



# The Observer

A Publication of The Cuyahoga Astronomical Association  
PO Box 868, North Olmsted, OH 44070

CAA Homepage: <http://www.geocities.com/cuyastro>

## CAA Officers

President:  
Vice President:  
Treasurer:  
Secretary and Editor, The Observer:  
Observatory Director:  
Board Member:  
Board Member:  
Board Member:  
CAA Webmaster:

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## 2002 CAA Calendar - Summary

8/10/02 8 p.m.	CAA Presentation and Star Party – Brecksville
8/12/02 7:30 p.m.	CAA General Membership Meeting – RRNC
8/26/02 7 p.m.	CAA Board Meeting – Starbucks
9/9/02 7:30 p.m.	CAA General Membership Meeting – RRNC
9/30/02 7 p.m.	CAA Board Meeting – Starbucks
10/5/02 7 p.m.	CAA Presentation and Star Party – Letha House
10/14/02 7:30 p.m.	CAA General Membership Meeting – RRNC
10/26/02 5 p.m.	Halloween Bonfire – Plum Creek
10/28/02 7 p.m.	CAA Board Meeting – Starbucks
11/9/02	Twilight to Midnight – The Chalet in the Cleveland Metroparks
11/11/02 7:30 p.m.	CAA General Membership Meeting – RRNC
11/25/02 7 p.m.	CAA Board Meeting – Starbucks
12/9/02	CAA Christmas Party
	No Board Meeting in December

## 2002 CAA Calendar - Detail

### Saturday, August 10

CAA presentation and star party at 8 p.m. at the Brecksville Nature Center. CAA member Art Nenadal will present "Meteors". Please bring your telescopes for the public star party that will follow the talk in the Meadows picnic area.

### Monday, August 12

CAA General Membership Meeting at 7:30 p.m. in the Cleveland Metroparks Rocky River Nature Center. August's speaker will be CAA Member Charles Grace. Charles will present "Hubble: Life and Discovery"

### Monday, August 26

CAA Board Meeting at 7 p.m. at Starbucks Coffee Co. Starbucks is located at 24950 Lorain Road, just west of Columbia Road in North Olmsted.

### Monday, September 9

CAA General Membership Meeting at 7:30 p.m. in the Cleveland Metroparks Rocky River Nature Center. CAA member Art Nenadal will be our speaker this month. Art will present "Meteors!"

### Monday, September 30

CAA Board Meeting at 7 p.m. at Starbucks Coffee Co. Starbucks is located at 24950 Lorain Road, just west of Columbia Road in North Olmsted.

### Saturday, October 5

CAA presentation and star party at 7 p.m. at the Letha House Warm Up Room and CAA Observatory. Thirty Girl Scouts from North Olmsted will be attending this public program. Please bring your telescopes for the public star party that will follow the presentation.

We need a speaker for this event. Please make Al Matyas' job easier by considering giving a talk for this event. If you are interested in giving a talk, please contact Al.

### Monday, October 14

CAA General Membership Meeting at 7:30 p.m. in the Cleveland Metroparks Rocky River Nature Center. Program to be announced.

### Saturday, October 26

It's that time of year again. Once again the Brunswick Hills Fire Department and the Medina County Park District are sponsoring the annual Halloween Bon Fire from 5 p.m. to 8 p.m. at Plum Creek Park which is just south of Sleepy Hollow Road on Plum Creek Parkway in Brunswick. It will be held rain or shine. A map will be provided in the October issue of *The Observer*. The CAA will provide telescopes at dusk for public stargazing. This event is usually well published and attended, so we will need a strong turnout with your telescopes.

### Monday, October 28

CAA Board Meeting at 7 p.m. at Starbucks Coffee Co. Starbucks is located at 24950 Lorain Road, just west of Columbia Road in North Olmsted.

**Sky Events for August 2002**

Moon Phase Calendar for August 2002

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

**Friday, August 9**

The moon passes 4° north of Mercury, 9 p.m. EDT.

**Saturday, August 10**

Mars is in conjunction with the sun, 6 p.m. EDT.

**Sunday, August 11**

The moon passes 6° north of Venus, 6 p.m. EDT.

**Monday, August 12**

Asteroid Pallas is at opposition, 8 a.m. EDT.  
Perseid meteor shower peaks.

**Monday, August 19**

Uranus is at opposition, 9 p.m. EDT.

**Tuesday, August 20**

The moon passes 4° south of Neptune, midnight EDT.

