

*The  
Ford  
Amateur  
Astronomy  
Club  
Newsletter*



**Brrr...**

Volume 3 Number 1 January 1994

## **BASIC OBSERVING SERIES**

by Greg Burnett

This article is the seventh in a series on basic observing techniques. This month's entry will discuss an observing pursuit that is somewhat unique in that no optical equipment is required, meteor observing. Previous articles have addressed solar, asteroid, lunar, double star, variable star and cluster observing; later installments will cover the basics for planetary, deep sky, and comet observing. Each article will discuss the preferred equipment and basic techniques for each type of observing. The goal is not technical depth, but to provide exposure to a wide range of observing alternatives. This may help a novice get started, or broaden the interest of a more experienced observer.

### **Meteor Observing**

It is estimated that tens of thousands of tons of meteoric material impacts the Earth each day. The vast majority of this material is dust, but some is in lumps of appreciable size, which we call "meteoroids." When a fast-moving meteoroid encounters the Earth's atmosphere, it is heated to incandescence by air friction at an altitude of 60-80 miles, and we see the phenomenon we call a "meteor." If the object is large enough to survive re-entry, it will arrive at the ground and become a "meteorite."

Most of the meteors we observe in the sky are about the size of sand grains. The very brightest, called "fireballs," and the ones that explode, called "bolides," are generally about the size of marbles. Few of these ever reach the ground. Rarely, a meteor of golf-ball size or larger will arrive and become a meteorite. It is estimated that, on average, one meteorite impacts the Earth's surface per square kilometer per year. Obviously, most fall into the oceans. The rest are lost among the naturally occurring rocks and into the soil. Only when a very large meteoroid is observed arriving, or when one breaks into a shower of fragment, do we have a reasonable chance of recovering any of the material. (Many meteorites are also recovered from Antarctica, where they "float" to the surface of the ice.)

It was once thought that most meteors were following hyperbolic orbits and that they arrived at the Earth from somewhere far beyond the Solar System. We now understand that virtually all meteoric material is debris from comets, and while there are many "sporadic" meteors, most meteors occur as showers associated with a particular comet. In many cases the parent comet is a known periodic comet that is regularly observed. A meteor shower occurs when the Earth passes through the swarm of debris lying along the comet's orbital path. Since the meteoroids of a particular swarm are all moving in the same direction along the comet's orbit, they enter the atmosphere along essentially parallel paths. When we see them from the ground, their paths do not appear parallel, but seem to originate from a particular point in the sky. This point is called the "radiant" of the shower. Because the orbit of the meteor swarm is consistent, the shower will recur each year when the Earth passes through it, and the radiant will appear in a consistent place in the sky. Consequently, most major showers are named after the constellation in which the radiant appears, for examples the Perseids each August and the Leonids each November. There are over a hundred known showers, but only about a dozen major showers are commonly recognized.

Meteor observation is important for gaining an understanding of how comets lose material, how it spreads out along the orbit of the comet, the composition of comets, and the relationship between comets and asteroids. Even though most serious meteor observations are now made by radar, the amateur astronomer can still make a contribution. Amateur observations provide important data that helps define meteor swarm orbits and radiant locations, and can help predict major meteor storms. Several organizations collect amateur observations. Two of them are the American Meteor Society (Dept. of Physics and Astronomy, State Univ. of New York, Geneseo, NY, 14454) and the International Meteor Organization (Physics Dept., Univ. of Western Ontario, London, ON, N6A 3K7).

In order for amateur observations to be useful when combined  
(continued on page 2)

## STAR STUFF

Monthly Publication of the  
Ford Amateur Astronomy Club  
Star Stuff Newsletter  
P. O. Box 7527  
Dearborn, Michigan 48121-7527

### 1993 CLUB OFFICERS

President:	Greg Burnett	24-81941
Vice President:	Brian Gossiaux	39-03935
Secretary:	Brian Gossiaux	
Treasurer:	Al Czajkowski	84-57886

### GENERAL MEETINGS

The Ford Amateur Astronomy Club holds regular general meetings open to the public on the fourth Thursday of the month at 5:00 pm. Meetings are held at the Ford Motor Credit Company (FMCC) building, northeast of the World Headquarters building in Dearborn, in the "Systems K" conference room, lower floor, NorthEast corner.

### OBSERVING SITE

The Ford Amateur Astronomy Club has an established observing site, by permit, at the Spring Mill Pond area of the Island Lake Recreational Area in Brighton, Michigan located near the intersections of I-96 and US-23. Observing at this location is usually held on any clear weekend and holiday evenings or as specified in the observing hotline phone message.

### OBSERVING HOTLINE NUMBER (313) 248-1941

On Friday and Saturday nights, or nights before holidays, you can call the hotline numbers up to 2 hours before sunset to find out if we will be observing that night. Assume that any clear Friday or Saturday night is a candidate observing night unless something else is going on or if none of the club officers are able to make it.

### MEMBERSHIP AND DUES

Membership to the Ford Amateur Astronomy Club is open to both Ford and Non-Ford Motor Company employees. The general public is also welcome to join. The dues structure is as follows:

Annual Individual/Family	\$20.00
Lifetime Membership	\$100.00

Membership benefits include a subscription to the Star Stuff newsletter, discounts on subscriptions to Astronomy and/or Sky & Telescope magazine(s), after hour use of the observing site at Island Lake Recreational Area, and discounts at selected local area astronomical equipment retailers.

