

*The
Ford
Amateur
Astronomy
Club
Newsletter*



Volume 3 Number 6

June 1994

BUYING YOUR "LAST" TELESCOPE

by Greg Burnett

Quite a bit has been written and said about how to choose your first telescope. This is true around our club as well, where many members are new to the hobby and still shopping for their first. It occurred to me, in the midst of all this discussion, that I perhaps was already in possession of my "last" telescope, and I got to thinking about how this came to be. I also became sensitive to others who seemed to have their "last" scopes also, and still others who obviously weren't done shopping even though they might presently own a nice instrument.

The term "last" is an indulgence in hyperbole of a sort; what I really mean is best, acknowledging that an observer's needs and desires may change over time. Indeed, for some folks no one telescope can answer all their needs at once. All scopes represent a compromise of some sort, so the "best scope" for you may be a suite of two or more instruments.

But let's get to the bottom line: In a phrase, **the best scope for you is the one (or ones) you will use.** That really sums it up. A scope that doesn't get used is worse than no scope at all. It's an investment going to waste, and an obstacle preventing you from enjoying the hobby. A scope you will use must be the right combination of 1) quality, 2) functionality, and 3) portability. These three characteristics will determine whether you observe, or read books.

QUALITY -- If what you see through your scope does not excite you, then you won't be motivated to drag it out. For many, image quality is the bottom line. Maybe it's splitting doubles, or seeing planetary detail. Part of quality is the hardware, too. A finely machined focuser is more enjoyable to use than a poor quality one. If your scope "delivers" you will use it more frequently. (An aside: For all practical purposes, quality and expense are equivalent, or at least proportional. You get what pay for, gross errors in judgement notwithstanding.)

FUNCTIONALITY -- If you really want to do astrophotography and your scope is not well suited for it, you probably won't do much of anything. If you want to split doubles, most Dobs and Newts will disappoint you. If you are after faint fuzzies, only a large aperture scope will deliver satisfaction (the late Walter Scott Houston and his 4-inch Clark refractor notwithstanding!).

PORTABILITY -- If it takes six men and a boy to set up your scope, it may not see a lot of use. Unfortunately, portability often becomes an issue only after a scope is bought. You will find out what level of portability you are consistently willing to deal with only by dealing with it. (Permanent installations are a different kettle of fish. Most of us don't have that luxury.)

All scopes represent a compromise of these three qualities, but that doesn't mean the best scope for you is an even mix. If you're driven to hunt down anonymous galaxies, you may be willing to wrestle with a large, heavy scope. If you get your satisfaction from high resolution, you will find ways of dealing with refractors that are less than compact.

The key is to discover your source of enjoyment from the hobby of amateur astronomy. The way you do that is to get out and observe.

Try as many different things as you can. Don't expect your first scope to be your last, and agonize over the purchase while you could be observing. If you have to own a number of scopes before you "discover yourself" that's OK. And even if you never achieve astronomical nirvana, you'll get a lot of enjoyment out of trying!

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PRESIDENT'S CORNER

Lots of **Star Stuff** stuff this month, so I'll be brief. I've heard lots of wonderful stories about the eclipse, and it's pleasing to see "the masses" taking an interest in astronomy, if only briefly. However, such events remind us once again that humans will be humans. More than one person has related a tale of fear and suspicion, where children were kept inside and denied this once-in-a-lifetime experience. My own 9-year-old daughter was such a victim. This is where our astronomy club functions as a public education vehicle. Hopefully each person who used one of the 1000-plus viewers that we made available is now a little better informed about, and a little more interested in the world (and universe) around them.

Hope to see you soon!

Greg Burnett

SKY & TELESCOPE NEWS BULLETINS

HUBBLE'S SUPERNOVAE -- I

New observations of supernovae made with the refurbished Hubble Space Telescope have left astronomers baffled. Images of the region around Supernova 1987A, which exploded in the Large Magellanic Cloud seven years ago, show two bright, intersecting rings unlike any seen before in *any* celestial object. The oval rings -- each a couple of light-years in diameter -- are mirror images of one another, but the axis of symmetry does not pass through the supernova. At a NASA press conference on May 19th, supernova researchers could not agree on what formed the unique structures. Astronomer Chris Burrows suspects that a companion star, barely visible in the Hubble images, has "painted" the rings on the interior of an otherwise invisible bipolar nebula created by gas shed from the supernova progenitor. This could be accomplished, for example, if the star Δ emitted two oppositely directed beams of radiation that swept out circles as the star precessed. Future Hubble images may help unravel the mystery.

HUBBLE'S SUPERNOVAE -- II

Future imagery may also help figure out what kind of star popped off as Supernova 1994I in the Whirlpool Galaxy, M51, at the end of March. Hubble images taken before last December's repair mission revealed what some astronomers took to be the supernova progenitor based on comparisons with ground-based photographs. But new Hubble images taken in April and May show that the alleged progenitor is an unrelated star adjacent to the supernova on the sky. As the explosion fades beyond the reach of ground-based instruments, additional observations with Hubble may enable astronomers to trace the supernova to its roots.

CLEMENTINE'S FATE

Recall that on May 7th, during a dress rehearsal for a flyby of minor planet 1620 Geographos, the Clementine spacecraft had a serious malfunction that left it spinning 80 times per minute, with no attitude-control gas and seemingly no way to slow it down. Planners were initially unwilling to write off August's asteroid flyby, but now they have. Clementine fired its engine on May 19th, slowing the probe down enough to ensure that it remains in Earth orbit. With a little help from Earth's magnetosphere, controllers will gradually despin the spacecraft using the its reaction wheels -- flywheels that help maintain and change spacecraft attitude. Clementine will then continue to fulfill its primary objective of electronics testing. Except for its steering gas, the spacecraft is otherwise healthy.

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DOUG BOCK'S SUMMER SOLSTICE PARTY

Date: June 11, 1994

Time: 2:00 pm until dawn Sunday morning.

Activities: Solar observing, Cookout at 4:30, Sporting activities if desired, Observing all night if clear. Indoor games if cloudy. I will put together an observing list for those who would like some help finding objects. Any questions?

Doug Bock X-08101

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

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.

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ECLIPSE OBSERVATIONS FROM OUR MEMBERS

The eclipse was EXCELLENT. Unfortunately we had a cloud cover for a few minutes right before maximum. At 1:14 I peeked out from the clouds and we had our totality (the max coverage). It did not appear to get as dark as I thought it would. It seemed like a sunset with the sun about a quarter way down. There was a rush of OH's and AH's and cheering when the ring of the sun could be seen. Ingress at 1:39 seemed to be about 45 degrees. Egress at 2:48 was about 315 degrees. The moon was totally confined within the sun at maximum eclipse (it appeared to be equally all around). What's puzzling is the moon's limb seemed to touch to sun at 255 degrees just after maximum. Does this suggest a pear shaped moon?

