December 2004/January 2005 Volume 12/1

The Night Sky

A Publication of The Astronomy Club of Akron
Akron, OH USA
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2005ACA Calendar	Summary
12/11/04 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory
1/22/05 Sat 6:00 p.m.	ACA Holiday Party—Kiwanis Club
2/5/05 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory
2/25/05 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
3/12/05 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory
3/25/05 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
4/9/05 Sat 8:00 p.m.	Open House and Star Party—ACA Observatory
4/22/04 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
5/7/05 Sat 8:30 p.m.	The Planet Saturn—ACA Observatory
5/27/05 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
6/11/04 Sat 9:00 p.m.	16 th Annual Telescope Seminar—ACA Observatory
6/25/05 Sat 9:00 p.m.	The Planet Jupiter— ACA Observatory
7/16/05 Sat 9:00 p.m.	The Summer Constellations—ACA Observatory
7/30/05 Sat 9:00 p.m.	The Jewels of Summer—ACA Observatory
8/13/05 Sat 6:00 p.m.	Solar/Lunar/Hot Dog Roast—ACA Observatory
8/27/05 Sat 8:00 p.m.	The Autumn Constellations—ACA Observatory
9/23/05 Fri 8:00 p.m.	ACA General Membership Meeting— Kiwanis Club
9/24/05 Sat 8:00 p.m.	The Planet Mars— ACA Observatory
10/8/05 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory
10/28/05 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
11/5/05 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory
11/18/05 Fri 8:00 p.m.	ACA General Membership Meeting—Kiwanis Club
12/10/05 Sat 7:30 p.m.	Open House and Star Party—ACA Observatory

2005 ACA Calendar-Detail

Saturday, Dec 11

ACA program at the observatory beginning at 7:30 p.m. Please bring your telescopes and mittens for random observing of the winter constellations and deep sky objects.

Saturday, Jan 22

Holiday Party at the Portage Lakes Kiwanis Club at 6:00 p.m. $12/person. RSVP by January 8 (cash or check made out to ACA) to Gary Smith, Treasurer.

Saturday, Feb 5

ACA program at the observatory beginning at 7:30 p.m. Please bring your telescopes for random observing of winter constellations, deep sky objects, and the planets Saturn and Jupiter.

Sky Events for December 2004/ January 2005

Saturday, 12/11
New Moon, 8:29 p.m.
As always, you can't see a New Moon, but you can look for the thin Crescent Moon in the western skies after sunset within a couple of days.

Monday, 12/13
Lunar perigee/perigean tides, 4 p.m.
The Moon reaches perigee or its closest point to Earth during this current cycle, at a time very near that of New Moon. The combined effects may cause tides to be a bit higher than usual. These are called perigean tides. At the time of perigee, the Moon will be about 222,440 miles (357,983 kilometers) from Earth.

Monday, 12/13
Geminid meteors, 5:00 p.m.
The Geminid Meteor Shower can rival or surpass the more famous Perseids of August. Although there will be no Moon to interfere, the peak is predicted a few hours before the radiant rises, which is roughly 7 p.m. local time. Nevertheless, some of the Geminids may be seen rising over the eastern horizon and given clear, dark skies, the prospects are good. The radiant of this shower is in Gemini, near the star Castor. From a dark location with clear skies, at the peak time single observer may be able to catch 75 to 100 meteors per hour. But meteor showers are noto-

riously hard to predict, if not in the timing, certainly in the numbers! [See the article on the Geminids.]

Saturday, 12/18
First Quarter Moon, 11:40 a.m.
This bright Moon illuminates the evening hours, but sets around midnight. Look for it high in the South at sunset.

Tuesday, 12/21
December Solstice, 7:42 a.m.
The orientation of the Earth's axis causes the planet to alternatingly tilt toward or away from the Sun. On this date, the Northern Hemisphere of Earth is tilted most away from the Sun. As a result, the Sun rises to its lowest noontime height of the year, and astronomical winter begins in the Northern Hemisphere. In the Southern Hemisphere, summer begins.

Wednesday, 12/22
Ursid meteors, 2 a.m.
While this is a minor shower, the peak comes at a good time, and Ursa Minor from whence the meteors seem to come is high overhead at the time. However, less than a dozen meteors per hour are likely and form much of the time a bright Moon will interfere.

Sunday, 12/26
Full Moon, 10:06 a.m.
This first Full Moon of winter rises in Gemini as the Sun sets. This is also the 13th and final Full Moon of 2004. To the Lakota Sioux, it may have been referred to as the "Moon of Popping Trees" (usually December) or the "Moon of Frost in the Tipi" (usually January).

Tuesday, 12/28
Moon/Saturn, 1:00 a.m.
Moon passes about 5 degrees North of Saturn in Gemini. This occurs well overhead throughout North America.

Wednesday, 12/29
Mercury / Venus, 12:00 a.m. (Midnight)
Mercury passes just 1.2 degrees North of Venus. Unfortunately this occurs well before either has risen, so look before dawn on Tuesday or Wednesday. This might offer a good chance to identify Mercury for those who haven't seen it before, but the two are only about 22 degrees West of the Sun, and are easily lost in the glare.

2005
Saturday, 1/1/05
Perihelion, 8:00 p.m.
The Earth is at its closest point to the Sun in the year, only about 91,403,000 miles (147,099,000 km). The farthest point from the Sun comes in early July.

Monday, 1/3/05
Quadrantid meteors, 7 a.m.
This shower has a sharp peak, which unfortunately comes after sunrise, and observations before sunrise are hampered by the light of the Last Quarter Moon. The radiant is between Draco and Bootes.

Monday, 1/3/05
Last Quarter Moon, 12:46 p.m.
This late night Moon also can be seen until almost noon the next day! (All Last Quarter Moons are like that.)

Monday, 1/3/05
Moon / Jupiter, 9:00 p.m.
The Moon passes in front of Jupiter, occulting it, but unfortunately this is not visible in North America or Europe. Observers in Central Africa, parts of the Indian Ocean and Australia will have a better go at it.

Frontiers of Astronomy Lecture Series

Frontiers of Astronomy is a free lecture series that offers those with an interest in astronomy the chance to learn about some of the latest research in the field. Presentations are held at The Cleveland Museum of Natural History in Murch Auditorium on Thursdays at 8 pm. No tickets or reservations are required. On clear evenings, the Museum's Ralph Mueller Observatory will be open afterward. Selected Thursdays, 8 pm. No tickets or reservations required. For more information, call (216) 231-4600, ext. 3362 or 3253.

