. $195 came in as donations in memory of Leo Heppner. There are currently 50 paid members.

4. Observatory operations:

a. Tom Rusek thanked Joe Manning, Gary George and Mike Talbard for installing the new lights in the stairway.

b. Joe Manning donated a battery charger for the scrolling sign and Gary George donated a cover for the telescope.

c. Sal Rodano had another laptop computer from the college for use in the observatory.

5. Outreach:

a. The Darlington Elementary School event was rescheduled for May 2nd from 7:30 PM until 9:30 PM. The purpose is to let the children look through the telescopes.

b. Grace Wyatt led an indoor program on April 8th. She used the Night Sky Network materials, and the group made planispheres. 28 children and 4 adults participated in the event.

c. Lucy Albert is teaching an astronomy class at the observatory. Tim Kamel, Gary George, and Grace Wyatt supported her for an observing session. Lucy is looking for someone to take over the class for the next term. The current class has two more sessions, running from 7-10 PM on Tuesday nights.

d. The Aberdeen Earth Day celebration takes place on April 19th from 11 AM until 4 PM. The rain date is Sunday, April 20th. The club will have a table with information and flyers to hand out. Grace Wyatt will be there early to set up. The HCAS theme for this event is light pollution. She asked if anyone was interested in leading a longer-term effort to encourage local communities to take action to reduce light pollution.

e. On May 6th, Tom Rusek will give a presentation for the kindergarten class at St. Joan of Arc elementary school in Aberdeen.

f. May 17th is Astronomy Day. This is also our scheduled open house date. We will open the facility at 5 PM. Grace has submitted announcements to all of the local media outlets and schools. She is looking for someone to help run a table showing the size distribution of solar system objects. A second volunteer is needed to lead a table for making planispheres. Mike Talbard will show a video on why Pluto is no longer considered a planet by some organizations. Karen Carey will demonstrate moon phases and eclipses. Jim Garrett will show a video about the Mars Phoenix mission. Once it gets dark, the group will move outside for a viewing session. Larry Hubble will man a table with his astrophotographs. Grace will invite Gary Lang to set up a table with his shop's products too.

g. On June 7th, the club will run an event at Susquehanna State Park. This will be similar to last year's event. Several telescopes are needed. Mark Kregel will also give a presentation.

h. Swan Fest at Swan Harbor Farms takes place on October 12th this year, from 11 AM-4 PM.

i. Astronomy Day in 2009 will be the International Day of Astronomy. The Astronomical Society of the Pacific (ASP) and American Astronomical Society (AAS) will be hosting workshops the weekend of May 31st-June 1st in St. Louis to train people to train others to lead activities that day. Funds are available to pay for expenses related to attendance at this training. Lucy Albert will attend as part of her job.

j. The latest club open house took place on April 12th. A Girl Scout group attended. They received a presentation in the classroom and then went up to the telescope room to look at the moon, Mars, Saturn, and some double stars. The group agreed that using the classroom and our stockpile of Night Sky Network resources allows us to provide valuable information to visitors during open house nights with bad weather.

6. Observing Reports: Roy Troxel gave a short summary of his recent trip to the Southwest. He got to observe in several outstanding locations. His trip report was published in the last newsletter. He will give a talk about the trip at the June 19th meeting.

7. Old business:

a. Leo Heppner's funeral took place 2 weeks ago. Several HCAS members attended and acted as pall bearers. The club sent flowers to his family. Tom Rusek noted that the use of the constellation Leo in the HCAS logo was done in honor of Leo being one of the club's founders. Grace said that he did receive the flowers and balloons the club sent him while he was in the hospital.

b. Grace Wyatt asked if we wanted to consider asking the school to name the observatory after Leo. The group agreed to think about it and continue the discussion at a later meeting. Tim Kamel said that there was another suggested name for the observatory several years ago, but it was never formally submitted.