-- Joe Kulezycki

It would have been nice to have a few more scopes in the building 3-4-5 area. At peak time the consensus was from people around me there was about 50 people in line to look through my scope and an additional 50 to 60 people viewing the eclipse through various devices. Most of the people were looking through our eclipse viewers. I sold my 75 viewers by about 12:30, and another club member sold his 50 soon after me. There were still requests for more that had to be turned down. I had to enlist my sister to help keep the line moving. Each person got about 5 seconds to view through the scope and then they were told to move. Several people did not get to see the annular phase because the line was too long and the viewers were sold out. I did manage to get one 5 second view of annular phase through my scope (I spent the rest of the annular phase looking through the zoom lens of my filtered camera, and in the spirit of the club I let the mob view through the scope). I did take a few pictures of just the crowd and I will bring them to the next meeting. Even though it was partly cloudy all day, there were no clouds for the 10 to 15 minutes near maximum eclipse.

-- Paul Mrozek

Quite a nice eclipse we were treated to yesterday. I got to see it through a welder's mask so I was able to watch it for quite some time. I watched and photographed the one we had in the late 70's but I didn't have the chance to set up and photograph this one. Thanks for sending the notification. I enjoy watching them as it reminds me just how insignificant we can be through the eyes of mother nature. Sometimes it does a mind good to be humbled.

-- Ray Violante

I lucked out and was just inside the northern limit. I love when a plan comes together. ha ha. It was great. At mid eclipse a tiny broken sliver appeared on the edge, for just 15 seconds. I made a video of the entire eclipse, unfortunately the image of the sun was a little too bright, but overall the recording came out ok. I almost forgot to snap the 35mm camera during the mid eclipse portion. I was watching the TV monitor so intensely for the sliver of light to show up on the edge, I didn't remember to shoot the camera during this process until the sliver showed up. I might have captured two shots on film before it disappeared. I had the video on a TV monitor so all the neighbors and family could watch it. It was a great thrill to see another eclipse.

-- Doug Bock.

I observed the eclipse from my backyard in West Bloomfield (16 mi/ Farmington). The annulus was pretty darn perfect! It seemed to go

right through the center of the Sun's disk. Do you have any verification of whether (how much) the predicted centerline matched the actual centerline? I figured that I may as well stay home and watch and provide another data point since everybody else was going to the same spot (the Toledo "centerline").

-- Greg Miller

We were very lucky re: clouds in Dearborn. A few drifting by but not much of a hindrance. By naked eye (with filter), moon looked centered at annularity to me; I was surprised; I expected it to appear farther off-center. I was also a bit surprised that ambient light didn't seem darker at annularity. Darkness didn't seem sufficient to scare middle-age peasants.

I got an outstanding view through a friend's welding glass (MUCH better than through the mylar filter, it turned out; not ghosting or distortion whatsoever). A few minutes after annularity, I'm sure I saw the western crescent of the moon partially illuminated; this surprised me; earthshine? By the way, my friend went to a welding shop for filters. Shop sold him a "number 10" and a "number 4"; told him to stack them, that would be about right; needed to stack them to be safe. Sounds like welding glass goes by the same ND scheme as photographic filters. I felt that his stacked glasses weren't QUITE dark enough; should have had a combined 16 instead of 14. The FAAC Mylar filter was about 2 f-stops darker, I think (quite comfortable; not very good optically, though). Welding glasses were \$1.50 each ($\times 2 = \3.00 for stacked pair). A couple of guys standing next to me were looking through a 5.25" floppy (w/o sleeve). I didn't know these were translucent. They had no idea what rays it passed, but it did darken things (and make them reddish). Not a good strategy probably.

-- Bill Colwell

I went across the street to United Airlines (my wife works there) and attracted quite a crowd...I made sure the club name was associated with the viewing experience...we had 50 or 60 people...I told them to come back in 2017 (or where ever it is).

-- John Ghesquiere

I helped Chuck Boren and Steve Neumann with activities at Regent Court yesterday. For about an hour and a half we had a steady stream of people rummaging around, checking the video and telescopic views, buying viewers from Chuck, and asking questions about the filters and eclipses. At annularity I would guess the crowd had ballooned to about 50 or more. If you've heard from Chuck you'll know we missed most of annularity because of an inopportune cloud. The obstructed sun did peak through for about three good views, however; thank goodness it lasted so long! I thought it was great, anyway. This was my fourth partial solar eclipse and my second annular, but the other annular was TOTALLY clouded out; this time I got to see at least some of it. I do feel a little jealous when I hear other's skies were completely clear. All that's left for me is to experience totality someday!

-- Tim Klepaczyk.

I had a wonderful day!! There was a small number from the club on the centerline and I do believe that if we had tried harder, we could not have found a better spot. The weather was great. It was so exciting to see so many "people off the street" have an interest. We all watched on the projected image of my little old scope and there

was a lot of ooing and ahing (and most of it by me). It was truly a sight to behold. I feel honored to be able to say "I was there!!!!!!!!!!!!"

-- Patricia Smith

p.s. Greg, did you get the cookies? *[Yes, thanks! -G.B.]*

What a beautiful eclipse! My brother-in-law and a friend came over and set up my 6" Newtonian in the driveway. We projected an 8" image onto white paper. Neighbors drifted over to watch; needless to say, they were impressed.

-- Dick Harris

It was totally overcast here until 3:00 EDT, sun came out about 5 minutes later as a result, I didn't sell any viewers.

-- Al Czajkowski *[Al was in San Diego at the time! --G.B.]*

I hope everyone got to see the eclipse. It was really a trip! I was with a small but hearty band of observers on the centerline in Toledo, under a cloudless sky. First contact occurred at 11:30:34am EDT. We watched as one lonely sunspot was inevitably swallowed up by the Moon. Second contact at 1:09:30 was spectacular! At mid-eclipse the annulus was perfect! A lot of lunar limb detail was visible telescopically. The temperature had dropped to the point that we were putting jackets back on. Third contact at 1:15:40 left us with 6 minutes and 10 seconds of unforgettable annularity. We continued to observe until fourth contact at 2:59:00. Just before fourth contact a new sunspot was apparent that had not been noticed earlier; a neat surprise to tie a ribbon on an incredible event!

I understand that last-minute viewer sales were brisk. I feel sorry for the eight people who called me Tuesday morning; I hope they were able to work something out, because I was not there to take their calls. Nothing like planning ahead, eh? Hope you all had a memorable eclipse experience!

-- Greg Burnett

Where : St Valentine Elementary School, Redford, MI. (Beech Daly south of Five Mile Road)

Club members present: Harry and Ada Kindt, John Paul and Barbara St. Peter along with their two boys, Jeremiah and Montgomery. At six months, Montgomery was the youngest amateur astronomer present. Preparation... On May 9th, John gave a presentation at the school, describing the orbital position of the earth and moon, with respect to the sun, that give rise to the solar eclipse phenomenon. He emphasized the safety precautions to be taken when viewing the eclipse, and demonstrated the construction of a camera obscura for use during the eclipse the following day.

