

*The  
Ford  
Amateur  
Astronomy  
Club  
Newsletter*



Volume 3 Number 5

May 1994

## BASIC OBSERVING SERIES

by Greg Burnett

This is the final installment in the "Basic Observing" series, and it discusses galaxy observing. Previous entries have addressed nebula, star cluster, solar, asteroid, lunar, double star, variable star, meteor, and comet observing. Each article discusses the basic techniques and preferred equipment 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.

### Galaxy Observing

Galaxy! The word itself conjures up a universe of romantic notions: "The Galactic Federation" "Battlestar Galactica" "A Galaxy of Hollywood Stars" These days we take for granted our understanding of galaxies (even though many of us fail to appreciate their scale). Galileo became the first astronomical observer of galaxies when he trained his telescope on our own Milky Way and wrote, "The galaxy is nothing other than a mass of luminous stars gathered together." For a long time after Galileo galaxies were simply regarded as "spiral nebula." It was Immanuel Kant who first guessed their true nature in 1755, but his speculations passed unnoticed at the time. The work of Heber Curtis and Edwin Hubble in the early 20th century finally confirmed their true character. These days the nature of galaxies is largely beyond speculation, even although we continue to work at establishing accurate intergalactic distance measurements.

Galaxies are huge agglomerations of stars, and vast quantities of dust and gas, all bound together by gravity. Galaxies occur in a wide range of sizes; the largest may contain trillions of stars. Our galaxy, the Milky Way, is variously estimated to contain 100 to 200 billion stars. There is a likewise "astronomical number" of galaxies in the observable universe. As early as 1957, over one million galaxies had been counted on Harvard Observatory photographs. It's estimated that over a billion are within reach of the 200-inch Hale telescope on Mt. Palomar, and the Hubble Space Telescope promises to reveal many more. Galaxies are very large, with typical diameters of tens to hundreds of thousands of light years. Given these dimensions, it's interesting to contemplate one astronomer's observation that the universe is more densely populated with galaxies than a galaxy is with stars.

Only three galaxies are visible to the naked eye: the Andromeda

Galaxy (M31), and the Large and Small Magellanic Clouds, but hundreds are within the capabilities of amateur telescopes, perhaps a couple thousand using the larger amateur "light buckets." They occur in a variety of shapes and sizes. the classifications devised by Hubble in 1926 are still in common use today, and they recognize three categories of galaxies: elliptical, spiral and irregular.

Elliptical galaxies are disk-like or spheroidal assemblages of stars with little or no internal structure. The class is further divided into subgroups according to their apparent flatness, from E0, the roundest, to E7, the flattest.

Spiral galaxies are those exhibiting an overall spiral structure. Those with tightly wound arms and a prominent central bulge are designated Sa, while loosely coiled systems with inconspicuous nuclei are labeled Sc. The Milky Way is an Sb type with intermediate characteristics. Sometimes stars and gas in the inner regions of a spiral are organized into a straight bar that extends diametrically across the nucleus. These barred spirals are designated SBa, SBB, and SBc.

Irregular galaxies are those that show no apparent symmetry at all, and are designated simply Ir. They are sometimes further classified as Ir+ if they are resolvable into individual stars and Ir- if they are not.

For they amateur astronomer, galaxies provide some of the most numerous yet elusive targets. The successful galaxy hunter will use a combination of large aperture and dark skies to stalk his quarry. While there are quite a few galaxies bright enough to be seen in smaller amateur scopes (the famous Messier catalog of "M" objects includes most of the best ones), the vast majority are very faint and are observable only with larger apertures under favorable observing conditions.

Sky Catalog 2000.0, Volume 2 (Sky Publishing) lists over 3000 galaxies with brightness down to about magnitude 15. The "New General Catalog of Nebulae and Clusters of Stars" (NGC) lists almost 8000 objects, most of which are galaxies. A true appreciation of galaxies can only come from observatory photographs. The finest compilation of photos and information about galaxies I have seen is Galaxies by Timothy Ferris (Sierra Club Books). It's a relatively expensive "coffee table book" but it's well worth the cost and is suitable for "non-astronomer" types as well. ★

## STAR STUFF

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

### 1994 CLUB OFFICERS

President:	Greg Burnett	24-81941
Vice President:	Brian Gossiaux	39-03935
Secretary:	John St. Peter	535-2755
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 conference room 1491, lower floor, East side of the building.

### 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) ~~390-5456~~ 390-5456

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	

### 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.

Articles presented herein represent the views and opinions of their authors and are not necessarily those of the Ford Amateur Astronomy Club or the Star Stuff Newsletter. Commercial advertisers appearing in the newsletter are not endorsed or in any way affiliated with Ford Motor Company, the FAAC, or Star Stuff Newsletter.

## PRESIDENT'S CORNER

Well, last month I wrote a pretty opinionated "Corner" about UFOs and nobody took me to task on it. I guess I can get away with whatever I want in this column, eh? We'll be glad to start a "Letters to the Editor" column if anyone ever writes to us! (You may be guessing by now that the topic of this month's "Corner" is PARTICIPATION!) I've blathered about this before, but this is the beginning of a new season, the weather is warming up, and it seems appropriate to reiterate my contention that the purpose of an amateur astronomy club is to help people DO amateur astronomy! With that in mind, and acknowledging that "doing" amateur astronomy means different things to different people (something I have learned over the past couple of years), I once again encourage you to get involved, get active, get out and observe!

Hope to see you soon!

*Greg Burnett*

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## IS VOLUNTEERISM ALIVE AND WELL IN YOUR CLUB?

From Astronomy Network News Spring/1994

Whose job is it?

This is a story about four people named Everybody, Somebody, Anybody, and Nobody. There was an important job to be done and Everybody was sure Somebody would do it. Anybody could have done it, but Nobody did it. Somebody got angry about that, because it was Everybody's job. Everybody thought Anybody could do it, but Nobody realized that Everybody wouldn't do it. It ended up that Everybody blamed Somebody when Nobody did what Anybody could have done...