### NEWSLETTER STAFF

Editor:	Brian Gossiaux	39-03935
Contributing	Patti Smith	Doug Bock
Editors:	Greg Burnett	Gary Miller

### NEWSLETTER SUBSCRIPTION

A yearly subscription at a rate of \$12.00 is available to those who are not members of the Ford Amateur Astronomy Club. Subscriptions are free to any other Astronomy Clubs wishing to participate in a newsletter exchange.

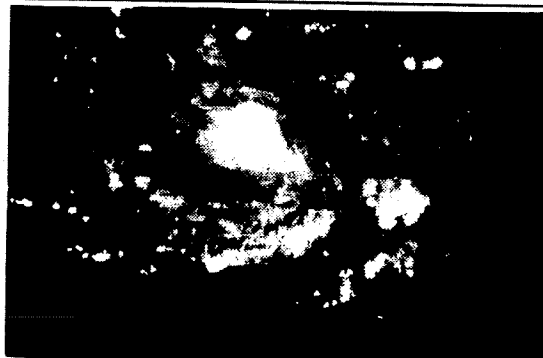
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(Continued from page 1.)

with many others collected from different areas, all must be conducted according to certain guidelines. The most common amateur observation of meteors is simply to count them, but it must be done right. Position yourself comfortably where you can view an unobstructed area of sky for at least an hour or so. If some of your view is obstructed by trees or buildings, record how much (e.g. 5%; If it's more than about 20%, choose another location.). Record your viewing period to the nearest minute, including start and stop times, not just the duration. Record the faintest star visible at your location (i.e. the "limiting magnitude"). There are charts available to help with this. The limiting magnitude can change during the night, so check it at least every hour, and record changes if necessary. If clouds temporarily obstruct your view, either record them as obstructions, or if they are more severe, stop your viewing session until they pass. Record the center of your viewing area. You should observe an area between the zenith and 40-50 degrees altitude. If you submit your observations for compilation, include the latitude and longitude of your location.

During your observing session, count the number of meteors seen. You should count sporadics and shower members separately. This requires knowing the location of the radiant in order to distinguish between them. You should also observe whether the shower meteors are fast or slow, faint or bright, whether they leave glowing trails along their path, called "trains", and what colors you observe, if any. Count only the number of meteors within your field of view; do not combine your count with anyone else's or count meteors that you did not actually see (in spite of "ohs" and "ahs" from your fellow observers!). It is also helpful to observe before and after the predicted peak of a shower, in order to help define the extent of the meteor swarm. If these guidelines are followed, your count will be statistically valid when combined with counts of other who followed the same procedure.

There are other, more rigorous methods for meteor observing. Some observers record the actual path of each meteor seen and its brightness by comparing with nearby stars. This requires substantial dedication and practice. Another technique is to coordinate multiple observations from different locations separated by 50-100 miles. In this way the actual path of the meteor can be reconstructed in three dimensions. There have been several projects aimed at meteorite recovery through path triangulation, but none have yet been successful. The best way to obtain a meteorite is to buy one from a collector. You can then hold a piece of the primordial Solar System in your hand.



## Lunar Eclipse -- November 28-29, 1993

Some observations of the eclipse from our members:

Sunday evening started off partially clear and became progressively worse as the evening went on. But I decide to wait it out. The cloud cover was approximately 85 percent at about 9:00 pm. I put the camcorder piggy-backed on the 12 inch and set it up to take interval frames every 30 seconds starting at about 10:00 pm. I also put the OM-1 at prime focus on the 12 inch. I used ekta-chrome 400 in that camera. Roger [Tanner] piggy-backed one of his cameras on the 12 also. Unfortunately, he found out the next day that this camera didn't have any film in it. Later he set up his 6-inch and ran 2 cameras on the back of that scope. The plan was to wait for holes in the clouds and shoot while we could see it. This meant paying attention to the sky constantly. I had to trigger the cam corder and fire the OM-1 when an opening in the clouds appeared. This looked a lot like a chinese fire drill. We got enough holes in the sky to catch a significant amount of the partial phase. Then at about 12:45 the sky cleared for about 45 minutes. So I set the timer on the camcorder to every 30 seconds and let it fly on its own. Meanwhile I could concentrate on several exposures on the Olympus. We used the LFK guide as a general rule of thumb for exposures, but had to vary them according to the cloud density. Needless to say, this was not an ideal way of photographing this event. But it made it a little more exciting. We followed the eclipse all the way into totality. In previous eclipses the moon showed more copper color, but in this eclipse it seemed mostly gray and much darker. The sky conditions weren't great so the haze may have taken some of the color out. the contrast was poor also. We did see several bright stars around the moon during mid eclipse though. Finally at about 1:45 the clouds came in for good. In fact it started snowing on us before we got everything packed away. It was worth staying up for and was allot of fun. Hopefully I managed to get a few good shots on film. The video wasn't very impressive but did show the progression of the eclipse.

-- Doug Bock

I was able to observe most of the ingress phase from my home in Clinton Twp. At 11:25 p.m. EST the effects of the penumbra were becoming clearly visible in the telescope as a pinkish tinge to the Moon's western hemisphere. By 11:30 the same could be seen with the naked eye. First contact with the umbra, predicted for 11:40, was not obvious to me until about 11:43, even thru the telescope. At first the lunar limb looked kind of squashed in, then the edge of the umbra appeared. The curve of the umbra wasn't apparent for the first few minutes. I was observing with my 6-inch APO at 22x and 38x. As the eclipse progressed, the surrounding stars began to appear, but so did the clouds. By the time the eclipse was total, at 1:02 a.m., I was observing through an almost complete overcast. It was thin enough that the moon could still be seen, even during totality, since the southern lunar limb remained surprisingly bright. I stuck it out thru totality, hoping to see the moon against the starry sky without the telescope, but I was never able to do so. As egress began at about 1:50, the clouds thickened and I packed it in.