8. New business:

a. Speakers have been arranged for several upcoming meetings. In addition to Roy Troxel's trip report in June, Phil Schmitz will give a talk on astrophotography at the May meeting. He wants to do a presentation on his meteorites at some later date. Lucy Albert will invite her colleagues from the Space Telescope Science Institute to give a talk at a future meeting.

b. The current slate of club officers all agreed to be nominated for the same offices for the next year. Tim Kamel will publish an announcement on line of these nominations and will ask the membership if anyone else wants to run. The final ballots will be mailed to all members at the end of April along with the membership renewals.

c. Tom Rusek thanked Sal Rodano for all of his assistance as the club's ambassador to the college. Sal thanked the club for hosting the many outreach events that support the school. The college's leadership is very happy with their relationship with HCAS. He said that the college supports the club's activities and improvement needs. Sal asked for people to send him suggestions via email for anything they think the school could do to fix any deficiencies or make improvements to the facility.

9. The meeting was adjourned at 8:07 PM. Mark Kregel gave a talk on relativity after the meeting concluded.

Thank You

The Harford County Astronomical Society would like to thank Gunther D. Hirsch, Cynthia Petillo and family, James and Barbara and an anonymous donor for the generous donations to the Society in the name of Leo Heppner.

- Tim Kamel

Mark Kregel and Maggie Carey discuss relativistic velocities.
April 17, 2008

Observation Reports

Broad Creek
May 4, 2008

On Sunday, May 4th, the Clear Sky Chart predicted beautiful clear skies with very good transparency. Seeing was good, 3/5 instead of the usual 2/5 we get around here. There was little wind and temperature was predicted to be in the mid 40's.

This was my first opportunity to go to Broad Creek since January 27th due to either overcast skies or bright moon.

Roy Troxel, Phil Schmitz and I arranged to meet at our observing site at about 7:45. The sun was to set at 8:03. We all arrived within minutes of each other and proceeded to set up. I brought my 10" Orion Atlas. Roy brought his 12" Obsession and Phil his 16" home built.

Right from the beginning I had problems setting up. First, in the middle of my first alignment, the batteries went dead. However, not a problem since I had spares. I replaced the batteries and started again. First star was located and synched. The second star was in the Big Dipper, almost overhead. A very difficult position from which to use a finder, and my knowledge of the star names of this asterism is not very good. I started over two more times before it went to a star I could recognize that was not overhead. However, my alignment was off for some reason and I was constantly off the rest of the night, having to search around for the object I was looking for.

I was not deterred, however, from enjoying this very nice night. I spent a lot of time looking at Saturn, realizing that by the next apparition, the disks will be invisible. Though this will set the stage for seeing Saturn's moons easier, it will not be the same.

I then started a clockwise tour of the sky starting with M44 (which I could see faintly naked eye, and it a beautiful sight in 10 x 50 binoculars) and Mars, and continuing with M38, M37, M36, M35, M82, M81, M57, M13, M5 and M4. That last one was particularly satisfying because neither Roy nor Phil could bring that object in even though they had bigger scopes. I also viewed the Double-

Double in Lyra but was unable to split it into four components at about 100 power. Not sure why since stars were pin points so I do not think I was having collimation issues.

By now it was almost midnight. I had work the next day and was also getting a little cold. Seems like I underestimated how cold it would get. I looked at Saturn again for a little while and then packed up. The other two stayed and continued to observe.

All in all, a great night. I would have loved to have stayed longer but it was not to be.

- Tim Kamel

The telescope I used was a 16" Dobsonian. Most observations were made with a 12mm, 2" Televue eyepiece at 153 power unless otherwise noted. The temperature remained pleasant throughout the observing session, and I did not see a cloud in the sky. Seeing and transparency were both very good.

Saturn and three of its satellites started off the night. Cassini's division was easily seen, as was the shadow of the rings on the planet. The steadiness of the atmosphere allowed me to use my 7mm Nagler (262x) to view Saturn.

Mars was a small reddish orb that showed a small dark feature at 262x.

The double star Al Gieba in the constellation Leo split easily at 262x. Only saw two stars of Castor in Gemini at 262x. At this power the third star of Castor was too diffuse to see! Polaris was also seen within its 9th magnitude companion. I stumbled across Mizar and its Companion as well. Enough double stars, this was a night to go galaxy hunting!