Th K y to Succ ss

(from Skywatch, the newsletter of the Northeast Florida Astronomical Society)

Th oth r day I d cid d to cl an up this old typ writ r. It is in almost p rf ct condition. It has 45 k ys that work and only on that do sn't. What diff r nc could on k y mak? Lik a typ writ r, an organization is most ffici nt wh n all m mb rs work tog th r to achi v r sults. You ar a k y m mb r of th Ford Amat ur Astronomy Club. Ar you a k y that works?

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## ASTRO-ABSTRACTS

*Copies of these articles are available on request to the individual indicated...*

**"Doubling your sunsets or how anyone can measure the earth's size with wristwatch and meterstick"** by Dennis Rowllins. A method is described whereby, using primitive equipment, anyone can measure the size of the Earth, to an accuracy of order of magnitude 10% -- by observing two sunsets in the space of a few seconds. The calculated result's closeness to the truth is comparable to the best extant ancient estimates. *For a copy of this article contact Gary Miller at PROFS=GMILLE12. (Call only if you are not at Ford, 845-4150.)*

**"The Star of Bethlehem"** by Craig Chester. For over two thousand years the Star of Bethlehem has been a powerful symbol of the Christian faith. Its unique story, told here by astronomer Craig Chester, was originally presented at Hillsdale College's Center for Constructive Alternatives Seminar, "Man and Creation: Perspectives on Science and religion," in the fall of 1992. *For a copy of this article contact Alan Pepper at PROFS=APEPPER or call 396-2660.*

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## SKY & TELESCOPE NEWS BULLETINS

### GALACTIC NEIGHBOR

A new nearest galactic neighbor to the Milky Way has been found by astronomers at the Royal Greenwich Observatory and at Cambridge University (Mike Irwin, 44-022-333-7524), who reported their finding last week at the European and National Astronomy Meeting in Edinburgh, Scotland. The object in question, a dwarf spheroidal galaxy only 80,000 light years from our solar system in the constellation Sagittarius, had not previously been discovered because our line of sight to the galaxy passed through the heart of the Milky Way, a place already rich in stars. The Sagittarius dwarf is about 1000 light years across and is apparently in the process of being pulled apart by the gravitational pull of the Milky Way, which now is known to have 11 satellite galaxies. (Science News, 9 April.)

### PULSAR PLANETS!

There's a big splash in the news this week about a new solar system being found around a pulsar in the constellation Virgo. Radio astronomer Aleksander Wolszczan first reported evidence of the unlikely planetary system two years ago, based on timings of the ultrafast rotation of the pulsar designated PSR 1257+12. Now, in this week's SCIENCE, Wolszczan explains that the pattern of radio pulses has evolved due to how the planets tug on the pulsar. The new pattern matches predictions deduced from the planets' presumed orbits and periods. This match, in essence, provides undeniable evidence that the two Earth-size planets really exist, in 67- and 98-day orbits; the data also suggest that a third, Moon-size object circles the pulsar every 25 days. All three bodies have orbits less than half an astronomical unit in radius, which puts them closer to the pulsar than Venus is to our Sun. A summary of Wolszczan's confirmation appears on page 10 of May's SKY & TELESCOPE; you'll find an article on the original observations in the May 1992 issue.

### A REALLY BIG METEOR

June's SKY & TEL describes about a fireball so bright that six early-warning satellites detected it simultaneously and sent alarms to ground stations of a nuclear explosion. The event occurred on February 1st, but details were not declassified and released until mid-March. The brilliant daylight bolide streaked over the western Pacific Ocean 300 km southeast of the tiny island of Kusiae. According to the eyewitness reports from two startled fishermen, it briefly rivaling the Sun for several seconds; the satellite records show it was at least magnitude -25. The giant meteor exploded harmlessly at an estimated altitude of about 20 km, and a good thing too: analysts estimate that it packed the kinetic-energy punch of up to 100 kilotons

of TNT, which equates to a rocky body roughly 15 meters across. It was the brightest meteor seen in 19 years of monitoring by the satellite network.

### CLOSE-APPROACHING ASTEROIDS

Observer David Rabinowitz made some remarkable discoveries within the last week with the Spacewatch Telescope. On April 7th he spotted a fast-moving asteroid, now designated 1994 GK. About an hour later, while making a follow-up image, he discovered *another* asteroid, 1994 GL, just 4 or 5 arc minutes away in the same tiny field. But there's more. According to Rabinowitz's colleague, Jim Scotti, 1994 GL appears to have the smallest semimajor axis of any asteroid yet discovered. Based on the best orbital calculations to date, it averages just 102 million km from the Sun, passing just a few million kilometers outside Earth's orbit when it reaches aphelion every 6 2/3 months.

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### HOME BUILT CCD'S

by Richard Lawrence




I am a newly interested person about to become a member of the astronomy club. (If I ever make it to a meeting) I have received and reviewed the newly published book by Richard Berry called THE CCD CAMERA COOKBOOK. This book is intended to encourage common everyday people to build a CCD camera suitable for astronomy uses. I must say that the book is very well done having 176 pages of pretty good basic information which would allow a person with even limited experience to build a high quality instrument. I would guess that to buy a commercial camera of this type would cost \$2500.00 or more at today's prices. The cost to build the best camera described in this book is about \$300.00. The novice builder will be led carefully along in the building process and then have his work checked by his home computer using the floppy disk provided along with the book. When he is finished he will have a camera he can be proud of and be able to take very high quality images with ease.

I have also been in contact with Roy Tucker of Southwest Cryostatics. He is putting together a package of information which will allow a person to build his own CCD camera of research grade components and capabilities. There are now 13 CCD cameras being built under the direction of Mr Tucker in order to try out his information package. At this time it is expected to be summer before the package is offered for sale. It is also expected that some of the components are going to be offered for sale by Mr Tucker. I must stress that Mr Tucker does not require anyone to buy any parts from in order to use his package. He seems to be a person more interested in helping interested people build cameras rather than build any sort of business. By the way the CCD chip he plans to use in his cameras costs over \$2000.00 and has capabilities far greater than the \$120.00 chip used in Richard Berry's Camera since this camera is a true research grade instrument. I urge your members to investigate CCD and the possible uses in astronomy. I am sure they will be amazed at the new things available in astronomy with the new fangled inventions of today. The "Cookbook" is available from most any astronomy type bookstore at about \$24.95.