May 10. Setting-up... By the time Ada and I arrived at the school, John had most of his equipment out of his trailer and was setting-up on the sidewalk adjacent to the school playground. I began to set up my telescope around 9:45, when I discovered that I had forgotten the keys to the case that contained my telescope tube. At this point, it seemed that I had two options, either have at the lock with a tire iron, or head back home to get the keys. Fortunately, we did not live that far away from the school, so I opted for the latter. We completed our set-up around 10:30 am. without further complications. On-site equipment... For viewing the eclipse, John had set up a 2.4in refractor which was rigged to project a reflected image onto a white screen. This was used so that a group of kids could gather around and see the reflected image of the eclipse and to give them some idea of what to look for when they looked through the telescopes. In addition John

had set up a pair of 11 x 80 binoculars on a mount with mylar filter material taped securely to the objective lenses. John also had his 8" Newtonian set up for optical viewing. Attached to the Newtonian was a 4" SCT to which he connected a CCD video camera whose image ran to a small amber screen monitor. I set up my 8" SCT with a full aperture glass solar filter attached. I used a 30mm lens which gave rather a large view of the eclipse as seen through my 'scope. Sitting curbside and not being used for the eclipse, was John's 17.5" Dobsonian telescope, which drew a lot of attention and comment which you would expect.

The wait... By 10:45 am all the equipment was up and running, the sun's image was in all of our eyepieces, the tracking motors whirring away and we all settled back to await the beginning of the eclipse. It was around this time that Barbara St. Peter arrived with a video camera so that we could record this event for posterity. She also brought along a short-wave radio so that we could listen to WWV and time the actual start of the eclipse at our site. Several passers-by stopped to view our equipment set-up. We were able to discuss with them the event, now only minutes away, which was about to occur. John and I discussed the equipment we were using and allowed them a peek through our telescopes. We were also able to sell a few solar filters at this time and to demonstrate their use.

The Eclipse... By 11:25am John and I could be seen bent over our telescope, our eyes intently glued to the eyepieces. I could hear John as he tuned in WWV for the time signal broadcast so that he could record the exact time of first contact. 11:31... I could now hear John counting along with the beeps heard over WWV. 11:32...(John has the exact time) we both observed the first contact in our eyepieces. While I continued to watch the progression of the eclipse, John pointed out a small sunspot almost at the center of the sun and very near the equator. At this point we planned on getting a time check on when the eclipse shadow would overtake this sunspot and to record the exact time of this occurrence. About 15 or 20 minutes into the eclipse, I began to notice irregularities in the shape of the moon's shadow through my eyepiece, I recognized these as being surface features of the moon being "sent along" with the moon's shadow as it passed across the surface of the earth's surface. We were now about an hour into the eclipse when concern began to grow amongst the club members and some of the parents, that were still on the scene, that the principle of the school may have had a change of heart and would not allow the school kids out of their classrooms to view the eclipse. During this period, we continued to observe the eclipse through the occasional puffy white clouds that sometimes obscured our view. We continued to observe, content in the knowledge that even if the school's principle did have a change of heart, we, the club members and those others present, could still enjoy this fantastic cosmic event, which, by now was about an hour and a half old. Our concerns were unfounded.....!

The Onslaught Begins.... At 12:50, or thereabouts, we looked up and saw the first group of kids, finally released from their classroom, heading in our direction with camera obscura's firmly in hand. It was now time to go to work. Our first task was to organize some sort of viewing schedule. With the help of the teachers and the other adults who were present, we began by assisting the children in the use of their "camera's", emphasizing all the while, the dangers of looking directly at the sun. We then directed their attention to either the 2-1/2" refractor, where a reflected image of the eclipse could be viewed, or, to the T.V. monitor we had available. We then had the kids form two lines, one line behind John's 8" Newtonian and a line

behind my 8"SCT. John and I allowed the kids about 15 to 20 seconds of viewing time through our 'scopes. For me personally, this was perhaps the most rewarding period of the whole experience. We heard a number of "oohs" "ahhs" "wow's" and "cool" as the kids moved away from the eyepieces, (the "cool's" winning by a wide margin). We continued with these procedures throughout the afternoon. As one group of kids left to head back to their studies, another group would show up for their turn at the 'scopes. We were not able to count the number of people who moved through our viewing site, counting the students, the parents, teachers, and passers-by, our best "guesstimate" would be between 250-270 potential amateur astronomers and FAAC members. Personal notes.... I would like to thank John Paul St Peter for the opportunity to take part in this endeavor. Ada and I thoroughly enjoyed this outing. We would also like to thank the administration of St. Valentine for their cooperation in allowing the FAAC to set up and provide their students with this unique opportunity. A special thanks to the students for their discipline and their industry in making their "camera obscura's". From my observations, almost every student took the time to build his or her own "camera", quite impressive. A final thanks to the man who bought 25 solar filters. I have no idea what he was going to do with them. Do you suppose we were witness to, and co-conspirators to a solar filter scalping scam??? See you at the next solar eclipse
-- Harry Kindt

John Paul's Two Cents: Rather than duplicate a lot of what happened in another report, I'll just tack on some of my observations here. First contact for us was at 11:32:34 and I would judge that as accurate to about a second. Last was at 2:59:50 with an uncertainty of about +5 to -15 seconds, the shape of the moon's limb made it quite hard. The timing for the first sunspot happened behind a cloud and the second spot was an unexpected surprise. While the Moon was ringed with the Sun, we were ringed with the kids, no timings taken. By the way, about 50 kids viewed the annular phase through the scopes. Jeremiah's scope with the projected image was a big hit. Besides everyone being able to see it a once and make comments to each other, I noticed that many people, perhaps even unconsciously, reached out and traced the Sun and Moon with their finger. I guess that made it even a bit more personal, being able to 'touch' the eclipse. As Harry mentioned we had a few clouds roll by. When one would graze the Sun, the groups watching would renew their ooh's and aah's at the detail and movement shown. Around the time of annularity it did not get as dark as I thought it might. Not even as close as to what early twilight might seem like. I did point out though, that the cloud tops in the distance were a dim pinkish rather than the brilliant white that they normally are. The air temperature did drop enough to make it uncomfortable but recovered in a short while. That's all from me. Its been about 26 hours since last contact and I am still recovering....
-- John Paul St.Peter

We were at Ft. Malden, in Canada, with a class of 9-11 year old children from Jaux, France. Many of the schools in Canada (and around here) didn't even notify the children and some kept them indoors during the best part. I guess they felt it was either not important or (giving them the benefit of the doubt) too difficult to instruct them safely. This frustrated most of the adults on our trip

because some kids may never have an opportunity to experience another one.

The French kids (and the adults too!) had a ball, and the view... "c'est extra!" (it's great), "c'est chouette!" (it's super), & clear as a bell! The only visual problems reported was after the peek. When the children were inside, one of them took a flash picture. Many reported it took an extended period of time for their eyes to recover from the flash. We also used the envelopes like a shadow box viewer - ripped it open, tore the envelope in 2, put a hole in one piece, put the other part of it on the ground, and focused the image through it onto the piece on the ground.

-- Betty L. Haley

Subject: Good fortune

Oriental was one of the themes in the Regent Court cafeteria on Tuesday (Eclipse Day). A few of the residents found these pearls of wisdom in their fortune cookies:

The sky will darken on the day of your promotion.

You will get lucky after the sky gets dark.

Recipients of these confucianisms generally chuckled. One complained of poor quality control as he read the first fortune in his cookie but proceeded to swallow the second one.

It appears a solar eclipse is still a mystical event.