Light in the Darkness: The Role of Mass, Energy and Gravity in Modern Cosmology
Dr. Stacy McGaugh, University of Maryland
Thursday, December 9, 8 pm
We live in a vast, expanding Universe full of luminous wonders like stars, galaxies and quasars. These beacons of light are thought to be but a small part of a cosmos dominated by dark matter and dark energy. Stacy McGaugh describes why we think these invisible components are necessary, and examines the possibility that they may instead point to the need to extend Einstein's theory of gravity.

How the Milky Way Galaxy Changed with Time
Dr. Robert Zinn, Yale University
Thursday, March 24, 8 pm
The stars and star clusters of the Milky Way provide a "fossil record" of its evolution from what were probably several protogalactic fragments - huge gas clouds initially composed of only hydrogen and helium - to its current configuration, a typical spiral galaxy. Robert Zinn describes the techniques used to decipher this record, what has been learned and how well this information agrees with studies of distant galaxies, which offer "snapshots" of galaxy evolution as a function of look-back time.

The Evolution of Galaxies in Different Environments
Dr. Jacqueline van Gorkom, Columbia University
Thursday, April 14, 8 pm
The morphologies of galaxies vary from elliptical to spiral, depending on how densely clustered they are. We now know that this so-called density-morphology relationship differs with time. What causes this relationship and why does it change? Does it happen when galaxies are formed (nature), or does the environment affect the evolution of the galaxies (nurture)? Jacqueline van Gorkom presents the most recent data illustrating the density-morphology relationship and explores the various mechanisms that could affect the evolution of galaxies in different environments.

Secretary's Minutes for 11/19/04

1. Mr. Joseph Derocher was the ACA's guest speaker from the Cleveland Museum of Natural History.
2. Secretary's Minutes from last meeting were accepted.
3. Treasurers' report can be found in the newsletter.
4. The ACA would like to welcome the new FOCUS committee chairs Mark and Diane North. Anyone with ideas or comments can contact Mark or Diane at Mark@MarkNorth.net. (Amendment to secretary's minutes: Ray Hyer will chair the Focus Committee Astronomy Day subcommittee, per the October 2004 meeting minutes.)
5. The next ACA general membership meeting will be Friday, February 25th at 8:00 p.m.
6. ACA public events calendar will be available in January.

7. ACA's Holiday Dinner will be Jan 15th or Jan 22th (amendment to secretary's minutes by Editor, 12/2/04) at 6:00 p.m. The dinner will be fully catered at the cost of $12 per plate. Menu to follow. We will need all reservations by Jan. 8th.

Happy Holidays!!

—Pete Flohr

Treasurer's Report: 11/1/04—11/30/04

Total Beginning Assets	**$7,877.27**
Income	
Interest Earned	*$6.77*
50/50 Drawing	*$15.00*
Donations	*$10.00*
Dues	*$20.00*
Expenses	
ACA Newsletter	*$ (26.20)*
Total Ending Assets	**$7,902.84**

Submitted 12- 02- 2004 Gary Smith

From the Veep: Choosing a First Telescope

A frequent topic of discussion with folks newly interested in astronomy is what sort of telescope they should consider purchasing. The advice most often heard in this situation is to choose binoculars instead. A close second is the suggestion of a Dobsonian telescope. Depending on many factors, either may be the best solution for a given individual - or perhaps neither. I'll briefly address some of the considerations that should be examined. This article is unlikely to lead someone to a firm conclusion, but I hope it will prepare the reader for the process of analyzing their telescope needs and searching for a suitable instrument.

Issues worthy of consideration include are optical design, portability, weight, ease of setup, aperture, cost, and ease of use. Reading the astronomy magazines or cruising the Internet will reveal that there's a great deal of discussion of modern computerized telescopes. Those are available and are very popular - but aren't the only way to go. The computer can be extremely helpful to inexperienced users who don't want to spend a great deal of time learning to find objects on their own. Some folks, on the other hand, consider finding the objects to be the best part of the hobby. Neither group is more correct than the other; it's a matter of what is of most interest to an individual hobbyist. Obviously, the more you spend on the motors and controller the less you'll have to spend on the optics so it's an important initial decision.

Optical designs in common use fall into three categories - refractors (lenses only), reflectors (mirrors only), and catadioptrics (mirrors AND lenses). Refractors can be either achromatic (a doublet lens pair, one of flint glass and one of crown) or apochromatic. Achromatic refractors tend to suffer from a failure to focus all the wavelengths of light to the same point, causing a loss of contrast and visible false colors. Apochromatic refractors tend to suffer from high prices; they are the most expensive popular design per inch of aperture. In the most economical instruments refractors are probably best avoided, as quality refractors are the most difficult to produce at the lowest price points. Even lower quality imported achromatic refractors are much more expensive for a given aperture than reflectors. Newtonian reflectors are the easiest to produce at low cost, and represent the most "bang for the buck" in entry level gear - but at moderately large apertures they are large and heavy. All the popular Dobsonian telescope packages include reflectors of the Newtonian design. The Catadioptrics are designed to pack more aperture into a smaller package but are more complex and not generally available at prices in the usual entry level range. The most common is the Schmidt-Cassegrain telescope (SCT). They are most commonly sold as altitude/azimuth computerized forkmount packages.

Mounts can be altitude/azimuth or equatorial. An altitude/azimuth mount can be moved in altitude (up and down) and in azimuth (left and right). The Dobsonian is an altitude/azimuth mounting, as are the popular forkmounted SCT's. Since celestial objects appear to move across the sky in an arc this means that alt/az mounts can't automatically track these objects with a simple drive; they must be computer controlled. An equatorial mount moves in Right Ascension (the same way that objects appear to move across the sky) and Declination (at right angles to RA). A single motor at a constant speed can track objects in RA once the RA axis is pointed at the Celestial Pole.