Mr Tucker can be contacted at 5600 Gibson Blvd. SE, #233, Albuquerque, NM 87108.

# May 1994



SUN	MON	TUE	WED	THUR	FRI	SAT
1	2  LAST QUARTER MOON	3	4 Saturn 7° S. of Moon Eta Aquarid meteors	5 Eta Aquarid meteors	6 Eta Aquarid meteors	7
8 Mars 4° S. of Moon Moon at apogee	9	10 <b>ANNULAR ECLIPSE!</b> Crestwood Planetarium * NEW MOON	11 Crestwood Planetarium *	12	13 Venus 4° N. of Moon EMU Fish Lake outing	14 EMU Fish Lake outing
15	16	17	18  FIRST QUARTER MOON	19	20	21
22	23 Jupiter 3° N. of Moon Moon at perigee	24 FULL MOON	25	26 The Ford Amateur Astronomy Club meeting .	27	28
29	30  MEMORIAL DAY	31	* Crestwood Planetarium - 1 hour program featuring: SUMMER SKY WONDERS: Explore the stars, constellations, and planets of the 1994 summer sky. Starts at 7:30pm. \$1 adult, \$0.75 children. Reservations recommended. Call during school hours at 278-0424. Crestwood School District Planetarium, 1501 N. Beech Daly, Dearborn Hts., MI			

## NEXT MONTH

The Ford Amateur Astronomy Club general meeting is June 23rd!

### MEETING ANNOUNCEMENT -- May 26, 1994

The Ford Amateur Astronomy Club holds regular general meetings on the fourth Thursday of each month. Our next meeting will be Thursday, May 26, at 5:00 p.m.

The program for the meeting has not yet been determined, but you can be certain that it will be well worth your while, as always!

### WE HAVE ADOPTED A NEW CONFERENCE ROOM FOR OUR MEETINGS:

The Ford Amateur Astronomy Club meets in the Ford Motor Credit Company (FMCC) **conference room 1491**, located on the lower floor on the east side 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 ways to enter the building for meetings is to park in the northeast lot (Employee Lot 7) and enter through the lower northeast door or the lower east door. At 5:00 p.m. no one seems to have much trouble getting in because many people are leaving around that time. At the east door you can press the security button and advise the "tele-guard" that you are here to attend a F.E.R.A. club meeting, and they will admit you. 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 and lower east doors and the meeting room.

**IMPORTANT UPDATE about building access:** Controlled doors are presently being installed to secure access to the lower floor from the front (south) building door. If any folks have been entering there because there was no security, that will no longer be the case. Your best bet will be the lower northeast door; the receptionist will not let you in at the front door. Hope to see you at the meeting!

# CosmosPolitan

By Patti Smith

*This month Star Stuff interviews Charles Messier of the famous Messier Catalogue of Nebulae.*

SS: How did you get started in Astronomy?

CM: I read a book written in 1705 by Edmund Halley that a certain comet was expected to return around 1758. There was some uncertainty at the time if this was a single comet that had appeared in 1456, 1531, 1607, and 1682. Halley certainly thought it was and I was eager to test his theory!

SS: Did the comet return?

CM: Yes, it did in 1758, just as Halley predicted, and I was the first in France to see it.

SS: What do you like most about observing?

CM: I love to search for comets!! I have been hooked on them since I was 28 and have discovered 21 of them myself. In fact King Louis XV calls me his "little comet ferret". I don't know if that's good or bad!

SS: But certainly your most famous for your Catalogue of Nebulae, did you not enjoy those discovery as well?

CM: That was a list I put together in 1781 of objects that had fooled me in my search for comets. Oh, those many nights sitting out, hoping that this fuzzy patch would show movement against the background stars, and the disappointment when they turned out to be ordinary members of the heavens.

I only made the list so that neither I nor other comet hunters would be fooled by them again!!

This writer thinks Messier's list is a good place to start learning to find objects in the sky. There are many charts and books on the subject. When you are out with the club observing, ask me how many I have found!

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## OUR GANG

On Sunday, 4/3/94, at approx 10:30-11:00PM four of us at Island Lake were fortunate to see some northern lights (aurora) centered on Cassiopeia. There was a glow on the northern horizon and several vertical rays (one extending up right through Cassiopeia). The number of rays varied from 4 to 8, and the entire event lasted for a half hour. We had extraordinary viewing, since a lot of stores and fast food restaurants were closed for Easter (and hence had their lights off!).

-- Ken Anderson

Hey, I would have gone out Saturday too. Oh well. Judy, Mark, Ken and I were there on Sunday. It was clear all the way to the horizon in

the south and the skies were very dark. There was even a wonderful aurora! Just whitish, with a greenish look, but it was moving fast and shooting up in spikes all the way to Polaris. I saw three more M's!!! that makes 28 total so far. -- Patti Smith

Sunday night was good also. I went out after 10. Patti Smith, Judy Doelker and Ken Anderson (I think) were out. Patti and Judy were looking for Messier objects when we saw the northern lights. Mostly white with a little green. Many lines from the horizon into Ursa Major. Very slow movement. It lasted for 15-20 minutes (maybe that was our attention span). It somewhat impaired our viewing. Otherwise, very clear skies. -- Mark Ten Brink