-- Bill Colwell

Speaking of the eclipse, I brought in old 3" reflector from home and set it up on the Southeast side of the EEE building. I wanted the most number of people to be able to view it, so I set it up near a wall and projected the image up into a large box lined with white paper. It acted just like an overhead projector putting an image about 9-10" in diameter into the box and people could see it from far back. Up close, details like mountains and craters could be seen. At peak time, there had to be about 100+ people outside watching. Many were quite interested and I answered their questions as best I could. It was quite an event! I wish I had planned it better... I decided to do it just that morning. I thought it would just be me out there looking... but, Boy was I wrong. just thought you'd like to hear, take care....

-- Ed Rychlick

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INFORMATION ON AVAILABLE ECLIPSE PICTURES

From: Neal Probert

For those of you who have TCP/IP connections, I have a couple of picture files from the eclipse. Hopefully I will find some better ones to add to the collection.

machine: etcs29.eld.ford.com

protocol: anonymous FTP







directory: pub/astro/eclipse

There is one MPEG movie of the eclipse, a picture of the eclipse itself, and a satellite picture of the moon's shadow on the earth.

Neal W. Probert Internet: nprobert@etcs29.eld.ford.com
Phone: 313-845-8178 Fax: 313-59-47596 PROFS: NPROBERT

June 1994



SUN	MON	TUE	WED	THUR	FRI	SAT
			1  Saturn 7° S. of Moon LAST QUARTER MOON	2	3	4
5 Moon at apogee	6	7	8	9 	10 Venus 5° S. of Pollux Mercury 3° N. of Moon	11 11th Annual Summer Solstice Star Party at Doug Bock's
12 Venus 7° N. of Moon	13	14	15	16 	17	18
19 Jupiter 3° N. of Moon	20	21 Summer Solstice, 10:48am Moon at perigee	22	23 	24	25
26 	27	28 Saturn 7° S. of Moon	29	30 	<i>Congratulations Graduates</i>	

NEXT MONTH

The Ford Amateur Astronomy Club general meeting is July 28th!

MEETING ANNOUNCEMENT -- June 23, 1994

The Ford Amateur Astronomy Club holds regular general meetings on the fourth Thursday of each month. Our next meeting will be Thursday, June 23, 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!

OUR GANG

GRAND FINALE TO ASTRONOMY DAY ACTIVITIES

April 16-17, 1994

by Harry Kindt

Although the weather refused to cooperate for the Astronomy day activities at the Dearborn Civic Center, that evening proved to be an excellent viewing opportunity. After an enjoyable day at the Astronomy day festivities, the wife and I packed our equipment and headed home for dinner. After dinner while thumbing through the T.V. channels, I decided to take a look at the Weather channel on the off chance that there would be some clearing of the cloud cover that had been with us throughout the day. The weather service indicated that it would be "mostly clear" around midnight. This was enough incentive for me to re-pack the car and head out to our viewing site at Island Lake.

It was one of those fortunate, spur of the moment decisions one makes occasionally, for, not only did the weather clear up considerably, but I was treated to a fantastic Auroral display that lasted all evening and into the wee hours of Sunday morning. I arrived at the viewing site around 10:15pm. My original intent was to stay out for a couple of hours with the idea of re-aligning my finder scope, do a polar alignment and to test the tracking on the newly installed motors on my 8"-SCT. After completing these rather mundane tasks, I decided to turn my scope towards the moon to do some "crater exploring". I stayed on the Moon for a while and noted that there was enough "Earth glow" so as to make the dark part of the Moon easily discernible against the darker background of space.

After leaving the Moon to its meanderings, I swung the 'scope' eastward to view the alignment of the moons of Jupiter. It was around this time that Doug Bock arrived at the site. He was on his way home and decided to stop by to see if anyone was out, on what proved to be a very clear viewing night. We talked for awhile, he then directed my attention northward and pointed to a diffuse grayish-blue light, spanning the northern horizon--The Aurora----. This proved to be the prelude to a fantastic night of Auroral activity. Since Doug wasn't dressed for an extended stay at the site--the wind was still quite brisk at the time--he decided to continue on home, change clothes, and perhaps, open his observatory and to continue his observations from there.

Shortly after Doug left, Patty Smith arrived at the viewing site. I immediately directed her attention northwards. By this time the arc of light from the Aurora had extended itself from the north-west horizon to the horizon in the north-east. The light from the Aurora was rather passive at this time (11:30-11:45), no discernible movement could be detected. It was around this time that I noted a thin band of clouds far to the North. From our perspective, these atmospheric clouds were high enough to lay within the inner arc of the Auroras light. The lower, thinner clouds were transparent enough to allow the Auroral light to pass through, giving the whole cloud layer a colorful appearance, with red, orange and yellow the

predominate colors. The upper, more opaque clouds, however, remained black against the back lighting of the Aurora. It was shortly after midnight that the real show began. As Patty and I stood watching the arc of light from the Aurora, we began to notice brilliant flashes of light all confined within the arc. These flashes were analogous to watching a distant thunderstorm where the lightning strikes light up the nearby clouds. We continued to watch these cloudlike bursts of light for awhile, when, suddenly long fingers of light began to form, stretching southward towards the zenith. These beams of light had a search-light like quality and filled the sky from west to east.

Movement of these beams of light was easily discernible, much like watching the spokes of a rotating wheel, at times these light beams would appear stationary, at other times they would appear to follow one another across the sky and sometimes they would appear to reverse direction. The best description I could think of would be that of a huge cosmic fan. As we continued to watch this cosmic "fan-dance", the spokes of the fan began to extend further and further south, gradually extending to the zenith and beyond. By the time this phenomena had ended, the Moon was very low in the west, and was about to set.

The time was about 12:50am when Patty decided to pack her telescope and get ready to head on home. I continued to watch the Auroral display. It was around this time that I began to see very subtle, diffuse flashes of light emanating from just above the Auroral arc. As I continued to view this new phenomena, these "flashes" took on the appearance of huge cloud-like structures, a subtle yellow-brown color, moving rapidly away from the main belt of the Auroral arc. I called Patty's attention to what I was seeing. We watched in fascination as these clouds virtually exploded away from the main structure and headed southwards towards our zenith. On occasion, these "clouds" would retain the arc like shape of the main belt of the Aurora and move rapidly, shock wave fashion, in the direction of the zenith. At other times the arc of these clouds would appear to break apart and send clumps of light toward the zenith where they would gradually slow down, stop, and the gradually dissipate.

It was around this time that a lone meteor passed through our line of sight heading east to west 2 or 3 degrees above Polaris. By this time the Moon had set, and while Patty continued her vigil, I began to pack up my equipment. It was around 1:15am when Patty decided to call it a night and head home. I decided to stay on a while longer. It was a fortunate decision for I was able to witness the grand finale of that evenings display. As I stood leaning against the car, I saw a vertical plume of light forming near the center of the Auroral arc. This plume of light gradually formed itself into a curtain like structure, pointing earthward. As I watched I could detect definite movement in the folds of the "curtain". I could also make out definite color "stripes" of red, blue and green near the earthward edge of the curtain. The colors were very distinct, forming definite bands easily separated one from the other. They formed a sort of a fringe on the bottom of the "curtain" and were a delight to view as they moved about folding in on one another. I would guess that I saw the formation of at least a half dozen of these curtains all similar in structure with the same color fringe around the bottom edge. (Sorry you missed this Patty).. I left the park around 2:00am. Whew!!!! In summation "you had'da be there"

THE GREAT ECLIPSE RADIO EXPERIMENT

From: Charley Harp

Subject: Notes from Eclipse Observation at Regent Court

A Radio Experiment during the Annular Eclipse

More than 40,000 radio enthusiasts attend the annual Hamvention at Dayton, Ohio. At the SWL (Short Wave Listeners) Forum on May 1, 1994, Dr. David Schneider, AD4CC, of Northern Kentucky University, gave a presentation entitled "Natural ELF (Extra Low Frequency) Emissions," or "Mother Nature's Radio." He described his research in monitoring the portion of the electromagnetic spectrum corresponding to audible frequencies (20 Hz to 20 KHz).