**Thursday, August 22**

Venus is at greatest eastern elongation (46°), 9 a.m. EDT.

The moon passes 4° south of Uranus, 10 a.m. EDT.

**Tuesday, August 27**

Asteroid Iris is at opposition, 7 a.m. EDT.

**Sky Events for September 2002**

Moon Phase Calendar for September 2002

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

**Sunday, September 1**

Venus passes 0.9° south of Spica, 2 a.m. EDT.

Mercury is at greatest eastern elongation (27°), 6 a.m. EDT.

The moon passes 2° north of Saturn, 1 p.m. EDT.

**Wednesday, September 4**

The moon passes 4° north of Jupiter, 9 a.m. EDT.

**Sunday, September 8**

The moon passes 9° north of Mercury, 1 p.m. EDT.

**Monday, September 9**

The moon passes 8° north of Venus, 10 p.m. EDT.

**Saturday, September 14**

Asteroid Eunomia is at opposition, 1 a.m. EDT.

**Tuesday, September 17**

The moon passes 4° south of Neptune, 5 a.m. EDT.

**Wednesday, September 18**

The moon passes 4° south of Uranus, 2 p.m. EDT.

**Monday, September 23**

Autumnal equinox is at 12:55 a.m. EDT.

**Thursday, September 26**

Venus is at greatest brilliancy (magnitude -4.6), 7 a.m. EDT.

**Friday, September 27**

Mercury is in inferior conjunction, 3 p.m. EDT.

Asteroid Melpomene is at opposition, 9 p.m. EDT.

**Saturday, September 28**

The moon passes 3° north of Saturn, 11 p.m. EDT.

**Club News / Stories**

**Cuyahoga Astronomical Association  
Financial Report August 4, 2002**

Bank Account Balance 6/4/02	\$2922.47
Cash On Hand 6/4/02	\$ 125.92

Total Assets 6/4/02 (approx)	\$3048.39
Bank Account Activity:	
Deposits:	
6/15/02 Interest	\$ 1.19
7/13/02 Memberships, Tee Shirt sales, Subscriptions	\$ 79.45
7/16/02 Interest	\$ 1.14
Expenditures:	
6/10/02 Refreshments	\$ 34.98
6/10/02 Newsletter	\$ 126.17
6/26/02 Honorary Life Member Plaques - 50% Down	\$ 116.91
7/8/02 Refreshments	\$ 20.33
7/8/02 Newsletter	\$ 81.85
8/2/02 Life Member Plaques - Paid In Full	\$ 116.91
Bank Account Balance 8/4/02	\$2507.10
Petty Cash Activity:	
Deposits:	
6/10/02 Refreshments	\$ 19.36
6/10/02 LED & "T" Shirt Sales	\$ 50.00
7/8/02 Refreshments	\$ 25.71
8/3/02 LED Sale	\$ 5.00
8/3/02 Door Prize Money - Convention	\$ 195.00
Expenditures:	
None	
Cash On Hand 8/4/02	\$ 420.99
Total Assets 8/4/02 (approx)	\$2928.09
Bank Account Balance Includes	
Observatory Fund Donation	\$ 200.00
Available Assets	\$2728.09

Art Nenadal, Treasurer

**November Elections**

This November the offices of President, Treasurer, and a Board Member will be filled through elections at our November general membership meeting. Each position has a term of two years.

The following officer's terms end December 31, 2002:

1. President: Bob Wiersma. Bob is not interested in serving another term.
2. Treasurer: Art Nenadal. Ted Sauppe has volunteered to run for Treasurer.
3. Board Member: Ted Sauppe. As noted above, Ted is interested in running for Treasurer. Bob Wiersma has expressed some inter-

interest in running for board member.

Thanks to all who have volunteered to run for office this November.

Newly elected officers' terms will begin January 1, 2003, and end December 31, 2004.

**Anyone who is interested in volunteering and running for any of these positions please let one of our current officers know. We would like to see more names on the ballot, so please consider stepping up to the plate and running for one of these positions. Any member in good standing who has been a member of the club for at least one year is eligible.**

### It's CAA membership dues time again

It's that time of year again. Your membership expires at the end of this year. So before you blow your budget on Christmas shopping, please drag out your old checkbook and renew your membership with us. The board has held membership dues at their current levels for 2003. Dues should be paid by November 1 of each year.