Just thought I'd let those who were not present know what they missed last night. I completely understand how difficult it is sometimes to get out under the skies and observe. I myself am guilty of saying, 'Too cold!' or 'But it's a weekday night and I gotta work tomorrow!' We all at sometime have some reason or another and most are quite legit. I suggest "drive-thru" astronomy. Last night I left my second job around 10:00pm and looked up and saw that the sky was clear. I remembered that John St. Peter had left a PROFS note saying that he would be out at Island Lake observing with his friend Harry. Well I was tired, and the thought of driving out to the site this late, and not having my own scope with me to look through discouraged me in making the attempt. While driving home listening to the radio the weather forecast for the weekend was bleak....rain. So I either observe tonight or wait till whenever. I chose to observe! Of course I wasn't dressed for the weather, but I would just stop by for a few minutes, steal a few looks through their scopes and be on my way. It was one of those decisions that would prove to be more than rewarding. As I got out of my car, I was immediately approached by John who stated, We got the comet in Harry's scope! Now I haven't seen a comet since Halley so this was indeed a treat. There it was. Comet McNaught-Russell at 6.5 mag. A bright fuzzy spot with a hint of a fan shape. Most impressive! And to make it even more exciting, over the course of 20 minutes the comet had moved several arc-minutes completely transversing a bright star in the field of view! While we were occasionally peaking at the comet Harry calls out, Look! Look! As John & I raise our eyes we see a long, bright green trail with a meteor at its head moving casually westward through Orion into the western horizon. Beautiful! Having a few more looks at the comet, John wants to take a look at the newly discovered supernova in M51 through his 17.5". I of course, not bringing a scope, offer to locate it for him. John graciously agrees and as I start looking through the eyepiece of John's Dobsonian in search of M51, John starts yelling, Look! Look! To the North! Look! Another meteor I thought. Wrong! The northern lights had just appeared out of nowhere. They were quite intense in color, primarily green with traces of red and a hint of a curtain. They spread about 40-50 degrees across the northern horizon and rose upward approximately the same amount. Wow! Within about 5 minutes they were all but gone.

The finale was of course seeing the supernova in M51. The bright spot was packed quite close to the nucleus but definitely distinguishable. Now I'm not saying that if you come out some night that we'll have available a comet, meteor, aurora, and supernova available for you to look at, but you just never know what you might be in for. It was definitely one of the neatest 20 minute observing sessions I've ever been at! -- Brian Gossiaux

Wow, after reading Brian's report I found myself wishing I was there. Then I realized I was. It was that great. After Brian left things settled back down. Jupiter had climbed out of the atmospheric diffraction and Harry had some outstanding views of it in his scope. We tried various color filters to see if we could bring out some more detail but really didn't have much luck. Just before leaving we looked up Pluto's location and pointed the 17.5" in that direction. The field was easy to find even though it was in the Detroit glare to the southeast. I'm about 95% sure that we found it. I sketched the field and hope to get out the next clear night to look for some movement.

-- John Paul St. Peter

John Paul StPeter predicts Aurora display!!!. On our way out to the observing site last Thursday, John casually suggested that we might see the Northern Lights that evening during our viewing session. Lo and behold, around midnight (I'm not sure of the exact time), the Northern Lights made their appearance, although of short duration, they provided another highlight to a rather productive and exciting viewing evening for this "neophyte". I'm now more encouraged than ever to "get out" as often as possible to view the night skies.

P.S. On the way home-considering Johns' predictive powers-I asked him if he had any suggestions concerning the commodities market with particular emphasis on cattle futures. I also jokingly suggested that he be named "soothsayer of the month" for the month of April. 'till later, clear skies. -- Harry Kindt

From my log for 16.IV.94.....

I went out in the driveway about 11:30 and tried unsuccessfully to find comet McNaught-Russell with the Pronto. It was still a little windy with scattered clouds, so a very late trip to Island Lake probably wouldn't have been worth it. HOWEVER, from about 12:45 to 1:30 I was treated to a fantastic auroral display. It looked like sunrise on the north horizon. At first there was just a greenish glow along the horizon extending about 45 degrees either side of north. This gradually rose to about 20 degrees altitude, intensified, and resolved into streamers and curtains. At times some streamers were extremely bright and their motion was clearly visible. They literally scurried across the sky, seeming usually to be moving from east to west. They were so bright that you didn't just realize they had moved after a few seconds, you could easily and clearly follow their motion with your eyes. The longest streamers reached maybe 60 degrees altitude. There were also very rapid flashes, bursts, or waves that swept upward from the bright area, sometimes reaching the zenith. They were very fast, reminding me of heat lightning. At times, all of this was going on behind scattered clouds, making the whole thing look like some sort of cosmic thunderstorm. I retired before it ended.

-- Greg Burnett

I saw the Aurora Saturday night and Sunday morning. On Saturday night I could see the Auroral Oval but no major activity. I saw a few streamers of the Oval around 9:30. On Sunday morning around 1:30 a.m., the Aurora was just spectacular. At first I saw the Oval and then the aurora began dancing. I could see red pulsating. Overhead, streaks of green aurora would sweep quickly across the sky from east to west. This all lasted about 5-10 minutes. It was more spectacular than the one in February. -- Greg Miller

## ANNULAR SOLAR ECLIPSE! MAY 10

The annular solar eclipse on May 10, 1994 offers a rare and beautiful celestial event. But this eclipse will pose a significant danger to your eyesight. Please take the proper precautions. To view the eclipse, we recommend an aluminized Mylar viewer made of the same material used to filter telescopes for solar observing. Small hand-held viewers are available for \$2 from Astronomy Club members. Contact the Ford Amateur Astronomy Club at ~~248-4444~~ for information about safe eclipse viewing.

**390-5456**

Here are the approximate times for the May 10 eclipse in the Detroit area. The centerline of the eclipse travels East Northeast thru Toledo, Ohio. If you are north or south of the centerline, or east or west of Detroit, the exact contact times will vary somewhat from those given here...Instant of greatest eclipse: 17:11:27 UT... Maximum length of annularity: 6 min 13 sec... Maximum annularity 94.3% (diameter)... Location of greatest eclipse: 41 deg 32.2 min North, 84 deg 7.3 min West near Wason, Ohio.