-- Greg Burnett

Took some slides. M42 (indented) interspersed with lunar images. Photo tripod (no tracking).

Cloud cover complete (but eclipse not?) by 12:49 (at my house).

Lunar Eclipse (11-28-29/93)

TeleVue Oracle (560mm f7.4; 2x convertor; 1120mm f14.8)

Kodachrome 64

[times included]

-- Bill Colwell

We stepped out at about 10:30 and there was heavy cloud cover in Hartland. The only view we had all night was a glimpse just after moonrise at about 7 pm. Nothing but clouds after that.

-- Charlie Harp

Saw about 10% of the coverage....about 11:50pm....heavy clouds rolled in after that. Took a few pic's too....will let you know how they turn out. Looked like it was going to be VERY dark again. I saw the "first bite" thru some holes in the clouds. Got to be really cloudy after about 20 min into the eclipse (around midnite). Maybe '96 will be better....late Sept. no snow. but could be rain.....

-- Gary Miller

I watched through the breaks in the clouds until about 12 then I got socked in and gave up.

-- Al Czajkowski

I was only able to see until 11:50pm. I wasn't able to see anything else. A few scattered clouds in Livonia. Moon was bright and as it disappeared... as far as I could tell, it looked black with my binoculars. I enjoyed what I saw.

-- Joe Vargo

I tried video taping the eclipse...not successfully. I could not get the F-stop on my camcorder adjusted correctly. The f-stop was either open or closed too much.

-- Dave Garrett

Oh! Was that last night?

-- Brian Gossiaux

□

## REQUEST FOR ARTICLES/PICTURES

The newsletter is always in need of articles and pictures (photographs, cartoons,...). Our primary interest is to publish articles/pictures that were done/made by our members. Articles/pictures for the newsletter should be sent to any of the newsletter/club officers or brought to the monthly club meetings. Local events, announcements, and classified items may be submitted up to one week prior issue and will be printed if layout space is available. The newsletter staff members do have access to optical scanners and can convert typed articles/pictures to the correct wordprocessor format. For those who have access to the FORD PROFS mail system, articles may be sent via PROFS or uploaded/downloaded through the same

## NEW CRASH PREDICTIONS

Periodic Comet Shoemaker-Levy 9 and Jupiter were hidden by the Sun in late 1993, making observations impossible from August through early December. But they have now moved far enough from the Sun in the predawn sky for astronomers to resume watching it using the Spacewatch telescope at the University of Arizona, particularly to extract the precise positional measurements so critical for orbital calculations. In an IAU Circular issued December 14th, dynamicist Brian Marsden offers such results for the comet's nine brightest nuclei. Working back in time, it now appears that the comet passed \*extremely\* close to Jupiter, less than 20,000 km from its cloud tops, on July 7, 1992. And, concerning the coming collision, Marsden now predicts that the 10 largest nuclei will come crashing into the planet between July 17.6 to July 22.3 (Universal Time), with the brightest and presumably largest fragment striking on July 20.8. A JPL team has also created some prediction times, which are generally about 1.5 days later than Marsden's.

## MARS OBSERVER REPORT

On January 5th a review board summarized what it thinks happened to Mars Observer last summer. You'll recall that communication with the probe was lost August 21st, just as it was preparing to fire its inboard engine and drop into orbit around Mars. The board concludes that most probably the loss was caused by a rupture in the craft's fuel-pressurization system. That eventually caused the whole spacecraft to spin up so fast that its computer could not regain control. But this hypothesis cannot be proven with certainty, since no data were received from Mars Observer after its transmitter was intentionally switched off in anticipation of the rocket firing. The panel also puts some blame on the NASA and industry teams that built the spacecraft, and on laxness in the procedures used to convert a design for what was basically an Earth-orbiting spacecraft into an interplanetary probe.

## NOVA SHINES ON

Nova Cassiopeia, a star that erupted to naked-eye visibility last month, has hovered near 7.0 for much of the time since. The nova is 4 deg southwest of Beta Cas; its equinox 2000 coordinates are right ascension 23 hours 41.8 minutes, declination +57 deg 31 minutes.

## NASA DECLARES HUBBLE SERVICING MISSION SUCCESSFUL

From Paul Mrozek

Following is a press release about the HST repair. I'm going to try and get an electronic copy of the new pictures they released.

RELEASE: 94-7

NASA Administrator Daniel S. Goldin today declared that last month's Space Shuttle mission to service the Hubble Space Telescope (HST) had been fully successful in correcting the vision of the telescope's optical components. The announcement, accompanied by the first new images from HST, followed the initial 5 weeks of engineering check-out, optical alignment and instrument calibration.

Word of the Hubble success came at a press conference at NASA's Goddard Space Flight Center, Greenbelt, Md. Goldin was joined in making the initial announcement by Dr. John H. Gibbons, Assistant to the President for Science and Technology, and Senator Barbara A. Mikulski (Md.), Chair, Appropriations Subcommittee on VA, HUD and Independent Agencies.

"This is phase two of a fabulous, two-part success story," Goldin said. "The world watched in wonder last month as the astronauts performed an unprecedented and incredibly smooth series of space walks. Now, we see the real fruits of their work and that of the entire NASA team.

"Men and women all across this agency committed themselves to this effort. They never wavered in their belief that the Hubble Space Telescope is a true international treasure," Goldin said.

Mikulski, who unveiled two new HST pictures at the press conference, said, "I am absolutely delighted that Hubble is fixed and can see better than ever. This is tremendous news. "Now we are going to look at the origins of our universe," Mikulski said. "What a wonderful victory this is for the Hubble team of astronauts, astronomers, scientists and engineers. Together they are moving American science and technology into the 21st century with exciting new opportunities for scientific and economic progress."