Remember that we offer you the exceptional opportunity to renew existing magazine subscriptions to *Astronomy* and *Sky & Telescope* at a good discount. Now is a good time to check what subscriptions you want. Don't forget to include your subscription number or mailing address label from the magazine for your current subscription so you won't be seen as a new subscriber. If you don't pay by October 1, 2002, we can't guarantee uninterrupted service for your magazine subscriptions. Your new subscription will be tagged onto the end of your current subscription.

You can also purchase one of the best observing handbooks printed, *The Observer's Handbook* by The Royal Astronomical Society of Canada, at a good discount as well.

Also included with your club membership is a 10% discount on books and products from the Sky Publishing Catalog or S&T's Online Store. To receive the 10% discount, identify yourself as a club subscriber and provide the name

and provide the name of our club. Sky Publishing will verify our participation in the Plan.

So please fill out the attached "2003 CAA Membership Dues & Subscription Order Form", and either bring it with you to one of our upcoming general membership meetings, or mail it to our P.O. Box, which is on the form.

### Welcome New Members

Please join me in welcoming the following new members to the CAA:

1. Lynn M. Laux
2. Patricia Long
3. Kris Roach

### Looking Up By Charles H. Grace

#### HUBBLE

The radial velocity of a galaxy outside our Local Group is proportional to its distance from us. That's all Hubble was saying. A Monday morning quarterback might think, "I could have discovered that."

If a crowd of people on bicycles are together in the middle of a big field, and they all start riding in different directions at the same time, the fastest ones will be the farthest away after one minute. By seeing how far away a rider is you can tell how fast he has been going. It's the same with our universe.

In 1912 American astronomer Vesto Slipher discovered that almost every spiral galaxy had a redshifted spectrum, so it must be receding from us. Edwin Hubble was also an American (1889-1953). In the 1920's he plotted a scatter diagram of velocity versus distance for remote galaxies, and drew a straight line through the points. It shows that the recession velocities of extra-galactic nebulae increase in direct proportion to their distance. Hubble's law would be explained by a uniformly expanding isotropic universe (Big Bang theory).

If you assume that the velocities of those galaxies have been constant, the slope of Hubble's line is a constant of proportionality for converting from distance to radial speed. You multiply distance by the "Hubble constant" to get radial velocity. The Hubble con-

stant is not known very accurately yet, but is believed to be about 20 km per second per million light years.

Assume that everything started out at the same point. Then the age of the universe can easily be calculated by dividing the distance to a galaxy by its velocity. This means that the time of the Big Bang is simply the reciprocal of Hubble's constant. When you pay attention to the units, it turns out to have been about 15 billion years ago.

You might think that you have to be at the starting point to apply Hubble's law. Actually it doesn't matter which of the moving galaxies the observer is on. An observer on any galaxy would see the expansion. However, you should remember that the redshift as seen from Earth gives only the radial component of velocity.

NASA named a space telescope after Hubble and put it in orbit in 1990, launching it from the space shuttle. It is 2.4 meters in diameter and gets its power from solar arrays. The optical system initially had spherical aberration because the mirror was too shallow by 2 micrometers, but they repaired it three years later with small corrective lenses.

### Want To Help Teach Astronomy? Project ASTRO Could Be For You! By Art Nenadal

Project ASTRO is a nationwide organization whose objective is to partner both amateur and professional astronomers with teachers to encourage the study of astronomy.

One or more teachers are partnered with an astronomer who assists them in matters astronomical and helps present the subject in the classroom about four times during the year. (The exact arrangements are worked out between the participants.)

The Project ASTRO organization provides materials and assistance to help with presentations, with the additional support of the Cleveland Museum Of Natural History.

The Cuyahoga Astronomical Association has supported this program since it started in Ohio four years ago. Art Nenadal and Lon Dittrick are

charter members, still active participants, and can serve as sources of information. If you would like more information and/or to join Project ASTRO, contact:

Joan P. Murdock  
Project ASTRO State Site Leader  
The Ohio Aerospace Institute  
22800 Cedar Point Road  
Cleveland, OH 44142  
Phone: 440-962-3033  
Fax: 440-962-3200  
[joanmurdock@oai.org](mailto:joanmurdock@oai.org)

## The Perseid Meteors Are Here! By Art Nenadal

July 23rd marked the beginning of the annual Perseid Meteor shower, which will peak at 22 hours Universal Time (6 pm EDT) on Monday, the 12th of August in a moonless sky, according to Sky & Telescope Magazine.

The peak of this shower, rich in bright meteors with long-lasting trails, should last 12 hours or more (6 hours before and 6 hours after the above time) providing 60 meteors per hour for those with clear, dark skies. Best viewing will be after midnight local time when the constellation Perseus, the shower's radiant, rises higher in the sky.