Contact times for Detroit:

Eclipse begins: 15:33 UT (11:33am EDT)

Maximum eclipse: 17:15 UT (1:15pm EDT) Umbral duration: 5:31

Eclipse ends: 19:02 UT (3:02pm EDT)

Some Ford Astronomy Club members will be observing the eclipse at the Wildwood Preserve Metropark in Toledo, Ohio. It is located south of the Michigan border just off US-23. Take US-23 about 3 miles south of the Michigan border to the Central Avenue exit. You may also take 475 west to 23 then south 1 mile to the Central exit. Go east on Central, (right at the light) past Reynolds Road, under a viaduct. From 23, it is 1.5 to 2 miles to the Wildwood Preserve MetroPark entrance. Turn left into the entrance (north). We will be setting up in the third parking lot from the entrance. If you are using an alternate route please be advised regarding the following: The east-bound exit from I-475 to Central Avenue is CLOSED. If you're coming from I-75, take WEST-BOUND I-475 to Talmadge and exit south. If you're coming from US-23, take EAST-BOUND I-475 to Talmadge and exit south. Go south on Talmadge about one mile and turn right (west) onto Central at the AMOCO station. Go west on Central about a mile to the park.

There is some construction along I-475 between I-75 and US-23; expect possible delays. Bring water. The drinking fountains at the park are not hooked up. Don't forget sunscreen, hat, umbrella or whatever. You will be out in the sun for a long time. Figure about 1 hour 20 minutes from the intersection of I-94 and I-75 (if you go that way).

The Toledo club will be observing the eclipse at Promenade Plaza which is downtown Toledo along the Maumee River. Steve Hopkins (419-833-7438) is planning the downtown Toledo event. Call him if you would like more information on their event

Another group from the Ford Club will be setting up telescopes at various Ford locations throughout the Dearborn area. For information regarding the location nearest you contact Chuck Boren at 24-83446, PROFSID: CBOREN



# ASTRONOMY WORKSHOP

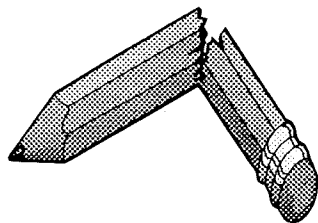
by Greg Burnett

PROFS=GBURNETT

InterNet

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I'm tempted to re-title this column "The Answer Man" because not many answers are being sent in. Thanks to Paul for his answer below. Here's YOUR chance to wax eloquent on the topic of your choice! Please send questions AND ANSWERS to the address(es) above. No question is too basic; there is always someone besides yourself who is looking for the answer too!



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

Enhanced coatings are commonly found on most telescope and eyepiece lenses. Two common coatings are Celestron's Starbright and Meade's Super Multi-Coatings. The main advantage of coated optics is an increase in the total light transmission. The following summary was taken from Orion's mail order catalog.

When light passes through air into glass, or from glass into air, about 5% of the light is reflected. This effect, easily seen in window glass, happens at each surface of the lenses and prisms in a telescope. Optical coatings are incredibly thin coatings of special materials. They are applied in vacuum chambers at temperatures around 550 Fahrenheit, under tightly controlled conditions. These coatings increase transmission and decrease reflections.

Single layers of Magnesium Fluoride are the most common coatings used. A single layer will decrease reflections from 5.0% to about 1.5% per surface. Multiple layer coatings of different materials can improve performance even more. The best 'multi-coatings' can further decrease reflection from a single surface to as low as 0.25%. You can detect coated surfaces by the color they give light reflecting from their surface. A white reflection usually means a surface is uncoated.

Depending on the number of surfaces in an optical system, enhanced coatings can yield images from 10% to 20% brighter, while also improving contrast and reducing glare. Mirrored surfaces also usually have some type of enhanced coatings. Aluminum coatings are commonly added for increased reflectivity, and transparent Silicon monoxide is usually added to protect the fragile surface (scratch-resistant).

-Paul Mrozek

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

I'm going to offer my answer to this, but leave the question standing for others to comment upon. I believe the real, long term answer to light pollution is to build a more general and widespread appreciation of astronomy, not the

kind done by us amateur observers, but the kind done by hikers, campers, and other outdoors-people when they look up at the night sky. They need to go home from their wilderness area, look up at their suburban sky, and say, "Gee, it doesn't have to be this way, does it?" Accomplishing this during these times of major social and political distractions will not be easy. -GB

## Q30. What would happen if the core of the Earth solidified?

The fluid core of the Earth is mostly iron and it's flow (there's weather down there!) creates the Earth's magnetic field (most of it, anyway). If the core solidified, then the field would mostly disappear. Without a magnetic field, the Earth's interaction with the Sun's environment would change drastically. The Van Allen radiation belts would disappear. Aurora would no longer occur over the poles, but would occur where ever the now unguided flow of the solar wind impacted the ionosphere. The composition of the ionosphere would change (I'm not sure exactly how) because our magnetic field protects it from a lot of charged particles and other stuff emanating from the Sun. The ionosphere is important for certain types of radio communications, which could be disrupted if the ionosphere were significantly altered. Also, tectonic activity would cease, that is, there would no longer be any continental drift. If this had happened in earlier geologic times, it could have had a significant impact on the evolution and distribution of plant and animal life on our planet. Once everything settled down, there would be no more major earthquakes and no more volcanic eruptions. After it finished cooling, geothermal would no longer be an alternate source of energy. Old Faithful would be history. Also, I suspect that the Sun and Moon pull tides in the fluid mantle and core now, so if it solidified there might be changes in the rates at which the Moon's orbit is expanding and the Earth's rotation is slowing due to tidal friction. -GB

## Q21. What are "deep-sky" objects.

## Q26. Is it ever the same day all over the world? If so, when, and what time is it here (EST) then?

## Q27. When you place an off-axis aperture mask on a Dobsonian (or any large Newtonian reflector) to increase it's resolution, e.g. for planetary observing, you have actually created a new optical configuration. What is that configuration called and why was it so named?