Pictures were released from the two cameras that received corrective optics during the servicing mission -- the Wide Field/Planetary Camera II and the European Space Agency's Faint Object Camera.

## PRESIDENT'S CORNER

Gee, things really seem to slow down when it's 20 degrees outside! It's unfortunate that some of the best objects are up during the winter nights. It's difficult to get motivated to observe when the mercury dips. Remote-control telescopes with CCD cameras begin to look like a viable option! I want to publicly thank Doug Bock for making his Northern Cross Observatory available for observing while Island Lake is sort-of shut down for the season (power is off, building is closed, etc.) even though the weather has not allowed us to take much advantage of his hospitality. Brian Gossiaux is in the process of renewing our after-hours permit with the park, so we should be back in business for 1994 and we'll be ready to go when the weather begins to warm up.

Hope to see you soon!

*Greg Burnett*

# FROM DOUG'S DECLINATION

by Douglas Bock  
PROFS=DBOCK1

## Observing Log from the Northern Cross Observatory January 14, 1994

Hello again. This last month we had two star parties scheduled. One of them was clouded out while the Dec. 11th party was clear. We had 4 people from the Ford Club out with their equipment and enthusiasm. The sky conditions were not the best due to high humidity, but it was usable. I was able to find Comet Mueller ( 1993a ) and photographed it. It seemed to be about a magnitude dimmer than the prediction of 9.3 which I had on my data sheet. The comet was fairly diffuse with no observable tail. I haven't processed the film yet so I don't know if any other details exist. I also tried for Comet Mueller ( 1993e ) but it was too dim to see at 11.3 magnitude under the current sky conditions. We saw many meteors during the night, since we were at the beginning of the Geminids. Many very bright meteors were seen with trails lasting for a few seconds. The star party broke up about 1:00 in the morning.

I also made it to the Warren Astronomical Society's Christmas banquet on Dec. 16th, where about 70 people showed up. The program was put on by two members for the now defunct DOAA. It was an audio visual program they built around 1970 and was a real crowd pleaser.

The next day was the Lowbrow meeting in Ann Arbor where we were treated to the Annual Artsy Meaningless slide show. That was quite spectacular. The kind of show you would just say, "Gee, wasn't that neat".

Over the holidays we had three clear nights, but the moon was near full and the mercury was in the single digits, so I stayed warm in the house instead.

Things to look forward to this next month are star parties on Jan. 15, Feb. 5th, Feb. 12th and possibly the EMU freeze-out. I haven't heard anything on the freeze-out yet though.

Don't forget to look for Comet Mueller and Comet Encke in January and February. I will bring whatever data I have for these comets to the next meeting.

Until next time, hope you have clear weather.

□

## FYI ON THE TSP

*The following is information for those who may be interested in attending the Texas Star Party. Registration for this event should be done well in advance as the article suggests. -ed.*

Ok, folks... it's time to start talking about the Texas Star Party!

This year, the TSP will be from May 8th thru 14th at the Prude Ranch, 5 miles NW of Fort Davis Texas in the Davis Mountains. We are expecting large crowds of 800+ this time, because we will also get to view a annular solar eclipse on Tuesday May 10th about 11 AM. The eclipse path will pass about 80 miles NW of the ranch. We will be providing an observing site about 30 miles inside the southern limit of the eclipse, near Dell City Texas. The Prude Ranch will provide transportation of you and your equipment if needed.

Our guest speakers (evening) include Brent Archinal of the US Naval Observatory, Arthur Whipple of UT Austin (Comet Levy/Jupiter), Stephen O'Meara of Sky & Telescope magazine, and Dr. Paul Hodges of the University of Washington. We will also be having paper sessions during the afternoon.

The Prude Ranch has motel rooms, family cabins, bunkhouse, berths, RV hookups, and lots of camping! They have a dining room, swimming pool, and horseback riding, and lots of mountain air at 6000+ feet altitude. The starting date for reservations at the Ranch is Saturday February 19th at 9 AM CST. Do not call earlier, as all reservations made up until then will be cancelled! Call 915-426-3201.

Want more info on the TSP? Write our Registrar at 1326 Mistywood Lane Allen TX 75002. TSP registration (not room or board) is \$20 per person plus \$9 per add'l family member until March 13th. After that, our rates are \$25 single + \$9 add'l until April 29th. Anything postmarked after April 29th and at-the-door rates are \$75 per person.

It is highly likely that we will be turning people away this year due to limited space and extra-demand from the eclipse. We haven't decided our cut-off this year, but it will be about 750-800 people, perhaps more if we can increase facilities in time. We turned away over 100 people one year several years ago, sad as that may be. So, REGISTER EARLY and often.

We will be mailing out over 4000 flyers during the week of January 17th. For those who contact our registrar this year another mailing of a detailed packet will be sent in late March. Ya'll come now, hear?

# ASTRONOMY WORKSHOP

By Gary W. Miller, Star Gazer



PROFS: gmille12

FAX: 84-55349

(call to let me know something has been sent)

PHONE: 84-54150

This is the fifth installment of this column. I appreciate the responses received from some of you on the questions. The new answers are included below with some repeats from previous columns.

Here are this months offerings:

**Q10. If you were on a different planet, would the constellations be the same?**

**A10.** Yes, they would look the same. The reason is really a matter of scale. The distance to the nearest star is over 7000 times the width of the solar system. This means that if you found yourself at the opposite side of Pluto's orbit, the shift in position of any star will be less than the width of a quarter at 500 ft. At this distance other stars making up a constellation would be about 15 to 20 feet apart. This slight wobble in position of one star is not discernable to the naked eye. Also most stars are tens to hundreds of times farther yet with a corresponding decrease in their position shift.