The radio "sounds" heard at these frequencies are associated with natural phenomena. They're initiated by lightning, and by the charging of the atmosphere by the sun. The chorus of hisses, tweeks, whistlers and other exotic sounds is the result of radio waves generated in one hemisphere being trapped in the earth's magnetosphere, and being transported more than 10,000 miles to the other hemisphere. Dr. Schneider mentioned accidental observations of peculiar ELF signals associated the recent Los Angeles earthquake. He was very careful not to step on his colleagues toes, but he hinted strongly that there soon will be exciting news about earthquake prediction.

He also described a monitoring experiment planned for the (then) upcoming annular eclipse. He and a squad of grad students would be monitoring ELF before, during and after the eclipse, looking for evidence of the sun's effects upon the atmosphere and ionosphere. Infected by Dr. Schneider's enthusiasm for ELF monitoring, I proposed a monitoring experiment to fellow-ham Greg Burnett. He solicited the mailing list for interest, and I received several expressions of responses, including one from Chuck Boren who was organizing activities at Regent Court. With encouragement and equipment loans from Bob Gehrke and Chris Cencula, Chuck and I set up a monitoring station alongside the optical observing equipment.

The station design consisted of: a home-brew ELF antenna; a high-gain audio-frequency pre-amplifier; use of the microphone input of a boom-box, providing more amplification while recording the received audio; and a short wave receiver for time stamping by radio station WWV. Unfortunately, shortness of time caused us to compromise the design, with a big loss in receiving sensitivity.

The original antenna design was a multi-turn shielded loop, to be constructed from printer hookup cable. A 35-foot length of the 25-strand cable, wound into seven five-foot turns, would give the equivalent of one 875-foot shielded wire wound into 25 seven-foot turns. This design is intended for use at wavelengths many times the total length of wire, so it might have been very effective at ELF. Unfortunately, the night before the event, after assembling the loops and prepping the ends of the cable, I realized that it would take all night with a hot soldering iron to splice the wires together. Plan B: Chuck and I split the two conductors of a 75-foot length of speaker hookup wire, making a dipole for 40-meters. This we laid that out on the grass and connected directly to the microphone

input jack of Chuck's boom-box, so that any signal would be recorded on both audio channels. The short wave receiver was connected to the left line-input jack, so WWV time signals were recorded on the left channel only. The second compromise in receiving sensitivity arose when Bob experienced a last-minute priority, and couldn't provide the high-gain pre-amplification stage for use between the antenna and the boom-box. The first listening of the audio tapes has been negative. None of the exotic sounds were heard on the first playback of the tapes. I'm not very optimistic that a more careful listening will be more positive. It seems there just wasn't enough listening power. I'll keep my eyes open, and pass along any breaking news from the ELF experimenters.

More successful than the radio experiment was a last-minute shoestring solar-image projection setup. The evening before the eclipse I caught a program on NASA TV that featured suggestions for viewing the eclipse. One of these, using modest equipment, caught my attention. Outside Regent Court I taped an expendable pair of 7 x 30 binoculars to one end of a five-foot piece of TV mast. (As it turned out, there was no danger to the optics, but I wasn't taking any chances.) A hole was cut in a piece of cardboard (the lid from a box of photocopy paper), just large enough to fit around one objective of the binoculars. The cardboard was positioned to block the second objective. The mast was leaned against a piece of furniture so that the cardboard cast a shadow on a sheet of white paper taped to the lid of my briefcase. The lid of the briefcase was propped up with my appointment book to catch the image at an appropriate angle. With the binoculars positioned just as for direct viewing (Danger!), the focus and aim of the binoculars was adjusted to project an image of the sun onto the sheet of paper. The result was a bright, reasonably high-quality, four-inch diameter image of the solar disk. (Trig theory: 7 times magnification of a 0.5 degree object gives a 3.5 degree projected image, which at a distance of 60 inches produces an image size of about $60 \times \tan(3.5) = 3.7$ inches). Some color fringing was visible at the top and bottom of the image (the angle of the lid wasn't perfect), but the center, and left and right edges, were quite sharp. Shadow images of passing clouds were very clear. I tried positioning several types of photographic filters over the objective to enhance clarity, but no detail was observed on the disk. The medium-yellow 85B filter provided the most "realistic" looking image. I'd bet that with better control of ambient light, that any sunspot activity would have been very discernible in this image. During the observation I scooted the furniture and briefcase around, keeping the image focused on the sheet of paper and in the shadow of the cardboard. The worst problem encountered was the gusty wind, estimated at 40 mph, during the hour before annularity.

Crowd reaction was remarkable. Hardened engineers grinned and pointed at the simple but effective setup. Everyone immediately grasped the principles involved. A crowd of about 50, gathered around the briefcase as annularity approached, groaned in unison as images of clouds flew across the image, and then totally obscured the image, just before second encounter. It was all over. A few momentary glimpses were seen as annularity came and went. A few minutes past third encounter the sky cleared and the image returned, but everyone had gone back to work. One big stupid cloud over Regent Court. The shopping center on Mercury Drive was in sunshine the whole time. Unpleasant things were said about those who went to Toledo. We packed up and went home. Wait 'til 2038.

ASTRONOMY WORKSHOP

by Greg Burnett

PROFS=GBURNETT

InterNet

USFMC6SH@IBMMAIL.COM

Wow! Participation in the ASTRONOMY WORKSHOP is really up! Many thanks to the folks who sent in answers and new questions. This is your chance to learn everything you always wanted to know about astronomy but were afraid to ask. 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!



Sally Ride

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

I've been reading through the last several issues of our newsletter and I noticed that Question 28 keeps putting in an appearance without being answered. I suspect that the wording of the question may have something to do with the lack of response from our readers. The question reads, "What is the planetary motion which is responsible for the recurring ice-age that effects the earth's orbit?". I think what was meant was "-----the earth's climate?" [You're exactly right, Harry. My error. -G.B.]

With this in mind, and after a bit of research, I will attempt to provide an answer to the question (with the help of Milutin Milankovitch 1878-1958). Milankovitch was a Yugoslavian mathematician who dedicated his entire scientific career from 1921 to 1941 to describing the connection between (a) the changing shape of the earth's orbit, (b) the tilt of its spin axis and (c) its slow wobble, and the variations in global climate over the ages.