## Q28. What is the planetary motion which is responsible for the recurring ice age that effects the earth's orbit?

## Q29. If you were on a small life supporting world that was traveling through space at 50% the speed of light and a star is traveling toward you at 50% of the speed of light, how much blue shift would you measure from your frame of reference, gravitational forces notwithstanding?

## Q31. What is meant by an Astrometric night and a Photometric night, are they the same? What are the differences and what type of astronomy are they related to?

# STATISTICALLY SPEAKING....

Dearborn, MI

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

Local Time = UT - 4.00 hours(EDT) Elevation: 180 meters

Times are in 24 hour format.

Abbreviations used in reports:

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

May 1994						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
SR: 6:29	SR: 6:27	SR: 6:26	SR: 6:25	SR: 6:23	SR: 6:22	SR: 6:21
SS: 20:33	SS: 20:34	SS: 20:35	SS: 20:36	SS: 20:37	SS: 20:38	SS: 20:39
MR: 1:42	MR: 2:19	MR: 2:51	MR: 3:19	MR: 3:46	MR: 4:12	MR: 4:38
MS: 12:00	MS: 13:04	MS: 14:07	MS: 15:07	MS: 16:07	MS: 17:05	MS: 18:03
LQ: 10:34						
8	9	10	11	12	13	14
SR: 6:20	SR: 6:18	SR: 6:17	SR: 6:16	SR: 6:15	SR: 6:14	SR: 6:13
SS: 20:40	SS: 20:41	SS: 20:42	SS: 20:44	SS: 20:45	SS: 20:46	SS: 20:47
MR: 5:06	MR: 5:37	MR: 6:10	MR: 6:49	MR: 7:32	MR: 8:21	MR: 9:15
MS: 19:01	MS: 19:59	MS: 20:55	MS: 21:50	MS: 22:42	MS: 23:29	MS: None
		NM: 13:08				
		SE: 13:12				
15	16	17	18	19	20	21
SR: 6:12	SR: 6:11	SR: 6:10	SR: 6:09	SR: 6:08	SR: 6:07	SR: 6:06
SS: 20:48	SS: 20:49	SS: 20:50	SS: 20:51	SS: 20:52	SS: 20:53	SS: 20:54
MR: 10:13	MR: 11:15	MR: 12:20	MR: 13:26	MR: 14:35	MR: 15:45	MR: 16:58
MS: 0:12	MS: 0:50	MS: 1:26	MS: 1:58	MS: 2:29	MS: 3:00	MS: 3:32
		FQ: 8:50				
22	23	24	25	26	27	28
SR: 6:05	SR: 6:05	SR: 6:04	SR: 6:03	SR: 6:02	SR: 6:02	SR: 6:01
SS: 20:55	SS: 20:56	SS: 20:57	SS: 20:57	SS: 20:58	SS: 20:59	SS: 21:00
MR: 18:13	MR: 19:29	MR: 20:41	MR: 21:48	MR: 22:46	MR: 23:35	MR: None
MS: 4:08	MS: 4:48	MS: 5:34	MS: 6:28	MS: 7:28	MS: 8:34	MS: 9:42
		FM: 23:40				
		LE: 23:31				
29	30	31				
SR: 6:01	SR: 6:00	SR: 5:59				
SS: 21:01	SS: 21:02	SS: 21:03				
MR: 0:16	MR: 0:51	MR: 1:21				
MS: 10:49	MS: 11:55	MS: 12:57				

Planet View Info Report for 5/ 1/1994 to 5/31/1994

Mercury							
Date	Rise	Set	RA	Dec	Elong	Ill Fr	DIST(AU)
5/ 1/1994	6:34	20:41	2h34m48s	15°00'40"	0°41'52"	1.000	1.32400
5/ 8/1994	6:43	21:35	3h34m04s	20°18'51"	8°59'03"	0.930	1.26176
5/15/1994	6:57	22:20	4h32m08s	23°54'42"	16°09'50"	0.758	1.14079
5/22/1994	7:12	22:48	5h22m42s	25°29'11"	21°01'01"	0.566	0.99360
5/29/1994	7:24	22:56	6h01m47s	25°24'06"	23°04'20"	0.398	0.84934

Venus							
Date	Rise	Set	RA	Dec	Elong	Ill Fr	DIST(AU)
5/ 1/1994	7:43	22:46	4h14m56s	21°58'37"	25°22'39"	0.900	1.48517
5/ 8/1994	7:45	23:02	4h51m10s	23°31'24"	27°05'32"	0.884	1.45091
5/15/1994	7:49	23:15	5h27m58s	24°31'55"	28°47'38"	0.868	1.41413
5/22/1994	7:57	23:26	6h05m00s	24°58'13"	30°28'41"	0.850	1.37489
5/29/1994	8:07	23:35	6h41m55s	24°49'35"	32°08'11"	0.831	1.33334

Jupiter							
Date	Rise	Set	RA	Dec	Elong	Ill Fr	DIST(AU)
5/ 1/1994	20:11	6:40	14h30m38s	-13°21'53"	178°23'24"	1.000	4.42083
5/ 8/1994	19:39	6:10	14h27m10s	-13°05'33"	171°24'41"	1.000	4.42686
5/15/1994	19:07	5:41	14h23m42s	-12°49'54"	163°50'46"	0.999	4.44754
5/22/1994	18:36	5:11	14h20m43s	-12°35'31"	156°19'49"	0.999	4.48228
5/29/1994	18:05	4:41	14h17m56s	-12°22'53"	148°54'39"	0.998	4.53020

Lunar Eclipse Report for 1994

Lunar eclipse on 5/24/1994  
Moon rise: 20:41  
Moon set: 5:34  
Magnitude: 0.24  
Partial phase begins: 22:39  
Time of maximum eclipse: 23:31  
Partial phase ends: 0:23

Solar Eclipse Report for 1994

Solar eclipse on 5/10/1994  
Sun rise: 6:17  
Sun set: 20:42  
Time of maximum eclipse: 13:12  
Eclipse is annular  
Eclipse is visible in the northern hemisphere