**A10. (rerun)** If you were on a different planet in our Solar Systems, no, the constellations would not look any different (to the naked eye) because the stars are very far away even compared to the distances between our planets. If you could travel to a planet orbiting another star, yes, the constellations would almost certainly look very different. The stars are scattered in three dimensional space; their apparent patterns would change dramatically as you moved among them.

**Q12. Which way do the planets rotate in orbit around the sun?**

**A12. (rerun)** All the planets revolve around the Sun in the same direction as the Earth. Each planet rotates in the same direction, except for Uranus, whose axis is inclined more than 90 degrees, so its rotation is considered to be "retrograde" or opposite everything else.

**A12.** Venus also has retrograde (ccw) rotation with one day lasting 244.3 Earth days. Uranus has retrograde rotation of 10 hours and 49 minutes.

**Q13. How does astrology and astronomy relate to one another?**

**A13.** Astronomy sort of began as astrology, before people understood much about the workings of the Cosmos. They believed that heavenly bodies were, or at least represented, gods

who held dominion over Man and controlled Earthly events. The study of the heavens that ultimately evolved into the science of astronomy was thus originally motivated by a desire to understand the influence of the heavens on the lives of people. Today, astrology is considered pseudo-science. There remains only an indirect connection in the form of some common terminology and, of course, reference to the planets and their positions.

**A13. Professional Astrologers are PAID better.**

**Q14. Why can't you see your zodiac sign all year?**

**A14.** During certain times of the year all constellations, including the Zodiacal constellations, will be "up" during the daylight hours. Specifically, to borrow the astrological notion, when the Sun is "in" your "sign" it will rise when the Sun rises and set when the Sun sets, so you won't be able to see it. (Note that many stars are telescopically visible during the day, as I have demonstrated on occasion at AstroFest and Fish Lake: GBurnett.)

**Q15. Why is there only a window of two hours or so for a Space Shuttle launch? If the Shuttle is going around the Earth only, how does it matter when it's launched?**

**Q16. How can anybody (earthly being) take a picture of Our Own Galaxy?**

**Q17. What would be a basic set of filters to acquire?**

**Q18. What basic star charts do recommend?**

**Q19. What is a good test for the optical quality of a telescope?**

**Q20. What causes the aurora? Where is the best place to see it?**

**Q21. What are "deep-sky" objects?**

**Q22. Is there a "best" time to see the planets?**

**Q23. Would you recommend some "necessary" accessories to add?**

**Q24. What are "enhanced coatings" and what do they do?**

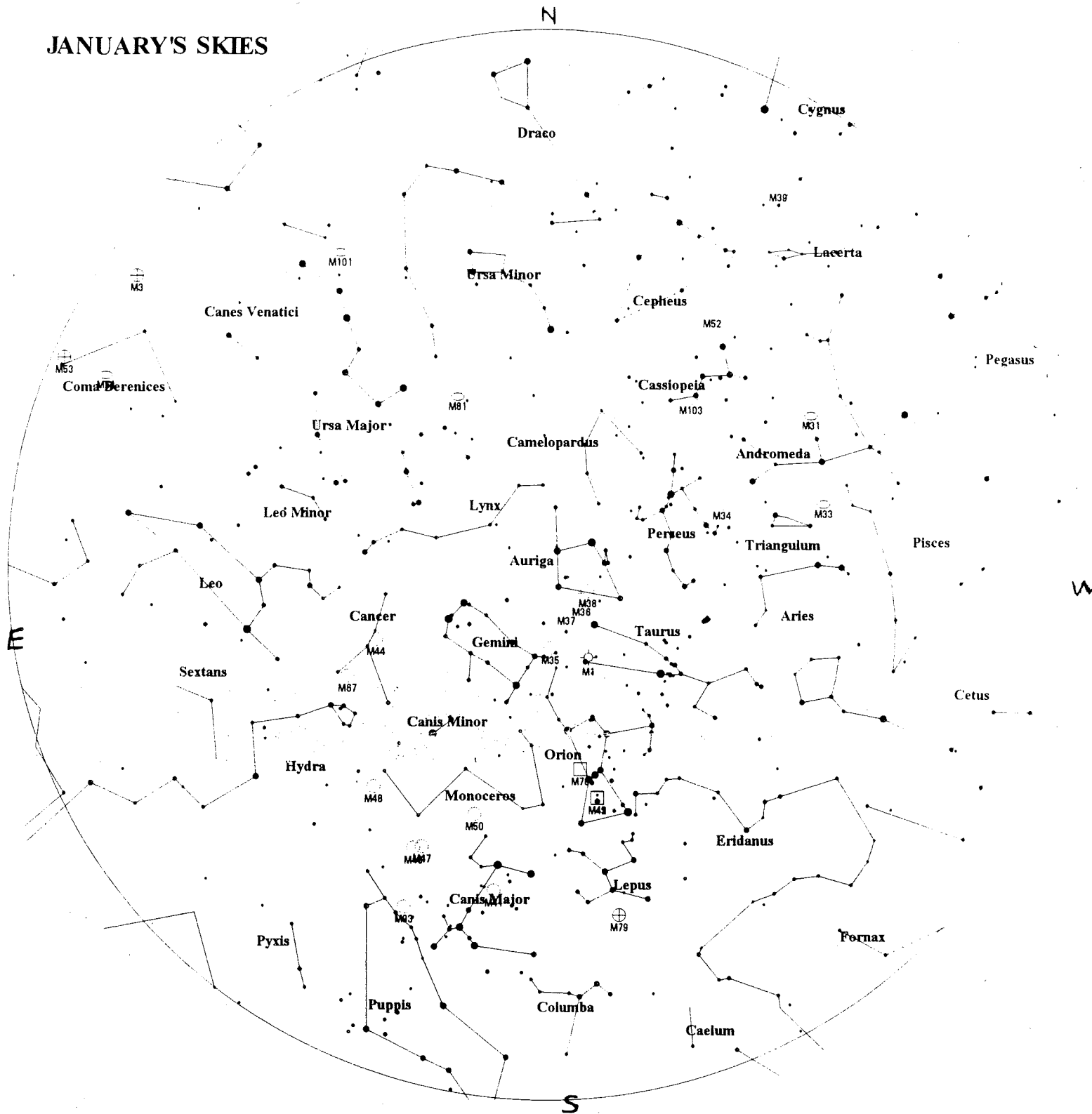
**Q25. What are your suggestions to reduce light pollution?**