Let's address ease of use. The simplest scheme is the popular Dobsonian telescope with no assistance whatever. It shows you whatever you manage to find with it. You can get the most telescope for your dollar if you don't mind this lack of assistance. The next step is a Dob with digital setting circles on it. There are no motors, so you push it to the object - but the controller tells you which way to push it so it finds the objects for you. I use this scheme myself in the field with my 15" and 20" Dobsonians. Unless we spend serious money, a Dob won't automatically track objects as the Earth rotates below them, so you'll have to manually follow them as they appear to move across the sky. Most folks (myself included) don't find this to be a problem. Examples of simple Dobs at good prices can be found here: http://www.speednetllc.com/dbaastronomyproducts/Web%20Specials%20November.htm

Inexpensive Dobs with digital setting circles are here: http://www.telescope.com/jump.jsp?itemID=14904&itemType=PRODUCT&path=1%2C2%2C4%2C9&KickerID=356&KICKER

Note that the Intelliscope requires the $150 optional hand controller (currently on sale at Orion for $74.50) for automatic assist. It could be added later.

The next step up in complexity is the computerized altitude/azimuth mount. Low cost examples of these are the Meade ETX series and the Celestron Nexstar series. At the higher end of this category would be forkmounted Schmidt-Cassegrain telescopes such as the Meade LX200GPS and Nexstar GPS series models. Setting these up typically involves placing the mount assembly onto the tripod, aiming the telescope somewhat near North and level, and doing a two or three star alignment. Because they aren't usually equatorially oriented, all current forkmount models are computerized since tracking would be impossible without that. Costs for these

models ranges from about $400 to about $5000 depending on aperture and quality.

Another popular scheme is the German EQ mount (GEM). These can be simple, non-motorized mounts but many in use today do include drives and computer operation. Setting up a GEM involves assembling the mount onto the tripod, adding the counterweights, and aligning the RA axis of the mount to (or near) the North Celestial Pole. A simple RA drive will permit a GEM to track objects as the Earth rotates. Orion Telescopes offers a couple of economy, non-computerized GEMs in the under $500 class. The two most commonly found computerized GEMs in the novice price class (under $1000) are the Meade LXD75 and the Celestron CG5-GT. These include motors and a controller which, after a simple alignment procedure, will automatically slew the telescope to the requested object. They will also automatically track objects as they appear to move across the sky. For these reasons they are popular but the cost of the computer & motors means you'll buy less telescope for a given total investment.

Now for ease of setup, weight, and portability. For a given aperture the GEMs break down into smaller, lighter components than the altitude/azimuth mounts (including Dobsonians) but must be assembled and torn down in the field. The alt/az setups take up more room in the car but set up in moments. The larger components of an alt/az setup weigh more individually although the total weight of a GEM is usually greater.

Aperture - the simplest statement is that aperture rules. The larger a telescope is, the fainter the objects it can reveal, and the more detail it can show.

A large Newtonian on a GEM is a great combination but it'll be heavy and expensive. Most folks choose between a relatively large Dob reflector, a mid-size altitude/azimuth mount, or a smaller GEM based on everything mentioned above.

Cost - $600-$800 would buy a fairly large Dob without digital setting circles. It'd get you a 10" Intelliscope with DSC's. It'd get you a 6" Newtonian on either the LXD75 (The 6" Newt on the L:XD75 sells for $469 but doesn't include the computer - that's another $150) or CG5-GT mount with GoTo computer. It'd also buy a 5" refractor or a 6" Schmidt-Newtonian on the LXD75. For info on the LXD75 and CG5-GT I'd recommend:

www.optcorp.com
www.meade.com
www.celestron.com

— John Crilly

Ramblings of the President

In 1957, at the age of eight, I wanted a magic set for the holidays. There were no toy stores then as there are now, so the ***O'Faust*** catalog my dad received each fall was the only way I had to see what toys were available. I don't recall ever telling my parents that I wanted it, but want it I did. Can you imagine my surprise when, on Christmas Eve, I received that box of magic from my Aunt Carmie. I couldn't figure out how in the world she knew about it…"must be magic!", I remember thinking. That box actually scared me. What secrets of the ages were contained therein? I got butterflies in my stomach as I looked at the mysterious Chinaman, complete with Fu Manchu mustache on the cover. I was so excited I couldn't open it! As a matter of fact, I placed it in an honored location in my bedroom closet high on a shelf above my clothes. Each and every time I opened my closed and saw that unopened box of magic, I felt a spark of excitement. It must have been nearly a year before I could muster the courage to open that box. When I finally did, something horrible happened…I discovered that what was in the box was nothing but tricks with logical answers and not the dark hidden secrets of the ages that had given me the butterflies. Oh, the tricks were really quite good – I still can do a few of them, and do, on occasion. The magic was gone. Very sad. No more nervous butterflies when I opened the closet door and saw the box on the top shelf. One by one, childhood mysteries have succumbed to reason and the magic disappeared from each. What's the point in relaying this story to you? I still get the butterflies and a deep sense of mystery when I look through a telescope at the amazing Universe we all share. Exactly what am I looking at? How long has it been there? How did it get there? Is there anyone out there? Is there intelligent life out there? (Is there intelligent life HERE? :^)) There are so many riddles and one by one the secrets of the Universe are being unraveled. Do you feel the magic when you look through an eyepiece? I hope you never lose it if you do – I know I feel the magic when I look at M13 and every other astronomical object I can see. Every time, no matter how often I gaze upon it. There's still mystery there and I feel the butterflies. We can discuss this at the Gala ACA Holiday Party that well be held at our normal meeting place at the Portage Lakes Kiwanis Civic Center on Portage Lakes Dr. We have the Kiwanis Center reserved for Saturday, January 22nd 2005 after 4:00PM. The dinner is being catered by the Waterloo Restaurant and the time to arrive will be at 6:00PM. Details for the dinner – charge is $12 per person prepaid to our illustrious treasurer, Gary Smith. If you have any questions about the dinner, please don't hesitate to contact me, or any other member of the Board for details. I look forward to seeing you all – and we'll have a golden opportunity to discuss the mysteries of the Universe over a delicious meal. Happy holidays to all!

—Dave Jessie

Observatory Director's Report

On Friday, Dec 3, the club hosted the science club from the Wadsworth elementary school at the observatory. We had about 50 5th and 6th graders and their families attend the event. The cloud cover cleared off enough for us to do some observing and Lynn Laux did one of her fabulous power point presentations in the park offices. Many thanks to Brian Andrews for organizing the session and for providing the hot chocolate. Also thanks to Rich & Dianne, Jason, Lynn, Jim, Gary, and Ted for helping out. Brian mentioned that many of the parents wanted to donate something to the club. Don't forget the star party on Saturday, Dec 11.

