



OBSERVATIONS

A MONTHLY PUBLICATION OF THE
CHESTER COUNTY ASTRONOMICAL SOCIETY



★President: Edwin Lurcott

★Treasurer: Pete LaFrance

MARCH 1996

(VOLUME 4, NO. 3)

★Vice President: Jim Sylvester

★Secretary: Nancy Armstrong

CCAS March Meeting

DATE: **Tuesday, March 12, 1996**
TIME: **8:00 PM EST**
PLACE: **Mount Cuba Observatory**
LOCATION: 1610 Hillside-Mill Road
Greenville, Delaware 19807
Phone: 302-654-6407

There will be no formal meeting this month. We have arranged with Dr. Emil Volcheck for a tour of the Mount Cuba Astronomical Observatory. Emil is the Observatory manager and past president of the Delaware Astronomical Society, which meets at Mount Cuba. The tour will include a visit to the Observatory's 24" reflector. Refreshments will be available.

To get there from West Chester, take Route 52 South to Route 1. At Route 1, you will turn left to follow the Route 52 signs for about a mile along Route 1 to where Route 52 turns South again (a right turn). Five miles south of Route 1, you will come to Route 82. Turn right onto Route 82, and follow Route 82 until you come to Hillside-Mill Road (it's about 1.5 miles on Route 82). Turn left on Hillside-Mill Road, proceed until you see the sign for the Observatory on the left. A map is enclosed.



Star Party at East Bradford Elementary

The Math & Science Committee of East Bradford Elementary School has asked the Chester County Astronomical Society to participate in its annual Student Interest Night, where students display their collections and hobbies. This year's event will be held on **Monday March 11** from 6:30 to 8:30 p.m., on the school grounds at 820 Frank Road in West Chester. Students and their families will be coming and going during this well-attended event, and with enough 'scopes, we can set up quite an outdoor collection of our own! Directions and a

map are included below. For more information or to indicate your willingness to attend, please call Chuck Shorten at (610) 696-3655 or 436-2360. Thanks!



Request for Occultation Timings

The International Occultation Timing Association (IOTA) has requested amateur astronomers to time the possible occultation of two stars by minor planets (asteroids). These timings are collected by IOTA to determine the size and shape of the asteroids and to refine their orbital elements.

The first occultation occurs in the morning of March 12, between 4:50 and 5:00 AM. Asteroid Erato (62) will occult a 9.7 magnitude star.

The second occultation will occur on the morning of March 28, between 3:45 and 4:00 AM. Asteroid Edith (517) will occult a 6.3 magnitude star.

If interested in making observations, call Ed Lurcott (436-0387). Telescopes are required, and some preparation is needed a day or two before the events.



March CCAS Observing Session

This month's observing session will be on Friday March 22, with a rain/cloud date of Saturday March 23, at the Brandywine Valley Association (BVA) property, approximately six miles west of West Chester on Route 842. As usual, there will be help available to set up and use your telescopes. All members are invited whether they have a telescope or not. Telescope owners are always glad to share the view through their 'scope. Dress warmly!!



Total Lunar Eclipse

West Chester University's Department of Geology and Astronomy has invited CCAS to participate in the observation of the Total Lunar

Eclipse on Wednesday evening, April 3. They will be observing from WCU's South Campus on South New Street, in order to have a good view of the eastern horizon. This eclipse occurs at sunset, and the Moon will be almost totally into the Earth's shadow as it rises.

CCAS should respond to this invitation with a significant number of members, since WCU is our sponsor and provides our meeting rooms free of charge. Binoculars or small telescopes would be appropriate, and should be set up before sunset. A map is enclosed.

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National Astronomy Day

This year, National Astronomy Day falls on Saturday April 20. A location and table have been reserved for CCAS by the Exton Square Mall, from 10 AM until 8 PM. Now it up to us to put on a display that will attract shoppers as they walk past. In the past, we have had both professional and amateur photographs of celestial objects, magazines, books, and models. A telescope or two would surely attract attention. Any ideas you may have are welcome, but no electricity is available at the table.

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February Observing Session

Windy, warm, and clear were the conditions on the evening of February 24, for the CCAS Observing Session at the W. N. Lurcott Observatory at Ed Lurcott's home. Pete LaFrance and his son James observed with James' 4.5" reflector. Peter and Kathy Cseke brought 7-power and 12-power binoculars. Jim Sylvester and the others observed through Ed's 10 inch reflector. In addition to the Moon and the Orion Nebula, we viewed M81 and M82, two galaxies in Ursa Major. We also looked at M65 and M66, two galaxies in Leo, as well as a number of double and binary stars. The new comets (see below) were not up in time to permit a look at those. A good time was had by all.