## OBSERVATIONS

The Lunar Eclipse was not clearly visible from my location. I could see some of the beginning and took some pictures of that part as a record. Hopefully, next time will be more productive. I found a couple of books that may provide some entertainment for the cloudy nights. The first is called *The Home Planet*, edited by K.W. Kelley and the second is *The Urban Astronomer*, by G.L. Matloff. The first is a compilation of photographs taken of the Earth from various space missions, Apollo, Skylab, Soyuz, and the shuttle. Try to identify "earthly features" without reading the captions. The second is written by an amateur astronomer living in New York City. This person provides several activities "do-able" from a city location. On the next cloudy night, visit your local library and give these books a chance.

Until next time..... clear skies.

# JANUARY'S SKIES



January's Skies - Ford Amateur Astronomy Club, 1/15/94, 23:00 EST  
 Center at: RA: 6h 8m Dec: +42d22' Date: 1/15/94, Time: 11:00 PM

# JANUARY 1994

SUN	MON	TUE	WED	THUR	FRI	SAT
						1
2	3	4	5	6	7	8
		LAST QUARTER MOON	Moon at perigee	Jupiter 3° N. of Moon		
9	10	11	12	13	14	15
		NEW MOON			Saturn 7° S. of Moon	
16	17	18	19	20	21	22
			FIRST QUARTER MOON Moon at apogee			
23	24	25	26	27	28	29
Moon at perigee						
30	31					
				The Ford Amateur Astronomy Club meeting. FULL MOON		

## NEXT MONTH

The Ford Amateur Astronomy Club general meeting is February 24th!  
Star parties at Doug Bock's on February 5th & 12th.

## MEETING ANNOUNCEMENT -- January 27, 1993

The Ford Amateur Astronomy Club holds regular general meetings on the fourth Thursday of each month. Our next meeting will be Thursday, January 27, at 5:00 p.m.

The meeting will include election of officers and a presentation by John St. Peter on observation of meteors by radar. This is a personal project of John's, and should make for a very interesting talk.

The Ford Amateur Astronomy Club meets in the Ford Motor Credit Company (FMCC) "Systems K" conference room, located on the lower floor in the far NorthEast corner of the building. FMCC is the low building immediately northeast of (but not attached to) Ford World Headquarters in Dearborn.

The FMCC building is secured with a card entry system. The easiest way to enter the building for meetings is to park in the northeast lot (Employee Lot 7) and enter through the lower northeast door. At 5:00 p.m. no one seems to have much trouble getting in because many people are leaving around that time. If it becomes a problem we will just prop the door open. You may, of course, find your way into the building any way you see fit, but I will post direction signs only between the lower northeast door and the meeting room.



# STATISTICALLY SPEAKING....

Dearborn, MI

Latitude: 42°22'00" N Longitude: 83°17'00" W

Local Time = UT - 5.00 hours Elevation: 180 meters

Times are in 24 hour format.

Abbreviations used in reports:

FQ First Quarter Moon  
FM Full Moon  
LQ Last Quarter Moon  
NM New Moon  
SR Sunrise  
SS Sunset  
MR Moon Rise  
MS Moon Set  
UT Universal Time

January 1994

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 SR: 8:02 SS: 17:11 MR: 21:44 MS: 10:06
2 SR: 8:03 SS: 17:12 MR: 22:54 MS: 10:37	3 SR: 8:03 SS: 17:13 MR: None MS: 11:07	4 SR: 8:03 SS: 17:14 MR: 0:04 MS: 11:38 LQ: 19:01	5 SR: 8:03 SS: 17:15 MR: 1:16 MS: 12:12	6 SR: 8:02 SS: 17:16 MR: 2:27 MS: 12:50	7 SR: 8:02 SS: 17:17 MR: 3:37 MS: 13:33	8 SR: 8:02 SS: 17:18 MR: 9:14 MS: 20:42
9 SR: 8:02 SS: 17:19 MR: 5:48 MS: 15:20	10 SR: 8:02 SS: 17:20 MR: 6:43 MS: 16:22	11 SR: 8:01 SS: 17:21 MR: 7:30 MS: 17:28 NM: 18:12	12 SR: 8:01 SS: 17:22 MR: 8:10 MS: 18:34	13 SR: 8:01 SS: 17:23 MR: 8:44 MS: 19:39	14 SR: 8:00 SS: 17:25 MR: 9:14 MS: 20:42	15 SR: 8:00 SS: 17:26 MR: 9:41 MS: 21:43
16 SR: 7:59 SS: 17:27 MR: 10:07 MS: 22:43	17 SR: 7:59 SS: 17:28 MR: 10:33 MS: 23:42	18 SR: 7:58 SS: 17:29 MR: 10:59 MS: None FQ: 15:28	19 SR: 7:58 SS: 17:31 MR: 11:27 MS: 0:40 FM: 8:24	20 SR: 7:57 SS: 17:32 MR: 11:58 MS: 1:39	21 SR: 7:56 SS: 17:33 MR: 12:34 MS: 2:37	22 SR: 7:56 SS: 17:34 MR: 13:16 MS: 3:34
23 SR: 7:55 SS: 17:36 MR: 14:04 MS: 4:30	24 SR: 7:54 SS: 17:37 MR: 14:59 MS: 5:22	25 SR: 7:53 SS: 17:38 MR: 16:01 MS: 6:10	26 SR: 7:53 SS: 17:39 MR: 17:08 MS: 6:53	27 SR: 7:52 SS: 17:41 MR: 18:17 MS: 7:31	28 SR: 7:51 SS: 17:42 MR: 19:29 MS: 8:06	29 SR: 7:50 SS: 17:43 MR: 20:41 MS: 8:39
30 SR: 7:49 SS: 17:45 MR: 21:53 MS: 9:10	31 SR: 7:48 SS: 17:46 MR: 23:06 MS: 9:42					