The nine galaxies in Leo, the spirals M65 and M66 (both around 9th magnitude) with their companion 9.5 magnitude galaxy NGC 3628, an elongated spiral galaxy. The bright galaxies M95 and M96 were easy, both are about 9th magnitude. The nearby bright galaxy M105 (magnitude 9.3) and its two spiral galaxy companions NGC 3384, at magnitude 11, and the rather small NGC 3389, at magnitude 12.4, form a neat little triangle. Considering the brightness of NGC 3384 and its close vicinity to M105, it is a surprise that Messier never recorded it. The parade of galaxies in Leo concluded with NGC 2903, a 9th magnitude spiral galaxy near the star Lambda, which is near the sickle of Leo.

M44, an open cluster, also known as the Beehive cluster, in the constellation of Cancer was visible with the naked eye. I also visited (through the telescope, that is) the neat little planetary nebula in Gemini, NGC 2371-2. At about magnitude 13, it is rather faint, but by using averted vision, both lobes were visible. This was the faintest object I saw this session.

In Canes Venatici, M51, an 8th magnitude galaxy was a treat. The spiral arm spreads between M51 and NGC 5195 (magnitude 9.6) was visible. On the other side of M51, the very small and rather faint NGC 5198, a 12th magnitude elliptical galaxy could also be seen.

In Ursa Major, the spiral galaxy M101 was a faint smudge in the eyepiece. I looked for some of the surrounding galaxies but saw none. Although M101 is an 8th Magnitude galaxy, its light is spread out, making it difficult to see well. The Owl Nebula, M97, a 10th magnitude planetary nebula, was a nice, ghostly gray oval against the background sky. The eyes of the owl, however, were elusive and not seen. I used two eyepieces, the 19mm (97x) and the 12mm (153x). As I was looking at the Owl Nebula, I heard an owl "hooting" in the nearby trees. I also saw the galaxy M108, a nice, elongated 10th magnitude spiral galaxy that is near the Owl Nebula. On the way to M81 and M82, I cam across a rather large circular fuzzy patch that I believe to be a galaxy, but was not able to identify it on my star charts. So I don't count it. The neat pair of M81, a 7th magnitude spiral galaxy and M82, an 8th magnitude irregular galaxy were seen. The Struve double star on the edge of M81 was visible, but I was unable to resolve it. Another galaxy that is near M81 is NGC 3077. This oval irregular galaxy shines at about 10th magnitude and was easily seen. While I was attempting to find 11th magnitude galaxy NGC 3718, I cam across two other

galaxies in Ursa Major, NGC 3739, an elliptical, and NGC 3756, a spiral, both around 12th magnitude. As for NGC 3718, I could not find it!

Melotte 111, the brightest open cluster in Coma Bernices, was naked eye. The area around this cluster hosts at least half a dozen fairly bright galaxies. I tracked down two of them. NGC 4494 is a 10th magnitude elliptical galaxy. The other galaxy, NGC 4565, a 9.5 magnitude spiral galaxy, is a must see. It appears as a needle against the stellar background.

On my way to M104, an 8th magnitude spiral galaxy, I cane across Delta Corvi, a nice double star. M104, the Sombrero galaxy in Virgo, was easy to see (once I found it!). I used both the 19mm eyepiece (97x) and the 12mm eyepiece (153x).

Closing the night, I quickly looked at M57, a 9th magnitude planetary nebula, also known as the Ring Nebula in Lyra; the globulars M13 (6th magnitude) and M92 (6.5 magnitude in Hercules and the globular cluster M3 (6th magnitude) in Canes Venatici.

Tonight, I only saw 22 galaxies of the 100 billion plus of them up there. All I could say is, so many galaxies, so little time.

- Phil Schmitz

Broad Creek
May 11, 2008
1:00am to 4:15am

Phil Schmitz, Cathy Tingler and myself met at Broad Creek around midnight. The Clear Sky Clock and Weather Underground had both predicted excellent seeing conditions through the night and into dawn. The clouds had all disappeared by 1:00am and Phil was able to get an excellent view of the M51 galaxy through his 16" reflector. Spiral arms were easily visible, as well as some details of its companion galaxy, NGC5195. These seeing conditions did not last, however.