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February Society Meeting

After relocating the meeting to the new Physics Lecture Room, Dr. John Stolar gave an excellent talk on how astronomical distances are determined. Distance to nearby stars (less than 150 light years away) can be found directly from their annual

parallax. Further out, astronomers must rely on color/magnitude relationships. Beyond this, the period/luminosity relationship of Cepheid variables is used. This gets us out into neighboring galaxies. Beyond that, astronomers use the brightness of major galaxies and supernovae to estimate distances. And finally, the redshift of the spectral lines in the light of galaxies and quasars are used to imply the recessional velocity of those objects. Applying Hubble's Constant to these velocities indicates their distance. This last step is still highly controversial. John's presentation was very enlightening, and many members asked questions after the meeting.

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CCAS Election Committee Named

Mike Tucker and Chuck Shorten volunteered to serve on the Election Committee. A third volunteer would be very helpful. If interested, call Mike at 584-8236, or Chuck at 696-3655. The committee will canvas the entire membership to obtain candidates for all elected offices. Please give consideration to serving as an officer. This is your Society, and officers are needed to determine the activities you want, and to run these activities consistently with the purposes of the Society.

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Membership List

It has been quite a while since we last published a list of CCAS members, and there have been a number of changes. It is planned to publish a new list of names, addresses, and telephone numbers. If for any reason you do **not** wish to have your address and phone number listed, call Ed Lurcott (436-0387), otherwise they will be listed.

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Spring is here (finally) !!!!!!!

The Vernal Equinox occurs on Wednesday March 20 at 3:03 a.m., EST. This is when the Sun will cross the Earth's equator, back into the Northern Hemisphere.

Contributing to the Newsletter

Contributions of articles relating to astronomy and space exploration, sketches of observations, maybe observing "challenge lists," etc. are always welcome. If you have a computer, and an Internet connection, you can type it up, attach the file to an email message, and send it to the editor at skywalkr56@aol.com

March's Skies

Moon Phases

Full Moon	3/05
Last Quarter	3/12
New Moon	3/19
First Quarter	3/26

The Planets

Venus continues to dominate the evening sky in March, and reaches its greatest elongation (maximum distance between Venus and the Sun as seen from Earth) on March 31. It's the first "star" you can see after sunset, in the West. This will be the best month this year to check out Venus. At the end of March and beginning of April, Venus will move very close to the Pleiades, moving within 1° on April 2 and 3. On the evening of March 14, Venus will occult a 7th magnitude star. It may be tough to see because Venus is so bright, but the unlit portion of Venus approaches the star first, so try it out!

Saturn, Mercury, and Mars are all pretty much lost in the Sun's glare this month.

Uranus and Neptune are low in the morning sky this month; they may be tough to find.

Jupiter is also in the morning sky, in the constellation Sagittarius. A thin crescent Moon will be nearby on the morning of March 14.

Pluto is in the morning skies, if you know where to look (in the constellation Ophiuchus).



Space Exploration Notes

Historical Notes for March

In 1926, Robert Goddard launched the world's first successful liquid fueled rocket.

In 1965, Alexei Leonov made the world's first space walk from the Soviet spacecraft Voskhod 2.

In 1969, Apollo 9 was flown in Earth orbit. Its mission was to test the Lunar Module in solo flight, and to test the self-contained life-support suit that would be used on the Moon. Both tests were successful.

In 1974, Mariner 10 became the first spacecraft to fly past the planet Mercury.

In 1979, Voyager 1 flew by Jupiter, and also returned pictures of its moon Io, showing active volcanoes on another solar system body for the first time.

In 1982, the Soviet spacecraft Venera 13 returned the first color pictures from the surface of Venus.

In 1986, two Soviet spacecraft (Vega 1 and Vega 2) and a spacecraft from the European Space Agency (Giotto) flew by Halley's Comet.

In 1989, the first commercially licensed U.S. rocket was launched.



Minor Planet Makes Appearance!

CCAS Secretary Nancy Armstrong and her husband Dave had a baby girl, Shannon Ashley, on February 8 at 19:06 UT. All are doing very well. Granddad Ed Lurcott (a.k.a. CCAS President) seemed very pleased about it all at the February meeting of the Society. On behalf of the Society, I'd like to extend our congratulations and best wishes to the family.



The Comets are Coming! by Jim Anderson

There are two comets that have been discovered in the past 6 months or so that you have probably heard about. Astronomers are getting excited about these comets because the last comet bright enough to see with the naked eye was Comet West in 1976. On average, we get a bright naked-eye comet about once every ten years. So it's been a long time since we last had a "good one", and now we have two within one year!