## Meteor Showers Report for 1/ 1/1994 to 1/31/1994

Date	Meteor Shower	ZHR	RA	DEC	Illum. Frac.	Longitude
1/ 3/1994	Quadrantids	80	15h28m	50°	0.64	283°

## Twilight Report for 1/ 1/1994 to 1/31/1994

Date	Sun Rise	Sun Set	Astronomical Begin	Astronomical End	Nautical Begin	Nautical End	Civil Begin	Civil End
1/ 1/1994	8:02	17:11	6:16	18:57	6:50	18:23	7:25	17:48
1/ 8/1994	8:02	17:18	6:17	19:03	6:51	18:30	7:26	17:55
1/15/1994	8:00	17:26	6:16	19:10	6:49	18:36	7:24	18:02
1/22/1994	7:56	17:34	6:13	19:17	6:46	18:44	7:20	18:10
1/29/1994	7:50	17:43	6:08	19:25	6:41	18:52	7:15	18:18

## Planet View Info Report for 1/ 1/1994 to 1/31/1994

Date	Rise	Set	RA	Mercury Dec	Elongation	Ill Fr	DIST(AU)
1/ 1/1994	8:07	16:57	18h38m13s	-24°47'09"	2°20'01"	0.998	1.44162
1/ 8/1994	8:25	17:24	19h27m53s	-23°56'04"	3°14'11"	0.996	1.42015
1/15/1994	8:37	17:56	20h17m38s	-21°50'12"	7°21'39"	0.975	1.36679
1/22/1994	8:43	18:32	21h06m09s	-18°29'10"	11°55'51"	0.919	1.27453
1/29/1994	8:41	19:06	21h50m29s	-14°05'38"	16°11'13"	0.784	1.13519

Date	Rise	Set	RA	Venus Dec	Elongation	Ill Fr	DIST(AU)
1/ 1/1994	7:51	16:51	18h28m24s	-23°38'41"	3°51'16"	0.998	1.70517
1/ 8/1994	8:00	17:04	19h06m45s	-23°11'01"	2°15'10"	0.999	1.70925
1/15/1994	8:05	17:20	19h44m41s	-22°08'22"	0°59'45"	1.000	1.71136
1/22/1994	8:07	17:36	20h21m52s	-20°32'55"	1°35'46"	1.000	1.71151
1/29/1994	8:07	17:54	20h58m07s	-18°27'48"	3°07'05"	0.999	1.70976

Date	Rise	Set	RA	Jupiter Dec	Elongation	Ill Fr	DIST(AU)
1/ 1/1994	3:09	13:31	14h30m36s	-13°38'04"	50°39'49"	0.994	5.85749
1/ 8/1994	2:47	13:07	14h34m39s	-13°56'27"	66°46'07"	0.993	5.75527
1/15/1994	2:24	12:42	14h38m18s	-14°12'38"	72°58'29"	0.992	5.64828
1/22/1994	2:00	12:17	14h41m32s	-14°26'29"	79°17'04"	0.992	5.53776
1/29/1994	1:36	11:51	14h44m18s	-14°37'56"	85°42'09"	0.992	5.42501

Date	Rise	Set	RA	Saturn Dec	Elongation	Ill Fr	DIST(AU)
1/ 1/1994	10:36	20:57	21h58m05s	-13°54'33"	46°28'57"	0.999	10.46373
1/ 8/1994	10:10	20:33	22h00m45s	-13°40'04"	40°02'39"	0.999	10.54315
1/15/1994	9:45	20:09	22h03m35s	-13°24'41"	33°38'57"	0.999	10.61260
1/22/1994	9:19	19:46	22h06m33s	-13°08'31"	27°18'00"	0.999	10.67120
1/29/1994	8:53	19:22	22h09m37s	-12°51'43"	20°59'44"	1.000	10.71836