The spin axis of the earth tilts 23.5 degrees from perpendicular to the plane of the orbit. Changes in the amount of sunlight received at different latitudes produce the succession of the seasons. As a result of the gravitational pull of the sun and moon on the earth's equatorial bulge, the axis of rotation precesses with a 26,000 year cycle. Independently, the tilt varies by about 1.5 degrees from its average value of 23.5 with a 41,000-year cycle. Milankovitch set out to calculate how these orbital variables combined to affect the amount of sunlight reaching the earth during each season of the year and at every latitude. By 1914, he had convinced himself that eccentricity and precession were potentially sufficient to influence the advance or retreat of ice ages and furthermore, that a 41,000 year variation in axial tilt was equally important. Perhaps we should change the original question from "What is...." to "What are..." and conclude that there are three orbital variables involved in the formation and recession of the ice-ages: orbital eccentricity, axial tilt and precession.

-- Harry Kindt

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?

If we ignore gravitational forces, then any red or blue shift is just the result of the Doppler effect. Austrian scientist Christian Doppler found that the observed light from a moving source is shifted to a shorter ("bluer") or longer ("redder") wavelength, depending on whether the source is approaching or receding. This blueshift or redshift, z , is directly proportional to the velocity of the source relative to the observer:

$$z = (w' - w) / w = v / c \quad (' \text{ meaning prime, } w \text{ meaning } \lambda)$$

where

c is the speed of light

w is the original wavelength

w' is the shifted wavelength

If we use the simple Galilean transformation, then the relative velocity for our example is:

$$v' = v - u = (-.5c) - .5c = -c$$

where v is the source velocity and u is the observer velocity. Unfortunately, the

Galilean transformation really only works well at low speeds. Just think about what result you would get if the two bodies were moving towards each other at 60% the speed of light. In this case, the more appropriate formula is the Lorentz transformation:

$$v' = \frac{v - u}{1 - \frac{vu}{c^2}} = \frac{(-.5c - .5c)}{1 - (.5c \cdot .5c / c^2)}$$

$$v' = \frac{-c}{1 - .25} = \frac{-c}{.75} = -1.33c$$

$$v' = -.8c$$

And so the observed blue shift would be:

$$(w' - w) / w = -.8c / c$$

$$w' = .2w$$

The observed wavelength would be 80% shorter. For the high relative velocity used in our example, many astronomy texts would appeal to Einstein's special theory of relativity. In this case the Doppler equation becomes:

$$z = \frac{1 + v/c}{1 - v/c} = 1.5 - 1$$

For our example the Doppler shift would now be $z = -.667$, or $w' = .333w$. Any gravitational redshift would depend on the star moving towards us, because light loses energy if it has to escape an intense gravitational field.

-- Paul Mrozek

Newtonian intuition may cause you to think that the velocity of the planet relative to the star is simply the sums of their velocities. This would give $0.5 + 0.5 = 1$ or 100% the speed of light. This is incorrect due to Special Relativity. (Thank you Mr. Einstein.) The first step is to calculate the relativistic velocity using a Lorentz velocity transformation;

$$V_r = \frac{(v_1 * c) - (v_2 * c)}{(1 - (v_2 * c) * (v_1 * c) / c^2)}$$

Where; c = speed of light

v_1 = velocity of planet (0.5)

v_2 = velocity of star (-0.5)

$V_r = 0.8 * c$ Which is the relative velocity.

So now we have the relative velocity is equal to 80% the speed of light. The next step is to calculate the Doppler shift of a wave-length. Because the velocity is close to the speed of light we must again account for relativity and use the symmetrical form of the Doppler equation;

$$R = L * \frac{1}{[1 + v/c] / [1 - v/c]}$$

Where; c = speed of light

v = relative velocity (0.8)

L = wavelength (Set to unity for this example.)

$R = 3$ Which is the Blueshift observed.

The blueshift of 3 means that the wavelengths of light emitted from the star and seen on the planet will be shortened to one third of their rest wavelength. If the star were a Red Giant its blackbody peak would be shifted out of the red and all the way into the ultraviolet! I'll leave you with this thought; Get out of the way!

-- John Paul St. Peter

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?

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?

Q32. What is a good light-weight 35mm camera for taking pictures through a telescope?

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	JSO	June Solstice

June 1994						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
			SR: 5:58 SR: 5:58 SR: 5:57 SR: 5:57			
			SS: 21:02 SS: 21:03 SS: 21:04 SS: 21:04			
			MR: 1:48 MR: 2:15 MR: 2:41 MR: 3:08			
			MS: 13:57 MS: 14:56 MS: 15:55 MS: 16:53			
			LQ: 0:04			
5	6	7	8	9	10	11
SR: 5:56 SR: 5:56 SR: 5:56 SR: 5:56 SR: 5:55 SR: 5:55 SR: 5:55						
SS: 21:05 SS: 21:06 SS: 21:06 SS: 21:07 SS: 21:08 SS: 21:08 SS: 21:09						
MR: 3:38 MR: 4:10 MR: 4:47 MR: 5:28 MR: 6:16 MR: 7:09 MR: 8:06						
MS: 17:51 MS: 18:48 MS: 19:43 MS: 20:36 MS: 21:26 MS: 22:11 MS: 22:51						
				NM: 4:28		
12	13	14	15	16	17	18
SR: 5:55 SR: 5:55 SR: 5:55 SR: 5:55 SR: 5:55 SR: 5:55 SR: 5:55						
SS: 21:09 SS: 21:10 SS: 21:10 SS: 21:11 SS: 21:11 SS: 21:11 SS: 21:12						
MR: 9:08 MR: 10:11 MR: 11:17 MR: 12:23 MR: 13:32 MR: 14:41 MR: 15:53						
MS: 23:27 MS: None MS: 0:00 MS: 0:31 MS: 1:02 MS: 1:32 MS: 2:05						
				FQ: 15:57		
19	20	21	22	23	24	25
SR: 5:55 SR: 5:55 SR: 5:55 SR: 5:56 SR: 5:56 SR: 5:56 SR: 5:57						
SS: 21:12 SS: 21:12 SS: 21:12 SS: 21:13 SS: 21:13 SS: 21:13 SS: 21:13						
MR: 17:06 MR: 18:18 MR: 19:26 MR: 20:29 MR: 21:22 MR: 22:08 MR: 22:46						
MS: 2:41 MS: 3:23 MS: 4:12 MS: 5:08 MS: 6:11 MS: 7:19 MS: 8:28						
		JSO:10:48		FM: 7:33		
26	27	28	29	30		
SR: 5:57 SR: 5:57 SR: 5:58 SR: 5:58 SR: 5:59						
SS: 21:13 SS: 21:13 SS: 21:13 SS: 21:13 SS: 21:13						
MR: 23:20 MR: 23:49 MR: None MR: 0:17 MR: 0:44						
MS: 9:35 MS: 10:41 MS: 11:44 MS: 12:45 MS: 13:45						
				LQ: 15:33		

Planet View Info Report for 6/ 1/1994 to 6/30/1994

Mercury						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	7:26	22:53	6h14m24s	24°59'42"	23°01'40"	0.333 0.79263
6/ 8/1994	7:23	22:33	6h32m58s	23°29'33"	20°33'49"	0.197 0.67814
6/15/1994	7:06	21:57	6h35m22s	21°37'13"	14°36'51"	0.083 0.59620
6/22/1994	6:33	21:09	6h23m39s	19°53'04"	6°14'04"	0.014 0.55771
6/29/1994	5:53	20:21	6h06m49s	18°50'08"	7°06'02"	0.020 0.57240