Planet Apsides Report for 1994  
Mercury 5/ 6/1994 Perihelion Distance from Sun: 0.31 AU  
Venus 5/18/1994 Perihelion Distance from Sun: 0.72 AU

Planet Conjunction/Opposition Report for 5/ 1/1994 to 5/31/1994  
Pluto  
Date Hour Event  
5/17/1994 20 Opposition

Moon Apsides Report for 5/ 1/1994 to 5/31/1994  
Date Hour Apsis Distance (km) Diameter  
5/ 8/1994 22 Apogee 406419 0.4900  
5/23/1994 23 Perigee 358819 0.5550

Meteor Showers Report for 5/ 1/1994 to 5/31/1994  
Date Meteor Shower ZHR RA DEC Illum. Frac. Longitude  
5/ 5/1994 eta-Aquarids 35 22h20m -1 0.20 45°  
5/12/1994 alpha-Scorpiids 5 16h04m -24 0.04 52°

Twilight Report for 5/ 1/1994 to 5/31/1994  
Date Sun Rise Set Astronomical Nautical Civil  
5/ 1/1994 6:29 20:33 4:35 22:26 5:16 21:45 5:53 21:08  
5/ 8/1994 6:20 20:40 4:21 22:38 5:05 21:55 5:43 21:17  
5/15/1994 6:12 20:48 4:09 22:50 4:55 22:05 5:35 21:25  
5/22/1994 6:05 20:55 3:58 23:02 4:46 22:14 5:27 21:33  
5/29/1994 6:01 21:01 3:49 23:13 4:39 22:22 5:22 21:40

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## MEETING MINUTES - APRIL 28TH, 1994

The meeting was called to order at 5:15pm by Vice President Brian Gossiaux. There were 21 club members in attendance. Fried chicken and side dishes were provided by Brian.

Vice President's Report: Brian Gossiaux announced the opportunity for the FAAC to join the Astronomical League. The benefits of affiliation and cost were explained. A vote was taken and approved for the club to join the A.L. A new Hot-line phone number for exclusive club use has been put into service. The number is (313) 390-5456. The date for the Second Annual Island Lake Star Party has been set for September 10th.

Treasurer's Report: Al Czajkowski stated the club's financial standing and announced that final notices will be sent out for those club members who have not yet renewed their memberships.

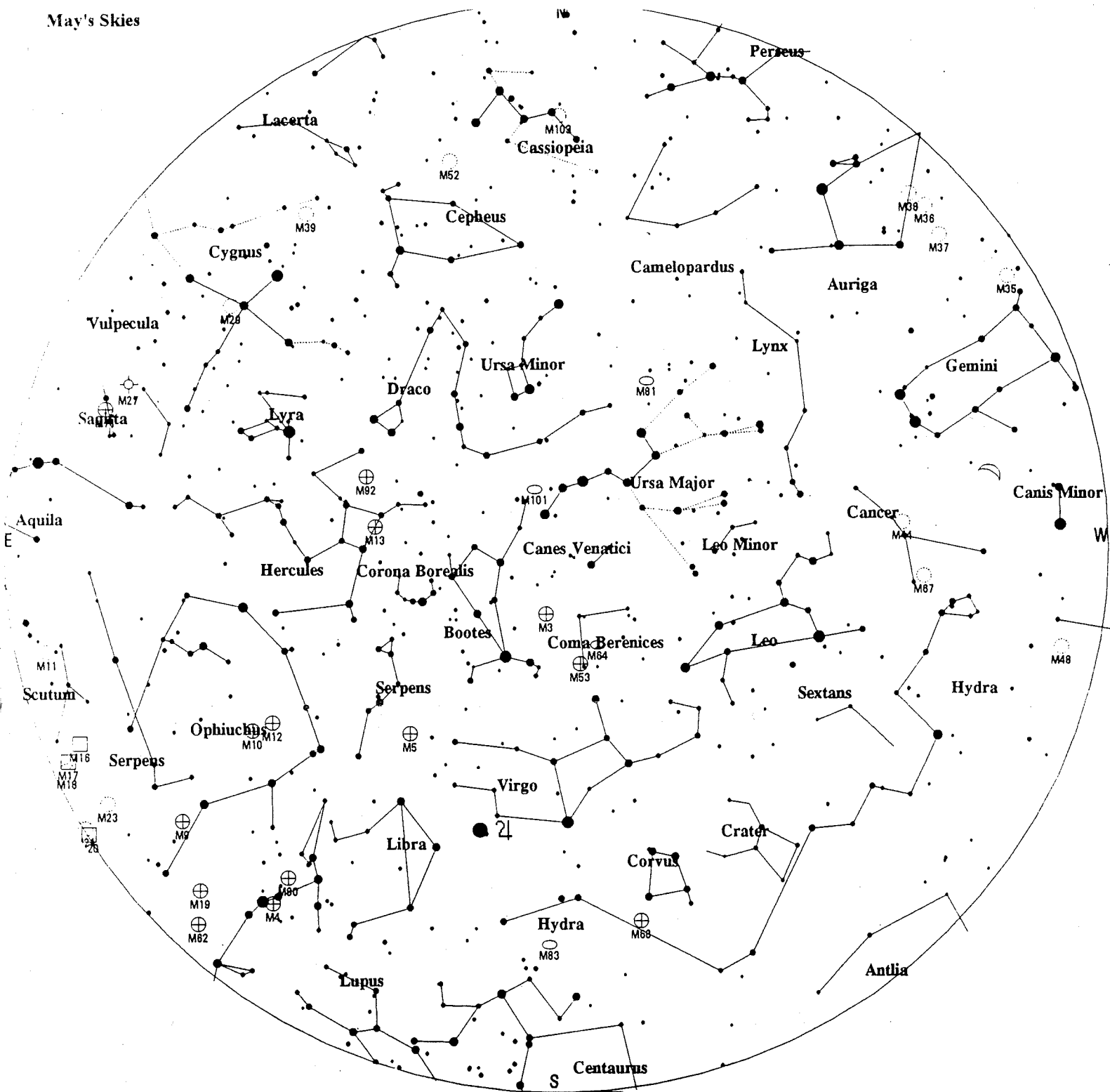
Upcoming Events: An auroral alert has been issued. Paul Mrozek provided info that there is a good chance of mid latitude auroral activity between April 29 and May 9. May 10th Annual Eclipse; Photos, by Greg Burnett, of the park in Ohio where the center line expedition will setup were passed around. Flyers for Fish Lake Under the Stars, May 13-15, were made available.