__Ray Paul

Did You Know?

A meteor shower is a phenomenon in which many meteors fall through the atmosphere in a relatively short time and in approximately parallel trajectories. A very intense meteor shower is called a *meteor storm*.

Meteor showers (and storms) occur when the Earth passes through a comet's orbit, and left-over comet debris (rocks, etc.) bombards the Earth. Each meteor shower occurs at a predictable time each year. Showers are named after the constellation they seem to originate from (their radiant, the point in the sky from which the shower seems to be come).

Meteor Shower	Approximate Dates	Date of Maximum	Approximate Hourly Rate of Meteors	Velocity km/sec	Parent Comet
Quadrantids (visible by Boötes)	Dec. 8-Jan. 7	Jan. 3	40-60	42	unknown
Lyrids	Apr. 16-25	Apr. 22	10-15	48	Thatcher 18611
Eta Aquarids	April 21-May 12	May 5-6	20-50	66	Halley (periodic)
Delta Aquarids	July 14-Aug.18	July 28-29	20	41	unknown
Perseids	July 23-Aug. 22	Aug. 12	50-75	60	Swift-Tuttle (periodic)
Orionids	Oct. 15-29	Oct. 21-22	20-25	66	Halley (periodic)
Southern Taurids	Sept 17-Nov. 27	Oct. 30-Nov. 7	10-15	x	Encke (periodic)
Leonids	Nov. 14-20	Nov. 17-18	15-80+++	71	Tempel-Tuttle (periodic)
Geminids	Dec. 6-19	Dec. 13-14	50-85	35	Asteroid #3200 Phaeton
Ursids	Dec. 17-25	Dec. 22	15	34	Tuttle

Winter Delight's:
The Geminid Meteor Shower
By
Lynn M. Laux

. The Geminid display is – for those willing to brave the chill of a December night – a fine winter shower, and usually the most satisfying of all the annual showers, even surpassing the more widely recognized Perseids of August. Studies show that the Geminids are rich in slow, bright, graceful meteors and bright fireballs, as well as faint meteors, with relatively fewer objects of medium brightness. Many Geminids appear yellowish in hue. Some even seem to form jagged or divided paths.

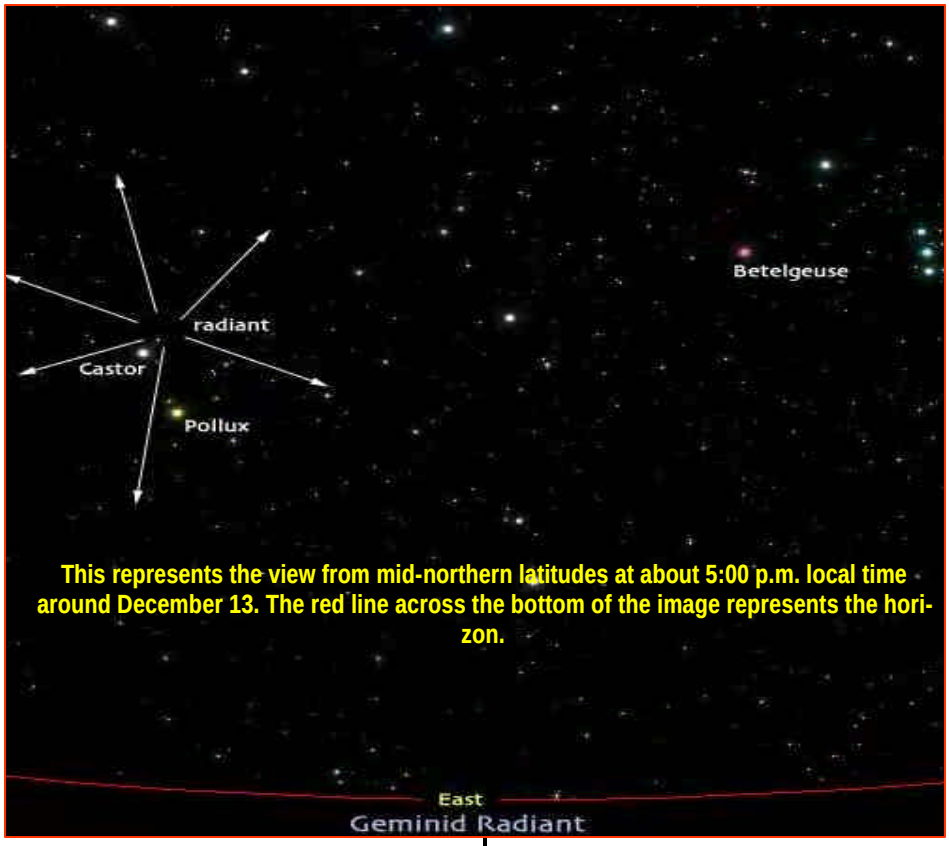
This year, new Moon on December 12 gives perfect observing conditions across the expected maximum on December 13/14. North of the equator, the radiant rises around sunset, and is at a usable elevation from the local evening hours onwards. The peak has shown slight signs of variability in its maximum rates and peak timing in recent years, with the six most reliably observed maxima over the past 15 years having all occurred within 2h 20m of the time above.

The Geminids are named for the constellation of Gemini, the Twins. On Dec. 13-14, the night of this shower's maximum activity, the meteors appear to emanate from a spot in the sky near the bright star Castor in Gemini as Earth barrels through a stream of space debris laid down centuries ago. According to meteor specialist Neil Bone, at 2 grams per cubic centimeter on average, Geminid meteoroids are several times denser than the cometary dust flakes that supply most meteor showers, so they burn up less quickly. Add this to the relatively slow speed with which Geminids typically encounter Earth – 22 miles per second (35 kilometers per second), or roughly half the speed of a Leonid meteor – and you have the recipe for meteors that linger a bit longer in view than most.

The Earth moves quickly through this meteor stream producing a somewhat broad, lopsided activity profile. Rates increase steadily for two or three days before maximum, reaching roughly above a quarter of its peak strength, then drop off more sharply afterward. Late Geminids, however, tend to be especially bright. Renegade forerunners and late stragglers might be seen for a week or more before and after maximum.

Geminids stand apart from the other meteor showers in that they seem to have been spawned not by a comet, but by 3200 Phaeton, an asteroid that crosses the path of Earth's orbit. Then again, the Geminids may be comet debris after all, for some astronomers consider Phaeton to really be the dead nucleus of a burned-out comet that somehow got trapped into an unusually tight orbit around the Sun.