Broad Creek's sky is usually darkest after midnight, but on this night heavy moisture in the atmosphere caused the southwest light dome to glow brightly, almost washing out the southern sky. As a result, all the great clusters and nebulae in the Scorpius-Sagittarius region remained invisible. Seeing conditions varied throughout the session until dawn, depending on what part of the sky you were observing and at what time. Consequently, the night became an interesting challenge to see what we could observe. (I've learned that observing is often a matter of patience. If you can't see an object's detail at first, try returning to it an hour or two later.)

Objects around the zenith were generally good, but not always. Although there were almost no clouds, many objects, like M81 in the northern sky, could not even be found. There were some notable exceptions, however. Saturn was low in the southwest, but it presented a clear, steady image in all three of our scopes. Bands and shadows were easily seen and Titan seemed unusually bright.

Initially, Jupiter's image wobbled with air turbulence, but two hours later, after the planet had reached 20 degrees above the horizon, the air was steady and the view became very clear. I observed a number of brown bands with distinct spots on them. One of Jupiter's moons was very close to the planet, and by 3am had gone behind the planet. I would have made a sketch, but the dew was beginning to form on everything, including my notepaper.

In general, globular clusters appeared dimmer than they had the previous week, possibly due to the increasing moisture in the upper atmosphere. M13 was near the zenith and the two reflectors could easily distinguish the separate arms of stars coming from the dense center. About half a degree away was the galaxy NGC6207, an 11th magnitude object. Moving the scopes about 15° southward, we saw the blue planetary nebula NGC6210.

However, M3 appeared unusually dim, as did M5 in Serpens Caput. This was disappointing, since these two globulars can be very striking objects. M56 in Lyra, at 75x in my 12.5" reflector, shone at 8th magnitude, but with no detail at all. At this low power, it could easily be mistaken for a comet, which is probably why Messier included it in his catalog. We observed three open clusters, all Messier objects. M29 in Cygnus is a little group of six or seven stars that looks like a miniature version of Pegasus. M39, also in Cygnus, is larger, with several dozen stars, about ten of which looked about 5th magnitude. The Milky Way could be seen faintly in this constellation, sweeping through Aquila and Scutum, but fading before it reached Sagittarius. I periodically observed M11 in Scutum (the "Wild Duck"), through the night. It varied in brightness each time. M26, also in Scutum, was only dimly visible.

Double stars – in fact, many other stars – had a fuzzy appearance, because of the increasing moisture in the air. Polaris' companion could barely be seen in the diffuse light caused by the moisture. Other doubles observed were Mizar/Alcor, Cor Caroli and Albireo.

Most nebulae were dim with two notable exceptions: M27 in Vulpecula and M57 in Lyra , possibly because they were in an area of the sky not effected by the moisture.

By 4am, the seeing began to improve, but the dew was much worse. (In other words, the dew on the eyepiece cancelled out the fact that it was now easier to see the Wild Duck Cluster.) We decided at that point it was a good time to pack up our equipment, which was now dripping profusely!

- Roy Troxel

Observatory Operations

April 2008

There is very little to report this month. The lights to illuminate the top set of stairs in the observatory were installed. We used a set of diode based Christmas lights connected through a dimmer switch. Mike Talbard and Gary George did the installation.

We have also received a lap top computer from the College to use up the Observatory. We are still in the process of checking it out to see if it can be used.

- Tim Kamel

Astronomy Class

April 8, 2008

On this night, Grace Wyatt, Gary George and I supported the astronomy class that member Lucy Albert is teaching. This session, she is holding the class art the observatory and is making use of the projection equipment in the classroom. Tonight's session was focused on the solar system.

The evening started off thickly overcast and it did not look promising. However, at about 9 PM, we started having breaks in the clouds and opened up the dome. Three students remained and we showed them the moon, Mars and Saturn.

April 15, 2008

Tonight was the third of four classes that member Lucy Albert was teaching at the observatory. On hand again were Grace Wyatt, Gary George and I. This session was focused more on deep sky objects.