For you who like to try something different, the excellent article in S&T suggests watching for meteors striking the moon.

The Perseids will be around until August 22nd.

Another meteor shower, the Delta Aquarids, peaked July 28-29th, and will be providing meteors until August 18th.

## Lagrangian Points

The following article was submitted by Les Kee from the NASA web site.

Much could be learned about space if only it were possible to suspend a satellite motionless in space, observing changes of magnetic fields and particle flows at one fixed spot. **It cannot be done.** To stay up and resist gravity, a satellite must be constantly on the move and must follow its prescribed orbit.

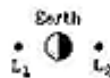
The best we can do is **station-keeping**: for instance, the motion of a satellite in a synchronous orbit around the equator is matched by the rotation of the Earth below it, allowing it to permanently stay above the same equatorial spot.

### Station-keeping in orbits around the Sun

With enough velocity, a spacecraft can break loose from the Earth's gravity and enter an orbit around the Sun, like that of a planet. If it then orbits the Sun with the same period as the Earth--one year--it may keep a fixed position relative to Earth. In particular, if that position is between the Sun and the Earth, the spacecraft can be an "early warning station", intercepting any changes in the solar wind before they reach Earth.

However, orbital laws require planets closer to the Sun to move faster, by a formula found in 1619 by Johannes Kepler. While the Earth goes around the Sun in 365 days, Venus which is closer only needs 225 days and Mercury, closer still, only 88. Thus any spacecraft going around the Sun in an orbit **smaller** than the Earth's will soon overtake it and move away, and will not keep a fixed station relative to Earth.

**However, there is a loophole.** If the spacecraft is placed between Sun and Earth, the Earth's gravity pulls it in the **opposite** direction and **cancel**s some of the pull of the Sun. With a weaker pull towards the Sun, the spacecraft then needs less speed to maintain its orbit.



If the distance is just right--about 4 times the distance to the Moon or 1/100 the distance to the Sun--the spacecraft, too, will need just one year to go around the Sun, and will keep its position between the Sun and the Earth. That position is the **Lagrangian Point L1**, so called after the French mathema-

mathematician who pointed it out, Joseph Louis Lagrange (1736-1813).

The sister-site From Stargazers to Starships discusses Lagrangian points in more detail than is done here, among other things deriving the distance of L1 (the derivation of L2 is almost identical) and also the equilibrium points L4 and L5. While neither calculation requires calculus, both are somewhat lengthy and assume familiarity with basic principles of Newtonian mechanics, covered in preceding sections of the "Stargazers" site.

### Spacecraft Observatories at L1

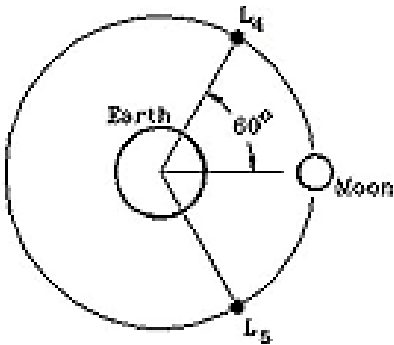
The L1 point is a very good position for monitoring the solar wind, which reaches it about one hour before reaching Earth. In 1978 the "International Sun-Earth Explorer-3" (ISEE-3) was launched towards L1, where it conducted such observations for several years. Equipped with an on-board rocket and an ample supply of fuel, ISEE-3 was later moved to the Earth's distant tail and still later was sent to intercept Comet Giacobini-Zinner. In November 1994 a new spacecraft, "WIND" was launched towards that position. It was originally scheduled to be stationed by 1996 in an orbit about the L1 point, but later it was sent on a more extended mission in a "flower petal" orbit around Earth. More recently the solar wind at L1 has been monitored by the solar observatory "SOHO" and by "ACE" whose main task is the study of energetic particles accelerated near the Sun.

Such a spacecraft must have its own rocket engine. First, the position is unstable: if the spacecraft slips off it, it will slowly drift away, and sooner or later some correcting action is needed. In fact, the preferred position is actually some distance to the side of L1, for if the spacecraft is right on the Sun-Earth line, the antennas which track it from Earth are also aimed at the Sun, a source of interfering radio waves. Thus corrections are in fact needed quite regularly. Furthermore, the most economic way of getting to L1 is letting the spacecraft pass close to the Moon and using the moon's gravity to extract an extra boost from the Moon's orbital motion. Those

maneuvers too require on-board propulsion, as does the final approach to L1.