To best observe the Geminids, make sure you're warm and comfortable. Warm cocoa or coffee can take the edge off the chill, as well as provide a slight stimulus. It's even better if you can observe with friends. That way, you can keep each other awake, as well as cover more sky. For Northern Hemisphere observers, the Geminid radiant is above the horizon for nearly all hours of darkness and the optimum observing point shifts throughout the night. Early in the evening the best observing position is to point your feet northward, westward, or southward and look straight up. Late in the evening your orientation could remain unchanged, but you should shift the center of your gaze to about 45° above the horizon. By about 10:00 p.m. you can point your feet in any direction, with your gaze centered about 45° above the horizon. By late morning, the best vantage point would be to point your feet towards the north, east, or south and set your gaze to a point about 45° above the horizon.



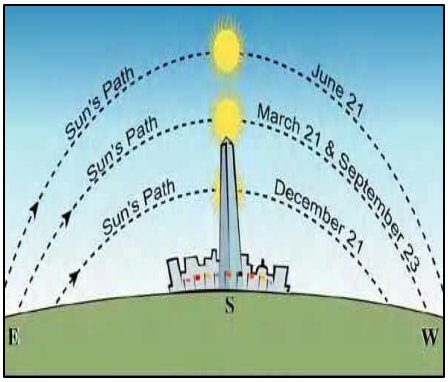
This represents the view from mid-northern latitudes at about 5:00 p.m. local time around December 13. The red line across the bottom of the image represents the horizon.

Glossary of meteor terms

Fireball: A bright meteor with an apparent visual magnitude of -4 mag. or brighter.
Limiting Magnitude: Generally denotes the faintest star visible during an observation and evaluates the quality of the sky as well as the observing technique. The magnitude of the faintest meteor visible can be different from the stellar limiting magnitude, particularly for photographic and video observations. Visual observations assume about the same limiting magnitudes for stars and meteors.
Meteor: The light phenomenon which results from the entry into the Earth's atmosphere of a solid particle from space.
Meteorite: A natural object of extraterrestrial origin (meteoroid) that survives passage through the atmosphere and hits the ground.
Meteoroid: A solid object moving in interplanetary space, of a size considerably smaller than an asteroid and considerably larger than an atom or molecule.
Meteoroid Stream: Stream of solid particles released from a parent body such as a comet or asteroid, moving on similar orbits. Various ejection directions and velocities for individual meteoroids cause the width of a stream and the gradual distribution of meteoroids over the entire average orbit.
Meteor Shower: A number of meteors with approximately parallel trajectories. The meteors belonging to one shower appear to emanate from their radiant.
Micrometeorite: A small extraterrestrial particle that has survived entry into the Earth's atmosphere. The actual size is not rigorously constrained but is operationally defined by the collection procedure. Micrometeorites found on the Earth's surface are smaller than 1mm, those collected in the Stratosphere are rarely as large as 50 microm.
Radiant: The point in the sky where meteors from a specific shower seem to come from. (Technically: The point where the backward projection of the meteor trajectory intersects the celestial sphere.)
Sporadic Meteors: Those not associated with a particular meteor shower.
UT, or Universal Time, is 5 hours ahead of Eastern Standard Time, and 4 hours ahead of the East Coast during Daylight Savings Time. UT is the same as Greenwich Mean Time (GMT), the 0 hour beginning at Greenwich mean midnight.
Zenith: The point in celestial sphere directly overhead from an observer.
ZHR (Zenith Hourly Rate): The number of shower meteors per hour one observer would see if his limiting magnitude is 6.5 magnitude and the radiant is in his zenith.
SOURCE FOR GLOSSARY: International Meteor Organization

The Winter Solstice and the Dark Days of Winter
By
Lynn Laux

As the calendar year winds down, so too does our Northern Hemisphere solar year, except that the sun reaches its cycle's end nine days before the last page of 2004 is ripped from the wall.



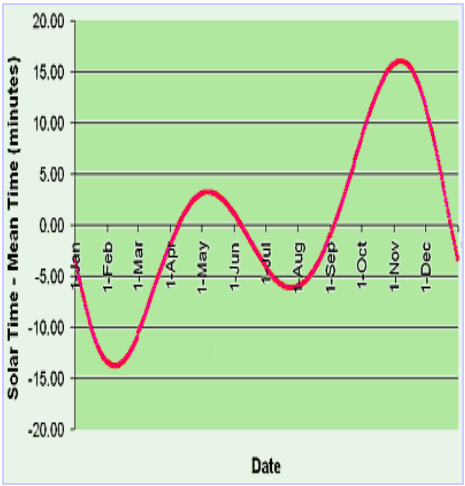
If each day we could mark off the altitude above the southern horizon of the noon sun, we would see it drop to its lowest angle in the sky on December 21, the Winter Solstice. To the astute eye, its lowering toward the southern horizon halts (thus the name *solstice* from "the sun standing still"). The following day the sun begins to again slowly rise in the sky, reaching its noon zenith next June, on the day of the Summer Solstice.

On the Winter Solstice, darkness reigns over all but the most equatorial latitudes north of the equator. Indeed, north of the Arctic Circle (latitude 66.5 deg N), the sun will not be seen today, and at latitudes just south of the Circle, it will tease us by rising and then quickly falling back below the horizon, shining weakly for only a few hours.

Note that *sunrise* is defined to occur when the upper edge of the Sun's disk appears on the horizon, and *sunset* is defined as the moment when the upper edge disappears below the horizon. These are the instants of first and last direct sunlight, but at these times the centre of the solar disk is still about a degree of arc (50 minutes) vertically be-

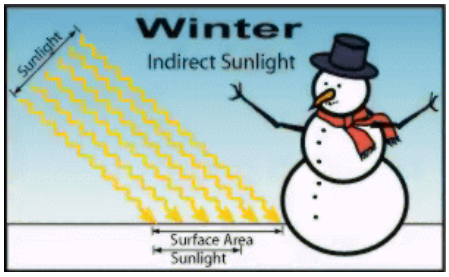
low the horizon. Refraction of sunlight by the atmosphere will also make the sun appear to rise earlier and set later than would be the case if we had no atmosphere. As a result, some northern latitudes have a midnight sun but no 24-hour night, and the longest day is longer than the longest night, the shortest day longer than the shortest night.