Venus						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	8:11	23:36	6h57m37s	24°35'17"	32°50'12"	0.822 1.31487
6/ 8/1994	8:25	23:39	7h33m46s	23°37'58"	34°26'32"	0.801 1.27029
6/15/1994	8:40	23:39	8h09m01s	22°09'01"	36°00'12"	0.779 1.22368
6/22/1994	8:55	23:37	8h43m08s	20°11'30"	37°30'40"	0.756 1.17521
6/29/1994	9:11	23:31	9h15m58s	17°49'06"	38°57'06"	0.732 1.12513

Jupiter						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	17:51	4:28	14h16m52s	-12°18'06"	145°45'55"	0.997 4.55452
6/ 8/1994	17:21	3:59	14h14m42s	-12°08'40"	138°30'56"	0.996 4.61948
6/15/1994	16:51	3:30	14h13m02s	-12°01'53"	131°24'17"	0.995 4.69488
6/22/1994	16:22	3:02	14h11m54s	-11°57'57"	124°26'41"	0.994 4.77922
6/29/1994	15:54	2:34	14h11m20s	-11°56'57"	117°38'10"	0.993 4.87103

Saturn						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	2:18	13:19	22h55m10s	-8°42'44"	88°33'54"	0.997 9.74445
6/ 8/1994	1:51	12:52	22h56m00s	-8°39'26"	95°03'26"	0.997 9.62791
6/15/1994	1:24	12:25	22h56m31s	-8°37'59"	101°37'04"	0.997 9.51253
6/22/1994	0:57	11:58	22h56m45s	-8°38'23"	108°14'48"	0.998 9.39993
6/29/1994	0:30	11:30	22h56m41s	-8°40'37"	114°56'56"	0.998 9.29158

Uranus						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	0:07	9:25	19h52m15s	-21°27'27"	134°19'47"	1.000 18.93678
6/ 8/1994	23:35	8:56	19h51m28s	-21°29'40"	141°12'57"	1.000 18.85836
6/15/1994	22:07	8:28	19h50m35s	-21°32'10"	148°07'10"	1.000 18.79112
6/22/1994	22:38	7:59	19h49m36s	-21°34'54"	155°02'05"	1.000 18.73610
6/29/1994	22:10	7:30	19h48m31s	-21°37'48"	161°57'40"	1.000 18.69406

Neptune						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
6/ 1/1994	23:47	9:14	19h38m55s	-20°51'42"	137°16'48"	1.000 29.42490
6/ 8/1994	23:19	8:46	19h38m21s	-20°53'01"	144°07'04"	1.000 29.34931
6/15/1994	22:51	8:18	19h37m43s	-20°54'30"	150°57'41"	1.000 29.28532
6/22/1994	22:23	7:49	19h37m01s	-20°56'08"	157°48'21"	1.000 29.23387
6/29/1994	21:55	7:21	19h36m16s	-20°57'53"	164°39'10"	1.000 29.19559

Planet Apsides Report for 1994

Mercury			
6/19/1994	Aphelion	Distance from Sun:	0.47 AU

Planet Conjunction/Opposition Report for 6/ 1/1994 to 6/30/1994

Mercury			
Date	Hour	Event	
6/25/1994	6	Inferior Conjunction	

Moon Apsides Report for 6/ 1/1994 to 6/30/1994

Date	Hour	Apsis	Distance (km)	Diameter
6/ 5/1994	8	Apogee	405702	0.4909"
6/21/1994	3	Perigee	362953	0.5487"

Meteor Showers Report for 6/ 1/1994 to 6/30/1994

Date	Meteor Shower	ZHR	RA	DEC	Illum.	Frac.	Longitude
6/ 9/1994	Ophiuchids	5	17h56m	-23°	0.00		79°
6/19/1994	Ophiuchids	5	17h20m	-20°	0.82		89°

Twilight Report for 6/ 1/1994 to 6/30/1994

Date		Sun	Astronomical	Nautical	Civil
		Rise Set	Begin End	Begin End	Begin End
6/ 1/1994		5:58 21:02	3:45 23:16	4:36 22:24	5:19 21:41
6/ 8/1994		5:56 21:07	3:39 23:24	4:32 22:31	5:16 21:47
6/15/1994		5:55 21:11	3:36 23:30	4:30 22:35	5:15 21:51
6/22/1994		5:56 21:13	3:36 23:32	4:31 22:38	5:16 21:53
6/29/1994		5:58 21:13	3:40 23:32	4:34 22:37	5:18 21:53



MEETING MINUTES - May 26th, 1994

The meeting was called to order at 5:10pm by President Greg Burnett. There were 30 club members and visitors in attendance.

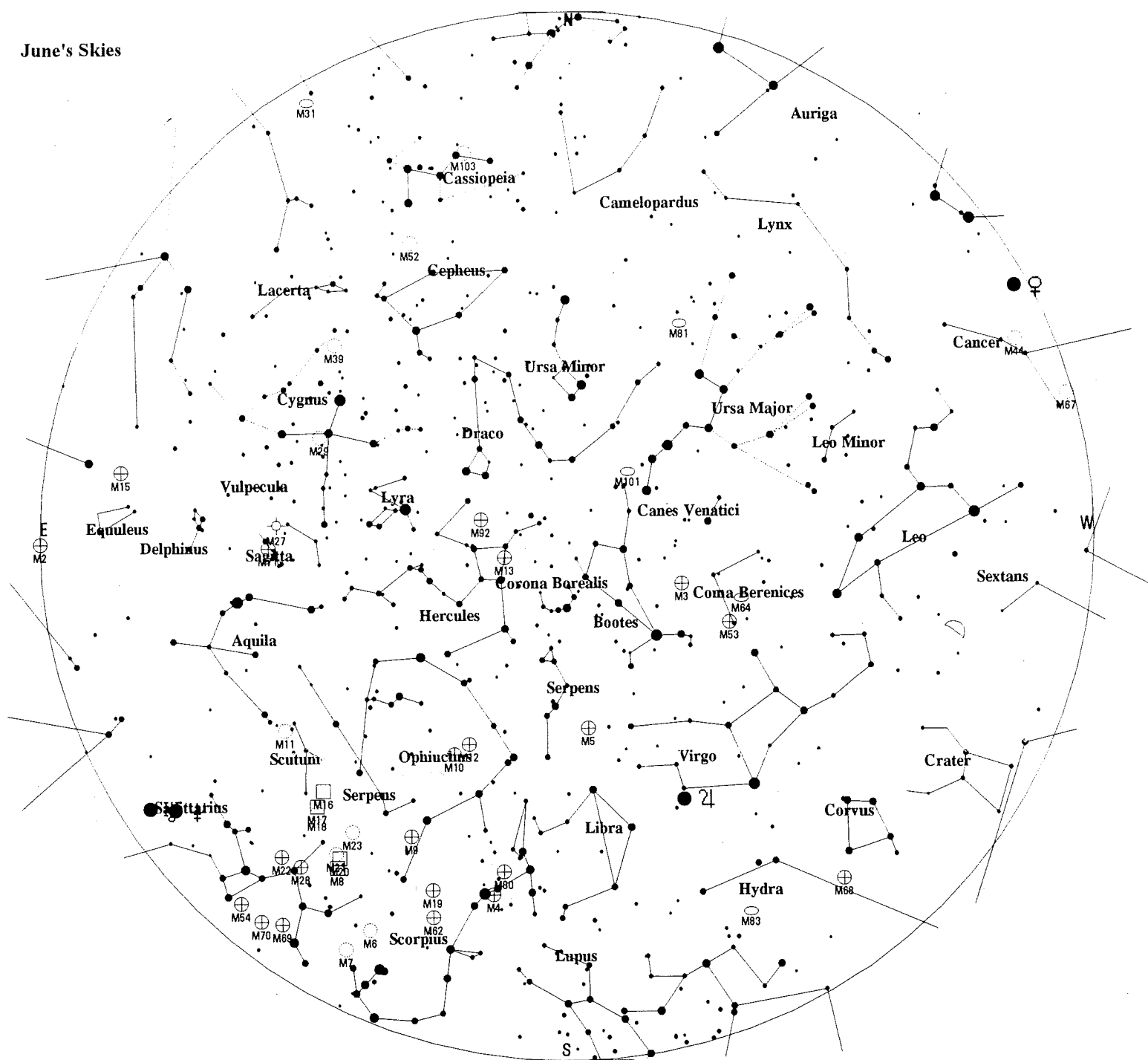
President's Report: Greg Burnett announced that sales of eclipse viewers were quite successful and that the club could earn up to \$400. The situation about the gates being locked at the Island Lake observing site was explained.

