

STAR STUFF

The Ford Amateur Astronomy Club Newsletter



Volume 3 Number 7

July 1994

Great Balls of Fire!

COMPUTING "DOBSONIAN" COORDINATES

by Greg Burnett

The usual object coordinates, right ascension (RA) and declination (dec), are not very useful for most Dobsonian owners. There are formulas[1] for converting these coordinates to altitude and azimuth, and the math can be programmed into a calculator for use at the telescope. The following is an example of such a calculation:

"What are the altitude and azimuth of Jupiter at 10:00pm EDT on July 1?"

First, determine the RA and dec for Jupiter at that time. Sky&Telescope magazine lists it as RA 14^h12^m , dec $-11^\circ59'$.

Next, you must determine the local sidereal time at your location (longitude) at that time. Sidereal time is the same as local mean solar time at the autumnal equinox, and runs about 4 minutes fast each day until it has advanced a whole day after a year has elapsed. On July 1, 282 days have elapsed since the autumnal equinox, so

$$282 \div 365 \times 24 = 18^h33^m$$

is the amount that sidereal time is fast on July 1. At our longitude of $83\frac{1}{2}^\circ$ west, local mean time is 32 minutes behind wall clock time (mean solar time at $75\frac{1}{2}^\circ$ west, the standard longitude for our time zone), so at 10pm EDT (subtract another hour because of daylight savings), local mean time is 20:28. So

$$20:28 + 18^h33^m = 15^h01^m \text{ local sidereal time.}$$

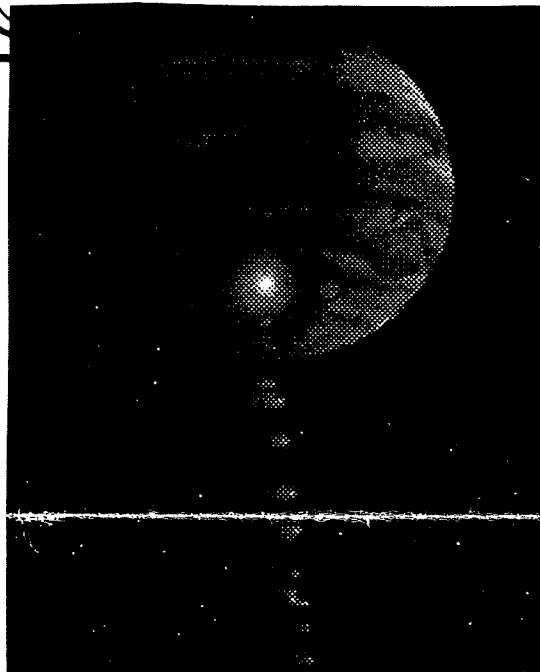
The "hour angle" of the object is the difference between its RA and the RA of the local meridian (which is just the local sidereal time), positive to the west, negative to the east, and converted to degrees:

$$15^h01^m - 14^h12^m = 49^m \Rightarrow 12\frac{1}{2}15'$$

(Already we start to see where it is, about a little west of the meridian, having culminated just less than an hour ago.)

The altitude is computed by

$$\sin h = \sin \delta \sin \phi + \cos \delta \cos \phi \cos H$$



where h = altitude

δ = declination ($-12\frac{1}{2}^\circ$)

ϕ = latitude ($42\frac{1}{2}^\circ$)

H = hour angle ($12.25\frac{1}{2}^\circ$)

$$\sin h = \sin(-12\frac{1}{2})\sin(42\frac{1}{2}) + \cos(-12\frac{1}{2})\cos(42\frac{1}{2})\cos(12.25\frac{1}{2})$$

$$= 0.571234...$$

$$h = 34.8\frac{1}{2}$$

Now, altitude is always between 0 and 90 degrees, so there is no trigonometric ambiguity; azimuth, on the other hand, may be anywhere from 0 to 360 degrees, so the following two equations are required to identify the quadrant and specify the azimuth angle uniquely:

$$\sin Az = \cos \delta \sin(\alpha - \theta) / \sin z$$

$$\cos Az = (\sin \delta - \cos z \sin \phi) / \sin z \cos \phi$$

where Az = azimuth

δ = declination ($-12\frac{1}{2}^\circ$)

$\alpha - \theta$ = opposite of hour angle ($-12.25\frac{1}{2}^\circ$)

z = zenith angle ($90 - 34.8 = 55.2\frac{1}{2}^\circ$)

ϕ = latitude ($42\frac{1}{2}^\circ$)