The period from about November 1 to February 1 can be defined as *solar winter*, the period of the year with the least potential daylight. Thus, the total hours of potential daylight have been slowly decreasing for us for seven weeks or so, before bottoming out on the Winter Solstice. The Winter Solstice is the shortest day of the year, but ironically is not the date of either the earliest sunset or the latest sunrise. The former has passed as of this mailing, having occurred around December 8, at latitude 40 deg N (the exact date depends on the latitude). The latest sunrise will come sometime in late December/early January (around December 26 at latitude 60 deg N and about January 4 at latitude 30 deg N).



Eccentricities in the Earth's orbit around the sun cause this split of earliest sunset/latest sunrise from the shortest day length: the variation in the sun's declination (its angular distance above or below the equator which changes during a yearly cycle), and several factors related to Earth's orbital movement (which is an ellipse and not a circle) and rotation relative to the sun. Official timekeepers adjust their sunrise and sunset tables using the *Equation of Time*, which can amount to a 16-minute difference between solar and mean time.

The Equation of Time has two components. The first accounts for the fact the plane of the Earth's equator is inclined to the plane of the Earth's orbit around the Sun. The second component is due to the orbit of the Earth around the Sun being an ellipse and not a circle. The Equation of Time influence makes the solar day longer than 24 hours from mid-November to early February (no wonder winter seems so long!), reaching a maximum in late December of about an additional 30 seconds.



Not only is the sun's visible presence brief this time of year, but its radiative strength is also greatly weakened and totally absent in the latitudes of perpetual night. Without the warmth of the sun, the surface in the polar regions lose heat all day, building great domes of frigid air over Siberia, Alaska, northern Canada and Greenland. Eventually, they will be kicked out of their frigid nests and sent southward across the hemisphere. The cooling reaches its greatest strength in January, and that is why the coldest winter days occur about a month after the solstice.

[For discussions of various questions on time, and solar and moon phenomena related to time, see the US Naval Observatory site, particularly their piece on the dark days of winter. A good semi-technical account of the Equation of Time can be found at www.astronomy notes.com]

Pictures Wanted!!

Recently a request was made via our member list for any digital images of past ACA events. To date only a few have been received, for which I am very grateful! Additionally, our esteemed President volunteered his time and equipment to process any slide or film images to digital for use in our "magical walk" down memory lane. Once again, I ask you to dig deep into the archives for any photographs—film, slide, or digital—so that we can incorporate them into the presentation which will play while we dine.
On that note also, if you have any memorabilia you wish to share from past ACA events, it would be great if you could bring it. We have grown in the last few years, gaining new members—despite losing long time members; we have a rich history as one of the oldest astronomy clubs in NE Ohio that deserves to be told!!
Again, thanks for your support this year and happy holidays to all!

Article Submission

The next newsletter will appear in February.
All articles are due **the second Tuesday after the last meeting.** In the summer months, when there is no meeting, the deadline is **the second Tuesday after the fourth Friday of the previous month.** This has been revised in order to get the newsletter into the mail **2 weeks after the last meeting or 4th Friday of the previous month.** All word processing files should be saved in any version of **Word** to minimize import problems.
If you don't have access to a computer, don't hesitate to write something out long hand.
Send in your articles, items for sale, and comments to:

Lynn M. Laux
14274 Bridle Trail
Strongsville, OH 44136

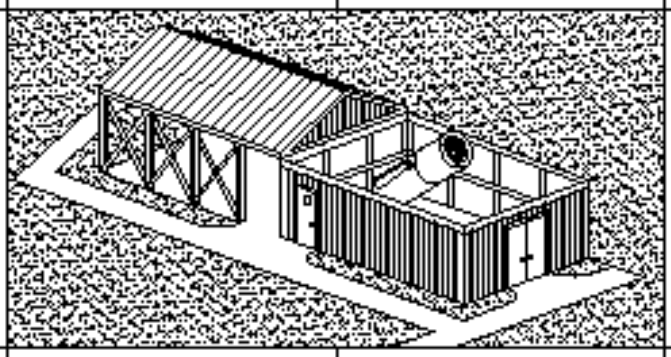
Or email:
gemmalady@msn.com

If you have any pictures of club events, astronomical images, rig pictures and the like, please submit them to:
http://groups.yahoo.com/group/astronomyclubofakron

ASTRONOMY CLUB OF AKRON
WWW.ACAOH.ORG

PORTAGE LAKES OBSERVATORY
ASTRONOMY CLUB OF AKRON
2005 CALENDAR OF EVENTS

All events are free and open to the public. Children are welcome.
For further information call (330) 658-3125 (after 5:00 pm, please)

SATURDAY 7:30 PM **FEB 5** OPEN HOUSE & STAR PARTY Random observing Views of Saturn, Jupiter and the Orion Nebula.	SATURDAY 7:30 PM **MAR 12** OPEN HOUSE & STAR PARTY Random observing Views of Saturn, Jupiter and the Orion Nebula.	SATURDAY 8:00 PM **APR 9** OPEN HOUSE & STAR PARTY Random observing Views of Saturn, Jupiter and the Orion Nebula.	SATURDAY 8:30 PM **MAY 7** THE PLANET SATURN Final look at this beautiful ringed gas giant. Saturn sets at 1:23 AM.
SATURDAY 9:00 PM **JUN 11** SIXTEENTH ANNUAL TELESCOPE SEMINAR Binoculars Refractors Reflectors Cassegrains Accessories			SATURDAY 9:00 PM **JUN 25** THE PLANET JUPITER Last chance to see the colorful bands of Jupiter which sets at 1:39 AM.
SATURDAY 9:00 PM **JUL 16** THE SUMMER CONSTELLATIONS Hercules Libra Ophiuchus Scorpius Sagittarius	SATURDAY 9:00 PM **JUL 30** THE JEWELS OF SUMMER Ring Nebula Dumbbell Nebula Hercules Cluster Andromeda Galaxy and many others	SATURDAY **AUG 13** 6:00 PM SOLAR See the surface of the Sun through special filters 7:30 PM HOT DOGS Culinary feast 9:00 PM LUNAR See the craters and mountains on the moon up close	SATURDAY 8:00 PM **AUG 27** THE PLANETS URANUS & NEPTUNE Gas giants will appear as tiny blue and green discs high in the southern night sky
SATURDAY 8:00 PM **SEP 24** MARS See surface details on the face of the red planet.	SATURDAY 7:30 PM **OCT 8** OPEN HOUSE & STAR PARTY Random observing There are still many excellent views of Mars.	SATURDAY 7:30 PM **NOV 5** OPEN HOUSE & STAR PARTY See Mars two days before its opposition - largest ang diam of 20 arc seconds	SATURDAY 7:30 PM **DEC 10** OPEN HOUSE & STAR PARTY Random observing and more views of Mars.