Treasurer's Report: Al Czajkowski stated the club's financial standing and announced that anyone who has not yet paid their membership dues should contact him as soon as possible.

Upcoming Events: June 11th is the Summer Solstice Party at Doug Bock's. 2pm till dawn. Cookout at 4:30pm, bring your own food and Doug will provide the grills. August 4 - 7th is the annual S.M.U.R.F.S. event.

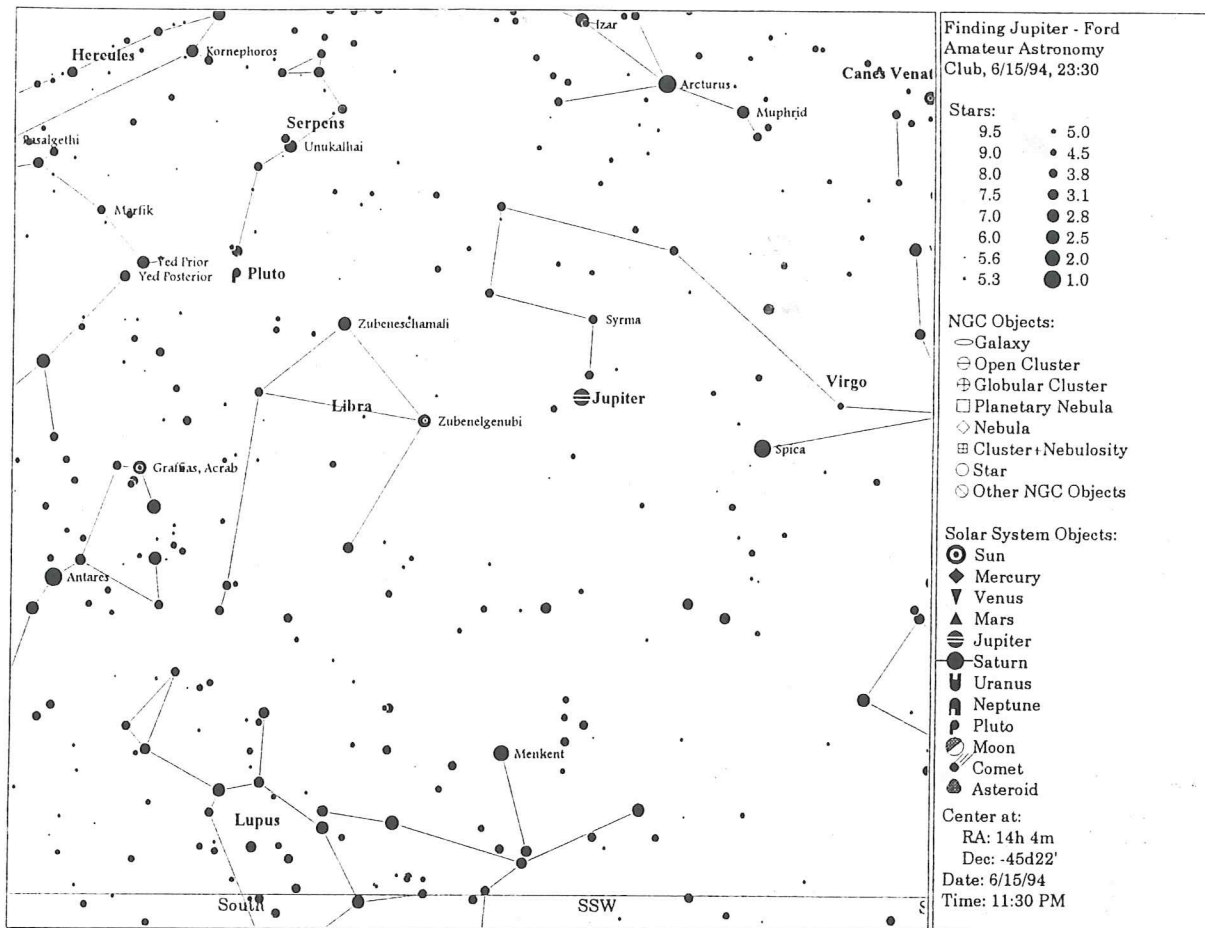
Misc: Chuck Boren passed around information about the supermassive blackhole in M87 and about the ring structure in SN1987A. John St. Peter passed around satellite images of the Moon's shadow during the eclipse. Patti Smith made a flip book of the eclipse using photos from Brian's telescope. Ada Kindt had labeled envelopes for anyone to place eclipse photos in for inclusion in the club scrapbook.

Main Presentations: The club viewed a video of the eclipse expeditions to the centerline in Ohio, Regent Court, and St. Valentine school. If anyone would like a copy of the video contact Chuck Boren, 24-83446 or PROFS=CBOREN. Next a slide show of various members photos was presented. Barry Craig of the D.A.S. showed a video of their club's eclipse observations from Southfield.



STARS	SOLAR SYSTEM		NOTES
<ul style="list-style-type: none"> • <1 • 1.5 • 2 • 2.5 • 3 	<ul style="list-style-type: none"> ☿ Mercury ♀ Venus ♂ Mars ♃ Jupiter ♄ Saturn ♅ Uranus ♆ Neptune ♇ Pluto ☄ Comet 	<ul style="list-style-type: none"> ○ Galaxy ⊕ Globular Cluster ○ Open Cluster ⊙ Planetary Nebula □ Diffuse Nebula ○ Other Object 	
<p>Local Time: 23:30:00 15-Jun-1994 UTC: 03:29:59 16-Jun-1994 Sidereal Time: 15:33:34</p> <p>Location: 42° 22' 0" N 83° 17' 0" W Centre Az: 180.0° Alt: 90.0° Field: 180.0° Julian Day: 2449519.6458</p>			

Finding Jupiter



Ford Amateur Astronomy Club
Star Stuff Newsletter
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