## Planet Conjunction/Opposition Report for 1/ 1/1994 to 1/31/1994

Mercury	Date	Hour	Event
	1/ 3/1994	18	Superior Conjunction

Venus	Date	Hour	Event
	1/16/1994	19	Superior Conjunction

Mars  
No Event

Jupiter  
No Event

Saturn  
No Event

Uranus	Date	Hour	Event
	1/12/1994	18	Conjunction

Neptune	Date	Hour	Event
	1/11/1994	3	Conjunction

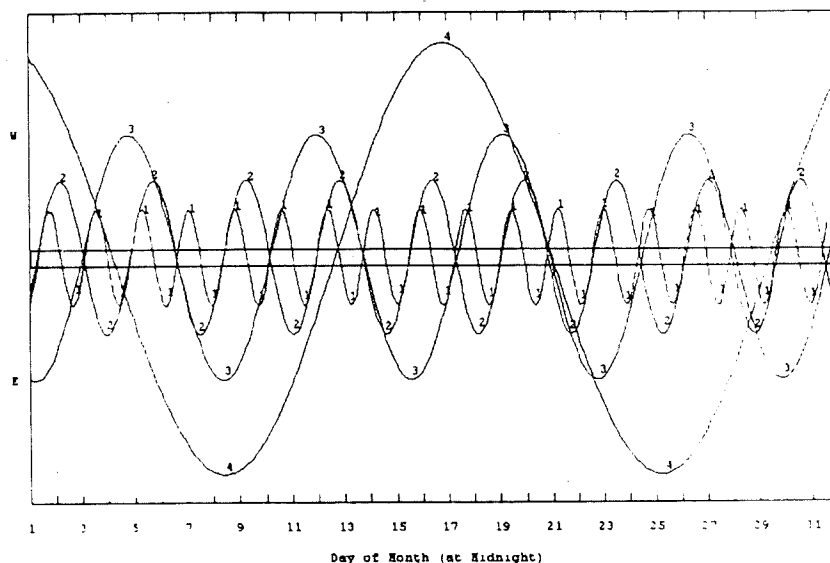
Pluto  
No Event

## Planet Apsides Report for 1994

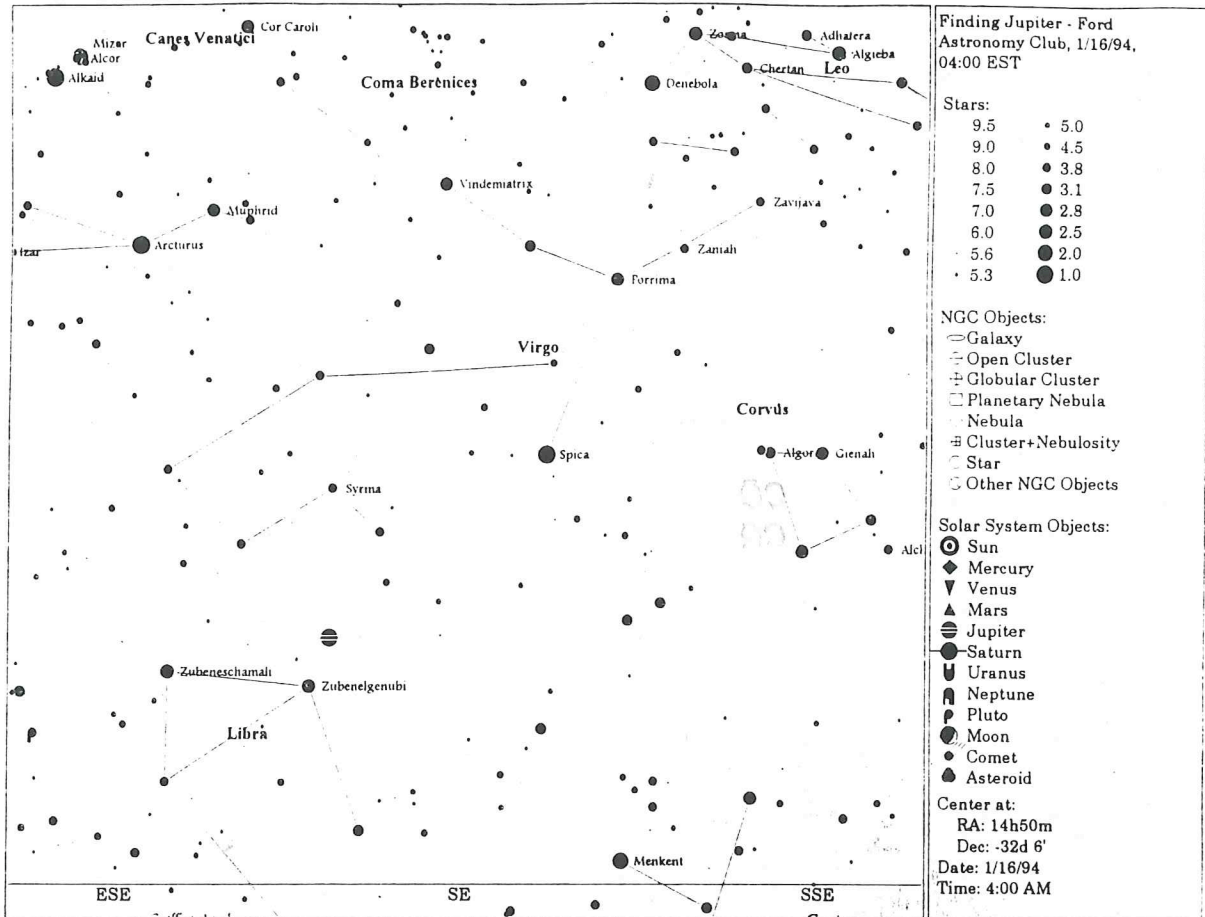
Earth	1/ 3/1994	Perihelion	Distance from Sun:	0.98 AU
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Venus	1/26/1994	Aphelion	Distance from Sun:	0.73 AU
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Jupiter Moons Orbit Graph for January 1994  
1: Io 2: Europa 3: Ganymede 4: Callisto



# FINDING JUPITER



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