11-23-04

- **In case of inclement weather, programs will be cancelled. If in doubt, call.**
- **Areas in & around the observatory are dimly lit. Please use caution. A restroom is available.**
- **Dress as you would for outdoor activities; in spring and summer, a lightweight jacket and insect repellant are suggested; in winter, several layers of clothing, cap, and gloves are suggested. Lawn chairs or blankets can add to observing comfort.**
- **Bring a pair of binoculars or your telescope if you have one.**

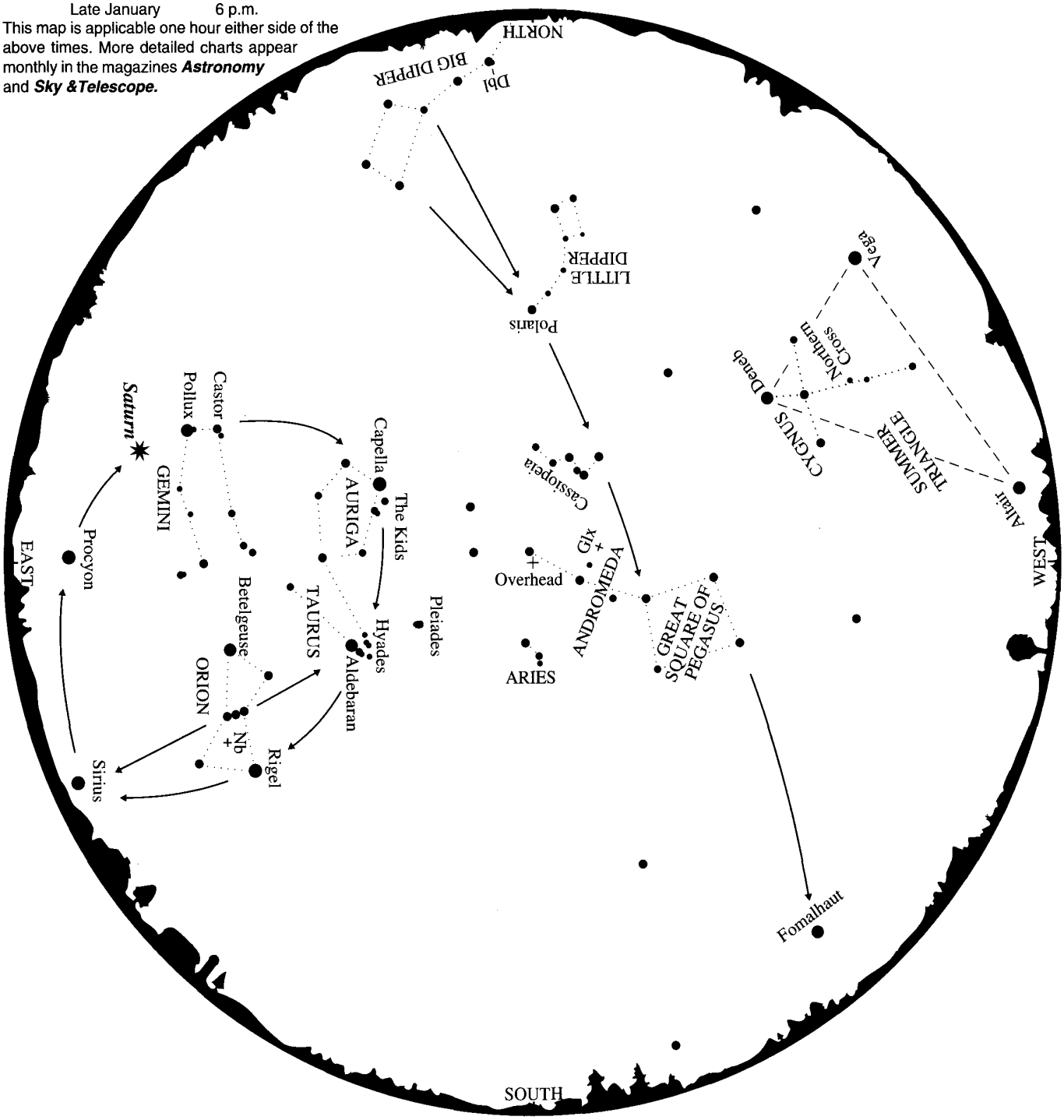
December Evening Skies

This chart is drawn for latitude 40° north, but should be useful to stargazers throughout the continental United States. It represents the sky at the following local standard times:

Late November	10 p.m.
Early December	9 p.m.
Late December	8 p.m.
Early January	7 p.m.
Late January	6 p.m.

This map is applicable one hour either side of the above times. More detailed charts appear monthly in the magazines ***Astronomy*** and ***Sky &Telescope.***

Subscription: $10.00 per year, from ***Sky Calendar***, Abrams Planetarium, Michigan State University, East Lansing, MI 48824-1324.