We started viewing early and were able to bring in the Orion Nebula before it drifted down below the tree line. It is low in the sky and the view was not particularly good but one could still see the Trapezium and the nebulosity of the object.

We then spent some time looking at several star clusters including M35, M36, M37, M38 and M47. We looked at Castor as a double.

April 22, 2008

Tonight was the fourth of four classes that member Lucy Albert was teaching at the observatory. Grace Wyatt, Gary George and I again participated. The focus of this session was primarily GOTO scopes and we set up the club's ETX-70 to demonstrate its ease of use. The scope was a hit and the three students that were present asked questions about availability and cost.

We demonstrated the alignment process and then used the scope to hit some of the brighter objects in the sky.

Lucy also brought her 4.5" Dobsonian reflector and had it set on Saturn for some great views.

- Tim Kamel

Open House

April 12, 2008

Tonight, we had our open house function and, again, it started off being overcast. We had a good turnout of about 30 people, mostly from a Girl Scout troop. Presentations to the group were made by Karen Carey, Mark Kregel and Grace Wyatt. Also present this night were Tom Rusek, Gary George, Roy Troxel and Mike Talbard.

Prediction for the night was that it would be clear around 8 PM. It did not happen till 9, when the moon could be seen through the clouds. We opened the dome and invited our guests to take a look. We saw the straight wall, the lunar Alps and the Alpine Valley as well as the multiple crater Gassendi. As the evening wore on, however, more of the sky cleared and we were able to also see Mars as a tiny gibbous disk with no features and, of course, spectacular Saturn with its rings and shadows and three moons. We were also able to bring in some of the star clusters including M35 and M37. Double stars included Algieba and Castor.

Attempts at faint fuzzies were limited to M84. Other attempts were unsuccessful, due to the brightness of the moon.

We packed up the dome and closed by 11 PM.

Earth Day

April 19, 2008

The weather could not have been better for Earth Day. A sunny, not-so-hot day with just a hint of a breeze and people came out in droves for the event. We had over 250 people stop by our table.

We had our usual table with many handouts: Hubble prints, Astronomy Day flyers, club schedules, and a flyer about being a good neighbor with your lights. Our main topic at Earth Day each year is light pollution. It was very easy to describe to people what lights not to use as the entire field and what I could see of Parke Street were lined with the worst lights that illuminate in every direction not just down.

I am looking for someone who would like to work with some other agencies in the county to raise awareness about light pollution and perhaps arrange a dark sky night with one of the towns. If anyone has an interest in the topic and would like to work with some other agencies (or alone) to find a solution and try to darken some of our skies, please let me know. I made some contacts at Earth Day through Amanda Koss who organizes the event that may be willing to work together towards a light pollution solution.

Tom Rusek and I manned the table and Angela came along for the fun. We were able to use Night Sky materials to demonstrate phases of the moon, eclipses, size and distance in space and a favorite—take a look at the sun with eclipse glasses. We did not have telescopes this year, but those glasses are a huge hit. Kids were dragging their siblings, friends and parents over to take a look. The sun through eclipse glasses gets almost as big a wow as the first look at Saturn. We told many people about the rings of Saturn disappearing for two years and encouraged them to come to Astronomy Day to get a look before they are gone. I asked kids where they thought the rings were going for two years. One young man thought for a moment and told me he thought God was going to use them for a Frisbee.

- Grace Wyatt

Upcoming Outreach Events

May 17--**Astronomy Day** celebration at the observatory starts at 5 PM. Club members are needed to give out information, help with teaching projects, use telescopes and binoculars for viewing.

Celebrate with the Harford County Astronomical Society on May 17, 2008 at the Harford Community College observatory!

(Please park at Harford Technical High School and walk to observatory)

If you bring a telescope or cannot walk 1000 feet, please let the assistant in the parking lot know and they will direct you to the observatory.