This month Comet Hyakutake (officially called C/1996 B2) will pass by Earth, about 9 million kilometers away (1/10 the distance to the Sun from Earth). It will be in the north circumpolar constellations when it is at its brightest, which means that we will be able to watch it all night long! On March 1 it is in Libra, shining at magnitude 7 (you'll need binoculars or a telescope to find it then). By March 15 it will be visible to the naked eye, shining at magnitude 4 or 5, and moving into the eastern end of Virgo. On the evening of March 22 it passes 8° to the east of Arcturus, in Bootes, heading north and getting brighter (then it will be at mag 2). It passes closest to Earth on March 25, and there will be very little moonlight to interfere with the sight. At that point it will be moving very fast across the sky, moving 18° a day! (a Full Moon is about 0.5° across) Within just a few days the comet will move past the end of the Big Dipper's handle, across the tail of Draco, and then past the Little Dipper, moving roughly parallel to the handle. It may reach first magnitude in the last

week of March, as it recedes from Earth on its path in towards the Sun, passing into the constellation Perseus. We will be able to watch the comet through the end of April, when it may brighten again, possibly to mag -1! After it swings around the Sun it will be visible from the Southern Hemisphere only. The April 1996 issue of *Sky & Telescope* has a set of star charts depicting the comet's movements.

Epoch 2000.0 coordinates for Hyakutake(96B2)

<u>Date</u>	<u>R.A.</u>	<u>Dec.</u>
3/3	14h 52.5m	-22° 11'
3/8	14h 54.3m	-20° 10'
3/13	14h 55.3m	-16° 25'
3/18	14h 54.5m	-07° 54'
3/23	14h 47.8m	+21° 10'
3/28	04h 21.9m	+80° 21'
4/2	03h 12.5m	+52° 31'
4/7	03h 05.9m	+43° 44'
4/12	03h 01.2m	+39° 14'

For those of you with a computer star-charting program that will plot comet orbits, here's the orbital elements:

Perihelion date: 1996 05 01.55295
 Perihelion distance(AU): 0.2294915
 Arg/Peri (2000): 130.29556 degrees
 Asc. node (2000): 188.15597 degrees
 Incl (2000): 124.65024 degrees
 Eccentricity: 1.0
 Orbital Period: Long Period
 Period Ref: MPEC 1996-C03

Then there's Comet Hale-Bopp, the real biggie. It is now still way out in the Solar System, appearing in our morning skies this month, in the constellation Sagittarius. Right now it takes a telescope to find it. It will become a naked-eye object in July or August of this year, becoming a really easy target by October and November. In December and January of 1997, it will be too close to the Sun to be seen. Then in February and March of 1997 the really big show is on: first it will reappear in the morning sky, shining at magnitude 0.9, and then it slides back over to the evening skies around mid-March, brightening to magnitude -1.7 by the end of March, probably sporting a tail 15° to 20° long! Recall that the star Sirius (visible now in our winter/spring skies), which is the brightest star

visible in the nighttime sky on Earth, shines at magnitude -1.46. Comet Hale-Bopp will be brighter!

At the February meeting of the Society I had copies of the coordinate data for both these comets (for Hale-Bopp the data was complete through 1997). I'll be carrying additional copies with me to future Society events for anyone who wants a copy.

Oh, and of course we have to add the traditional caution about comet predictions like these. Comets are notoriously unpredictable. Most people remember Comet Kohoutek, and how it failed to live up to predictions. This is not unusual, especially for comets like these two that are making their first pass (that we know of) through the inner Solar System. But all of the updates I've been reading indicate that both these comets are behaving as predicted so far, and I think the prognosis is looking pretty good. In fact, the 2/23/96 *Skyline* bulletin from *Sky & Telescope* said that Hyakutake-(96B2) was actually a magnitude brighter than predicted for that week. So get ready for the comets!



First Light by Jim Anderson

What's a comet, you ask? "A big dirty snowball" is probably the most accurate answer.

A comet is a solid body that may measure several miles in diameter, perhaps several tens of miles across. It is made up of various ices, mostly water ice, perhaps with some carbon dioxide (dry ice) or other frozen gases mixed in. Remember that it is so cold in space that many things that are normally gaseous on Earth (e.g., carbon dioxide and methane) can freeze into an ice. Mixed in with these ices are what astronomers refer to loosely as "dust". This dust is particles of matter that range in size from microscopic to perhaps the size of small stones. This composite type of solid body forms the nucleus of every comet.