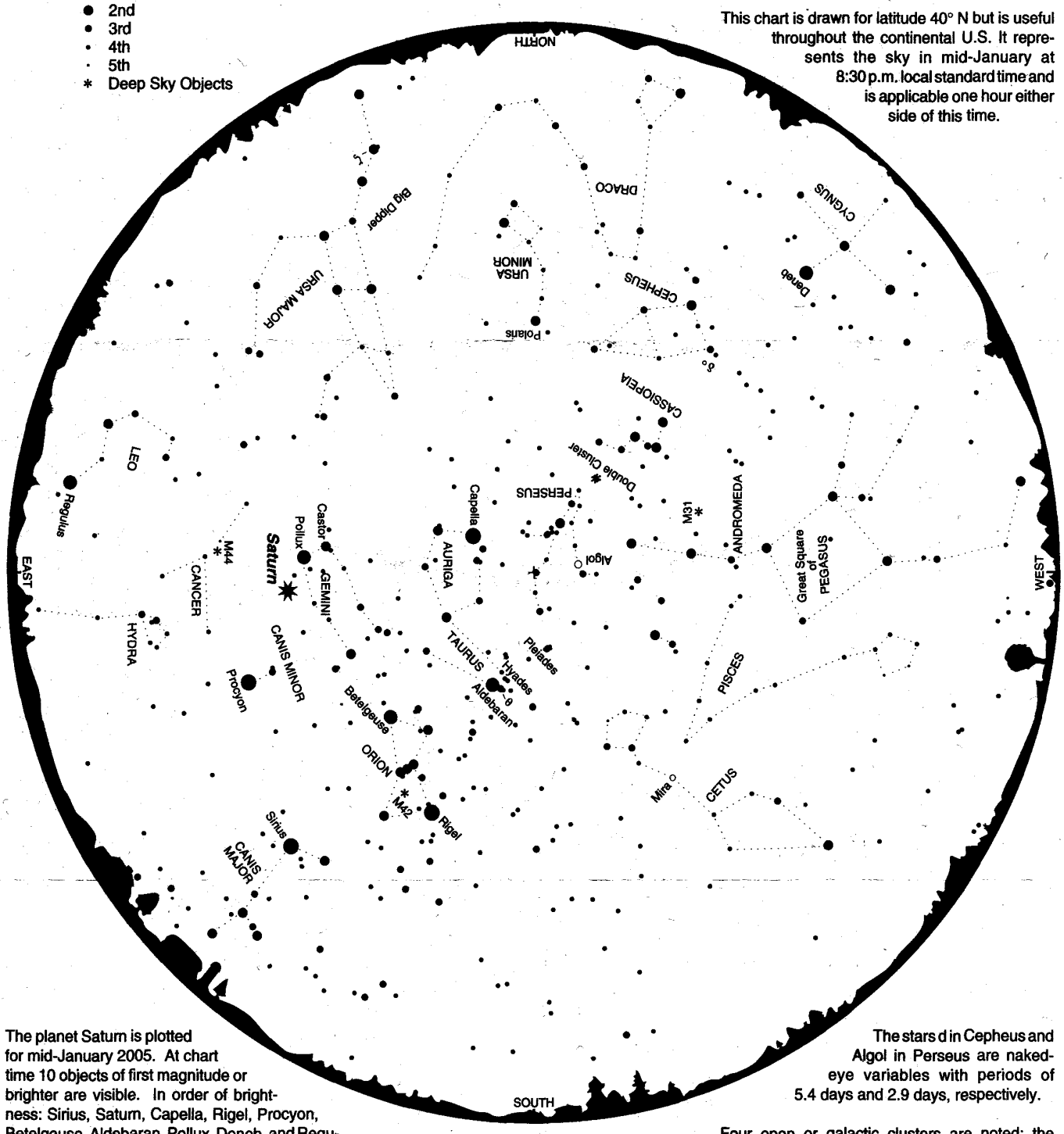
The planet Saturn is plotted for mid-December 2004. At chart time 12 objects of first magnitude or brighter are visible. In order of brightness they are: Sirius, Saturn, Vega, Capella, Rigel, Procyon, Betelgeuse, Altair, Aldebaran, Pollux, Fomalhaut, and Deneb. In addition to stars, other objects that should be visible to the unaided eye are labeled on the map. The double star (Dbl) at the bend of the handle of the Big Dipper should be detectable above the treetops in the north. The famous Orion Nebula, a cloud of gas and dust out of which stars are forming, is marked (Nb) in that constellation. The position of an external star system, called the Andromeda Galaxy after the constellation in which it appears, is also indicated (Glx). Try to observe these objects with unaided eye and binoculars.

—D. David Batch

January Evening Skies

Subscription: $10.00 per year, from ***Sky Calendar***, Abrams Planetarium, Michigan State University, East Lansing, MI 48824-1324.

This chart is drawn for latitude 40° N but is useful throughout the continental U.S. It represents the sky in mid-January at 8:30 p.m. local standard time and is applicable one hour either side of this time.



The planet Saturn is plotted for mid-January 2005. At chart time 10 objects of first magnitude or brighter are visible. In order of brightness: Sirius, Saturn, Capella, Rigel, Procyon, Betelgeuse, Aldebaran, Pollux, Deneb, and Regulus.

Our usual monthly maps are designed for stargazers just beginning to find their way around the sky. This month's map is useful for serious stargazing from dark locations. It contains many more stars, inclusive to magnitude 4.5, and some fainter stars as needed to complete patterns or assist in locating special objects.

A selection of double stars (labeled with Greek letters) and "deep sky objects" is also plotted. All are visible with modest equipment; most are within the range of the unaided eye or binoculars. The double stars, in order of decreasing angular separation, are z in Ursa Major, and q in Taurus.

The stars d in Cepheus and Algol in Perseus are naked-eye variables with periods of 5.4 days and 2.9 days, respectively.

Four open or galactic clusters are noted: the Pleiades or Seven Sisters, and the Hyades, both in Taurus; the Double Cluster in Perseus; and M44, the Beehive or Praesepe, in Cancer.

M42 is the famous Orion Nebula, a gas cloud out of which stars are forming. M31 is the Andromeda Galaxy, a collection of 300 billion stars located 2 million light years from Earth. Look for both with unaided eye and binoculars from a dark location.

Holiday Party 2005
Astronomy Club of Akron
Date: January 22, 2005
Time: 6:00 - ?
Where: Portage Lakes Kiwanis Civic Center
725 Portage Lakes Drive
Akron OH 44319

Cost
$12/person includes dinner, coffee/tea
Cash or Check made payable to The Astronomy Club of Akron

Menu: Classic Buffet
(Prepared by the Waterloo Restaurant)

- ❄Relish Tray Appetizer
- ❄Rigatoni with Meat Sauce
- ❄Bread/Butter
- ❄Roast Sirloin of Beef
- ❄Lemon Roasted Chicken
- ❄Scalloped Potatoes
- ❄Tossed Salad

Presentation:
The Astronomy Club of Akron: 1949 to the Present

R.S.V.P. by January 8 2005 (cash or check) to Treasurer Gary Smith

Detach this portion and Mail to:
Gary Smith, Treasurer, ACA
754 Annapolis Avenue
Akron, OH 44310

❄Holiday Party Reservations--required❄

Name: _____

Number of reservations: _____ x $12.00

Total amount enclosed: $ _____