Activities for the Day:

Assist the public in learning about:
--Telescopes and binoculars
--The size and distance in our solar system
--How to read star charts
--How to make a planisphere
--What makes a planet or why Pluto is no longer a planet
--Moon phases, lunar eclipses and solar eclipses

Also, Learn about the Phoenix Mars Mission-
A taped PowerPoint teleconference will be presented at 5 PM, 6 PM and 7 PM for participants to learn about this new program from NASA.

The Phoenix Mars Mission was launched in August 2007 and is the first of NASA's Scout Program. It is scheduled to land on Mars on May 25, 2008. Dr. Chris McKay, a planetary scientist with the Space Science Division of NASA Ames Research Center, speaks about NASA's Phoenix Mission and his research on the Polar Regions of Mars and Earth. Hear about the Phoenix Mission's plans to study the water, habitability potential of the Martian surface and how the Earth's poles are giving us clues to follow when studying Mars.

Event is rain or shine. Weather permitting, both solar and nighttime viewing will be included.

Please call 410-836-7285 for more information.

The following presentations are planned for the April and May meetings:

May 22 -- **"Astrophotography 101--The Bare Basics."** Presented by Phil Schmitz.

June 19 -- "Observing and Hiking in the Southwest." Presented by Roy Troxel.

Club meetings will be at 7pm and presentations will follow at 8pm.

John Bortle's Dark Sky Scale

From Wikipedia, the free encyclopedia:

The Bortle Dark-Sky Scale is a nine-level numeric (and color coded) measure of the night sky brightness of a particular location. It quantifies the observability of astronomical objects and the interference caused by light pollution and skyglow. John E. Bortle created the scale and published it in the February 2001 edition of *Sky & Telescope* magazine to help amateur astronomers compare the darkness of observing sites. The scale ranges from class 1, the darkest skies available on Earth, through class 9, inner city skies.

Class 1: Excellent dark-sky site. The zodiacal light, gegenschein, and zodiacal band are all visible – the zodiacal light to a striking degree, and the zodiacal band spanning the entire sky. Even with direct vision the galaxy M33 is an obvious naked-eye object. The Scorpius and Sagittarius region of the Milky Way casts obvious diffuse shadows on the ground. To the unaided eye the limiting magnitude is **7.6** to **8.0** (with effort); the presence of Jupiter or Venus in the sky seems to degrade dark adaptation. Airglow, (a very faint, naturally occurring glow most evident within about 15° of the horizon) is readily apparent. With a 12½" scope stars to magnitude **17.5** can be detected with effort, while a 20" instrument used with moderate magnification will reach **19th** magnitude. If you are observing on a grass-covered field bordered by trees, your telescope, companions, and vehicle are almost totally invisible. This is an observer's Nirvana!

Class 2: Typical truly dark site. Airglow may be weakly apparent along the horizon. M33 is rather easily seen with direct vision. The summer Milky Way is highly structured to the naked eye, and its brightest parts look like veined marble when viewed with ordinary binoculars. The zodiacal light is still bright enough to cast weak shadows just before dawn and after dusk, and its color can be seen as distinctly yellowish when compared to the blue-white of the Milky Way. Any clouds in the sky are visible only as dark holes or voids in the starry background. You can see your telescope and surroundings only vaguely, except where they project against the sky. Many of the Messier globular clusters are distinct naked-eye objects. The limiting naked-eye magnitude is as faint as **7.1** to **7.5**, while a 12½" telescope reaches to magnitude **16** or **17**.

Class 3: Rural Sky. Some indication of light pollution is evident along the horizon. Clouds may appear faintly illuminated in the brightest parts of the sky near the horizon but are dark overhead. The Milky Way still appears complex, and globular clusters such as M4, M5, M15 and M22 are all distinct naked-eye objects. M33 is easy to see with averted vision. The zodiacal light is striking in spring and autumn (when it extends 60° above the horizon after dusk and before dawn) and its color is at least weakly indicated. Your telescope is vaguely apparent at a distance of 20 or 30 feet. The naked eye limiting magnitude is **6.6** to **7.0**, and a 12½" reflector will reach to **16th** magnitude.