Comets typically spend most of their career far from the Sun, remaining a solid body, just the nucleus as described above. When their orbit carries them in closer to the Sun, the ices start turning into gases again, through a process called sublimation. These gases, and the freed dust, form a large cloud around the nucleus. This cloud is called the coma; it's what appears to us on Earth as the "head" of the comet. We can't see the nucleus of a comet from Earth because the coma obscures it completely. But back in 1976, three spacecraft flew close enough to

Comet Halley to snap pictures of the nucleus. So we know for sure that there is a solid body inside the coma.

When the comet is near the Sun, the radiation streaming outward from the Sun (you may have heard of the solar wind) can exert pressure on the dust and gases in the coma, and "blow" it back away from the coma, in the direction opposite the Sun. This forms what is called the tail of the comet. Not all comets develop a tail. Sometimes we can't see the tail, because the Earth is in such a position that we are looking at the comet at an angle where the tail is behind the coma from us. Some comets develop two tails, one composed of dust and the other made of gases. In some rare cases, some of the dust from the coma will precede the coma in its path, forming a visible "spike" on the Sun-side of the coma. In these cases, the comet appears to have two tails, one in front, and one in back!

There are two broad types of comets. The one type is the periodic comet, which follows a known orbit around the Sun. The appearances of periodic comets can be predicted in advance because we know their orbits. Comet Halley is the most famous example of a periodic comet. The other type makes one pass in through the inner Solar System, and then is thrown by the Sun's gravity out of the solar system. These objects probably come from a belt or belts of cometary material that orbit the Sun out past the orbit of Pluto. In fact, the Hubble Space Telescope has found and photographed several of these bodies over the past couple of years. These bodies are probably leftover material from the formation of the planets 4.5 billion years ago. Somehow, every now and then, one of them gets nudged into a Sunward path, and we get to see a "new" comet. Hale-Bopp and Hyakutake-(96B2) are "new" comets, if you can really call a 4.5 billion year old comet a new one! So remember that as you enjoy these comets this year. You are looking at stuff untouched and unchanged from the beginning of our Solar System, the stuff of which we are made! Enjoy the show!

References:

The Quest for Comets by David Levy
Sky Watcher's Handbook edited by James Muirden

Also Available

A free brief overview on getting started in astronomy called *Getting Started In Astronomy* is also available from the CCAS. It can be picked up at a CCAS function, or you can call the newsletter editor to get a copy mailed to you. Suggestions for improving this introduction to our hobby are always welcome. Articles for the *First Light* column, intended for beginners, are also needed.

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Membership Renewals

Check the date printed on the address label of this issue of *Observations*. If you are due to renew, you may send your renewal check made out to our Treasurer, Pete LaFrance. Mail to:

Pete LaFrance
413 Church Rd.
Avondale, PA 19311

Sky & Telescope Magazine Group Rates!

Subscriptions to this excellent periodical are available through the CCAS at \$24 per year, a significant savings over newsstand prices (\$50.24 per year that way), and even cheaper than individual subscriptions! Make out a check to the Chester County Astronomical Society, note that it's for *Sky & Telescope*, and mail to Pete LaFrance.

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CCAS Membership Information

The present membership rates are as follows:

REGULAR MEMBER

(18 years or older)\$20/year

SENIOR MEMBER

(65 years or older)\$10/year

STUDENT MEMBER

(full-time college student) \$ 5/year

JUNIOR MEMBER

(under 18 years old)\$ 5/year

FAMILY MEMBER

(husband, wife & children)\$ 30/year

For further information on membership or society activities you may call:

President:	Edwin Lurcott	(610) 436-0387
Vice Pres:	Jim Sylvester	(610) 696-1102
Treasurer:	Pete LaFrance	(610) 268-2616
Secretary:	Nancy Armstrong	(610) 873-7531
Public Rel:	Kathy Cseke	(610) 644-9543
Obs Chm:	Mike Tucker	(610) 584-8236
Newsletter:	Jim Anderson	(610) 993-0261

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Directions to East Bradford Elementary School

Time: Monday March 11 from 6:30 to 8:30 p.m.

From West Chester, travel towards Downingtown on Rt. 322 Business and turn right onto Copeland School Road, the first right turn after the intersection with Rt. 322 Bypass.

After less than a mile, Copeland School Rd. turns to the right, but you should travel straight; this becomes Frank Road.

The school is 100 yards further on the left (it is very well lit).

An area map is shown below, and for more information or more detailed directions, or to indicate your willingness to attend, please call Chuck Shorten at (610) 696-3655 or 436-2360. Thanks!

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