### Other Lagrangian Points

There exists another Lagrangian point L2 at about the same distance from Earth but on the **night** side, away from the Sun. A spacecraft placed there is more distant from the Sun and therefore should orbit it more slowly than the Earth; but the extra pull of the Earth adds up to the Sun's pull, and this allows the spacecraft to move faster and keep up with the Earth. The L2 point has been chosen by NASA as the future site of a large infra-red observatory, the Next Generation Space Telescope.



There exist altogether 5 Lagrangian points in the Sun-Earth system and such points also exist in the Earth-Moon system. Among these, the most attention has been given to the two stable points L4 and L5, located in the Moon's orbit but off the position of the Moon (see picture). These positions have been studied as possible sites for artificial space colonies in some (very!) distant future.

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### CAA Logo T-Shirts and Red LED Reflectors Still Available

We still have some CAA logo T-Shirts and red LED reflectors for sale. T-Shirts are \$10 each (\$12 for XXL),

and the red LED reflectors are \$5 each. See Al Matyas at one of our upcoming meetings if you are interested.

### CAA Loaner Scopes Available For Member Use

The CAA has 2 club scopes available that can be loaned out to any CAA Member that is interested in using them. They are:

1. 6" f/8 Dobsonian Reflector
2. 6" f/8 Equatorial Reflector

Please contact Bob Wiersma if you are interested.

### Observatory Training

We are in the process of setting up some more Observatory training classes. If you are interested in Observatory Training, please contact Bob Wiersma so he can add you to the list.

### Schuele Planetarium Star Parties

On the 1<sup>st</sup> and 3<sup>rd</sup> Saturday of each month there are Schuele Planetarium star parties at dusk following the 7 p.m. Planetarium shows. CAA members are welcome to bring their scopes to help out at the star parties in the field across the street from the Schuele Planetarium. Any CAA members that could help out would be greatly appreciated by Jay Reynolds and the Lake Erie Nature and Science Center.

### Swap Corner

No items.

#### Upcoming Astronomical Events

### Other OTAA Meetings

Saturday, August 10, 2002: Mahoning Valley Astronomical Society OTAA meeting. The MVAS OTAA meeting and star party will take place at the Mahoning Valley Cortese Observatory in Braceville, OH on St. Rt. 534, about 8/10 mile north of the Rt. 82 – Rt. 534 intersection. Registration – 5:00 p.m. Please bring your favorite put luck covered dish, dessert, or other picnic treats to share with guests.

with guests. Cool-aid and coffee will be provided.

Saturday, September 14, 2002 (new date): Black River Astronomical Society OTAA meeting in Birmingham.

Friday & Saturday, October 4/5, 2002: Richland Astronomical Society Hidden Hollow convention at the Hidden Hollow Campground in Mansfield, Ohio.

### CWRU Nassau Observatory Public Nights

Every summer the observatory, in cooperation with the Geauga Metroparks and the Chagrin Valley Astronomical Society, holds several public nights. Here is the schedule for this summer:

Friday, August 23<sup>rd</sup>

Friday, September 27<sup>th</sup>

Rainout dates are the following Saturdays.

The public is permitted to view through the 36" reflector in the observatory, and the Chagrin Valley club usually has at least ten additional telescopes available for viewing on site.

Because of limited parking, reservations must be made through the Geauga Metroparks at 440-286-9540. Call early. This event fills up very quickly.

The observatory is on Clay Street in Chardon. Additional information may be obtained by calling the metroparks at the above number, by checking with the Chagrin Valley club, or by checking the CWRU web site: <http://astrwww.astr.cwru.edu/nassau/nassau.html>

Art Nenadal has attended several of these and can also fill in whatever details you may require.

#### Other News / Stories

### Note From The Desk of The Editor

I am always looking for articles for *The Observer*. If there are any aspiring authors out there who want to contribute an article, share a story or observation, etc. please do so, and I will include it in the next issue. Also, if you have any items for sale, or if you are looking for any items, send these in and

and I will include them in the *Swap Corner*. Remember, this is your newsletter, and participation from the general membership can only make the newsletter better. Thanks to all who have taken the time to send in articles. Please send articles, items for sale, items wanted, suggestions, and/or comments to:

Jeff Lewis

5623 Allendale Drive

North Olmsted, OH 44070-4622

Or you can send them via e-mail to

[bruisse@ameritech.net](mailto:bruisse@ameritech.net).

Thanks and Clear Skies!