Class 4: Rural / suburban transition. Fairly obvious light pollution domes are obvious over population centers in several directions. The zodiacal light is clearly evident, but doesn't extend even halfway to the zenith at the beginning or end of twilight. The Milky Way well above the horizon is still impressive but lacks all but the most obvious structure. M33 is a difficult averted-vision object and is detectable only at an altitude of higher than 50°. Clouds in the direction of light pollution sources are illuminated but only slightly so, and are still dark overhead. You can make out your telescope rather clearly at a distance. The maximum naked-eye limiting magnitude is **6.1** to **6.5**, and a 12½" reflector used with moderate magnification will reveal stars of magnitude **15.5**.

Class 5: Suburban sky. Only hints of the zodiacal light are seen on the best spring and autumn nights. The Milky Way is very weak or invisible near the horizon and looks rather washed out overhead. Light sources are evident in most, if not all, directions. Over most or all of the sky, clouds are quite noticeably brighter than the sky itself. The naked eye limit is around **5.6** to **6.0**, and a 12½" reflector will reach about magnitude **14.5** to **15**.

Class 6: Bright suburban sky. No trace of the zodiacal light can be seen, even on the best nights. Any indications of the Milky Way are apparent only toward the zenith. The sky within 35° of the horizon glows grayish white. Clouds anywhere in the sky appear fairly bright. You have no trouble seeing eyepieces and telescope accessories on an observing table. M33 is impossible to see without binoculars, and M31 is only modestly apparent to the unaided eye. The naked eye limit is about **5.5**, and a 12½" telescope used at moderate powers will show stars at magnitude **14.0** to **14.5**.

Class 7: Suburban / urban transition. The entire sky background has a vague, grayish white hue. Strong light sources are evident in all directions. The Milky Way is totally invisible or nearly so. M44 or M31 may be glimpsed with the unaided eye but are very indistinct. Clouds are brilliantly lit. Even in moderate-size telescopes the brightest Messier objects are pale ghosts of their true selves. The naked eye limiting magnitude is **5.0** if you really try, and a 12½" reflector will barely reach **14th** magnitude.

Class 8: City sky. The sky glows whitish gray or orangish, and you can read newspaper headlines without difficulty. M44 and M31 may be barely glimpsed by an experience observer on good nights, and only the bright Messier objects are detectable with a modest-size telescope. Some of the stars making up the familiar constellation patterns are difficult to see or are absent entirely. The naked eye can pick out stars down to magnitude **4.5** at best, if you know just where to look, and the stellar limit for a 12½" reflector is little better than magnitude **13**.

Class 9: Inner-city sky. The entire sky is brightly lit, even at the zenith. Many stars making up familiar constellation figures are invisible, and dim constellations like Cancer and Pisces are not seen at all. Aside from perhaps the Pleiades, no Messier objects are visible to the unaided eye. The only celestial objects that really provide pleasing telescopic views are the Moon, the planets, and a few of the brightest star clusters (if you can find them). The naked eye limiting magnitude is **4.0** or less.

Here are Bortle ratings for some familiar locations:

Cherry Springs: 2
Broad Creek: 4.5
HCCC Observatory: 6
Spruce Knob, W.Va: 2

References:

http://skytonight.com/resources/darksky/3304011.html

http://en.wikipedia.org/wiki/Bortle_Dark-Sky_Scale

Cartes du Ciel
Interactive Sky Chart

Here's a great online star atlas that's free of charge.

Cartes du Ciel (Sky Charts) is an interactive map that includes Messier objects, NGCs, ICs, etc. It has closeup controls so that you can locate objects down to the 15th magnitude, for finding those "faint fuzzy" galaxies. You can then print out the chart. This is an excellent aid for preparing your observing sessions.

You can download it at: http://astrosurf.com/astropc/cartes/index.html

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Miscellaneous

FOR SALE: Dark Sky portable open top observatory. Six panels 48 by 64, six risers, stabilizer bars, all clamps, permanent anchors. Purchased 2003, used very little, good condition, best offer. Ken, 410-838-1721. kenshoem@aol.com.

This newsletter is the official publication of:

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Items for the newsletter are due to the editor by the 13th of the month of publication.

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