Misc: Judy Doelker made available an index she compiled for Astronomy magazine from Jan. 91 to present day. Richard Lawrence brought with him info on amateur radio observations of neutral hydrogen emissions. A handout was available on eclipse viewing and photography. A sample filter which may enhance viewing Mars was passed around along with a flyer from the manufacturer.

Main Presentations: Chuck Boren gave a demonstration on 'How to Build your own Solar Filter'. Chuck built an aluminized mylar type filter using simple materials and easy techniques. His design stressed safety for the observer and protection for the long life of the filter.

John St. Peter led a club participation activity on 'Thirty Deductions from a Glimmer of Star Light'.



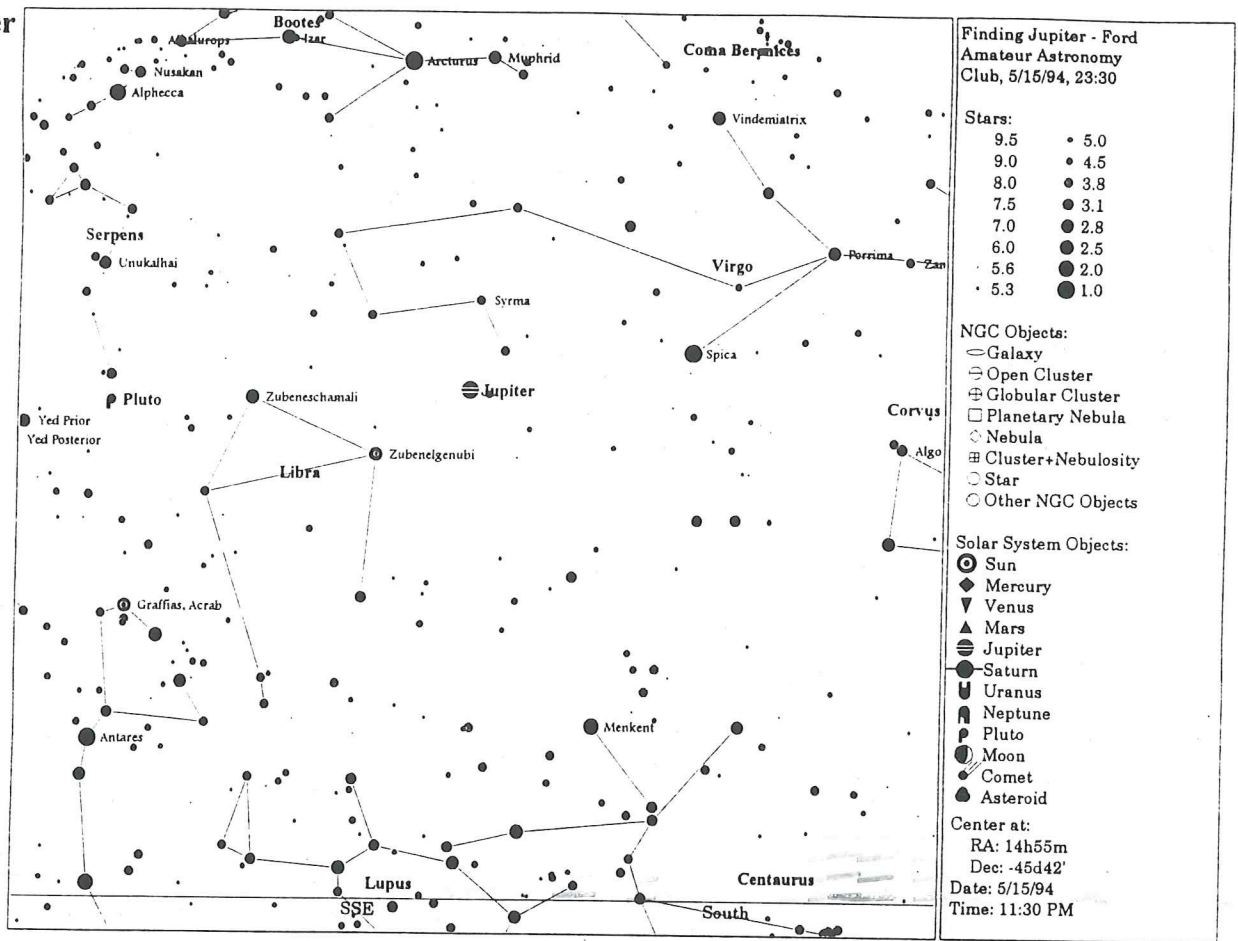


STARS	SOLAR SYSTEM	Galaxy	NOTES
• <1 • 3.5	☿ Mercury	☉ Galaxy	
• 1.5 • 4	♀ Venus	⊕ Globular Cluster	
• 2 • 4.5	♂ Mars	○ Open Cluster	
• 2.5 • >5	♃ Jupiter	◇ Planetary Nebula	
• 3	♄ Saturn	□ Diffuse Nebula	
		○ Other Object	
	♅ Uranus		
	♆ Neptune		
	♇ Pluto		
	☄ Comet		

Local Time: 23:30:00 15-May-1994	UTC: 03:29:59 16-May-1994	Sidereal Time: 13:31:21
Location: 42° 22' 0" N 83° 17' 0" W	Centre Az: 180.0° Alt: 90.0° Field: 180.0°	Julian Day: 2449488.6458

# Finding Jupiter



**Ford Amateur Astronomy Club**  
**Star Stuff Newsletter**  
**P. O. Box 7527**  
**Dearborn, MI 48121**