So,

$$\sin Az = \cos(-12\frac{1}{2})\sin(-12.25\frac{1}{2}) / \sin(55.2\frac{1}{2}) \\ = -0.2527...$$

$$\cos Az = (\sin(-12\frac{1}{2}) - \cos(55.2\frac{1}{2})\sin(42\frac{1}{2})) / \sin(55.2\frac{1}{2})\cos(42\frac{1}{2}) \\ = -0.9665...$$

Therefore, since the sine and cosine are both negative, the azimuth angle must lie in the quadrant 180-270 degrees (which is exactly what we would expect based on our earlier observation of the approximate position), and the unique solution is

$$Az = 195\frac{1}{2}$$

Now, this result presents something of a puzzlement. I checked the computation using another set of formulas and got the same answer, but it's not clear how an object that is only 12 degrees west of the meridian can have an azimuth of 195 degrees. If you can spot an error here, please let me know.

References:

1. Sidgwick, J.B., Amateur Astronomer's Handbook, 4th edition, Enslow, 1980.

Note: On p.500 of Sidgwick, the formula for $\sin h$ used above is printed incorrectly.



PRESIDENT'S CORNER

Well, I'm off to the dark skies of New Mexico for a couple of weeks. I should return in time for the July meeting, and I hope to have some photos, astro and otherwise, to share with you then. Of course, if I stumble across a decent job while I'm there, you may just get a postcard! Meanwhile, the club will be running under the able leadership of V.P. Brian Gossiaux; Al Czajkowski will be getting the mail; and John St.Peter will be updating the observing hotline, possibly the most critical function of all (he gets to make the call on the weather for the next couple of weekends!). Thanks to those folks for handlin' things.

Hope to see you soon!

Greg Burnett



FROM THE EDITOR'S DESK

I find it necessary to thank all those who have contributed articles and material to the Star Stuff newsletter over the past months. Due to the overwhelming amount of information, not all submissions were printed on a timely basis. These 'a little' late articles are found in this issue and the editor asks for the understanding of those who took the time to write them. Thanks! ALL material is appreciated!

I would also like to thank all the members of the FAAC for the award presented to me at last month's meeting. For those who were not in attendance, I was given an award of recognition for "The Best Newsletter Editor in the Known Universe". Thank you folks. I will try to maintain the high quality of our newsletter!

STAR STUFF

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1994 CLUB OFFICERS

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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

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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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THE SOLSTICE COMETH

The Sun reaches its June solstice at 14:48 Universal Time -- 10:48 a.m. Eastern time -- on the 21st. That marks our star's greatest northern declination in the sky and the unofficial beginning of summer.

HUBBLE'S DISKS

Astronomers Robert O'Dell and Zheng Wen announced this past week that the Hubble Space Telescope has uncovered the strongest evidence yet that the process by which planets are thought to form occurs often throughout the galaxy. The researchers used HST to make detailed images of 110 stars in the Orion Nebula, 1,500 light-years from Earth, and found disks of matter circling 56 of them. Such disks have been seen from time to time before, but this new result demonstrates that they are in fact quite common. Theory suggests that when a star forms from a cloud of dust and gas, it may also be accompanied by a massive disk, from which planets and smaller bodies later condense.

NEW COMET S-L9 TIMETABLE

Thanks to improved positional data, dynamicists Paul W. Chodas and Donald K. Yeomans have issued an updated timetable for July's collision of Periodic Comet Shoemaker-Levy 9 with Jupiter. It shows that most fragments should still strike the planet near the times given on page 34 of July's Sky & Telescope; however, the revised prediction is now 2 hours earlier for fragment F and nearly 3 hours later for U.

CANADIAN METEORITE

The tranquil farming village of St. Robert, about 60 miles northeast of Montreal, was disturbed mightily at 8 p.m. on June 14th, when a large bolide exploded overhead. A brilliant streak of light and thunderous boom were witnessed over a huge area. One resident heard a whistling sound, then went outside to find a grapefruit-sized meteorite in a hole about 1.5 feet deep. Some reports indicate that the meteor may have created a strewnfield, an elliptical area over which many other meteoritic fragments fell. But only the one has been found thus far.

JAMES POLLACK DIES

Planetary scientists around the world are mourning the death on June 13th of James Pollack, a NASA researcher highly regarded as one of the world's top experts on planetary atmospheres. His contributions to the study of atmospheric greenhouses on Venus, Mars, and Earth led him and others to propose the "nuclear winter" theory in 1983. Pollack died of cancer at age 55.

NO CLEMENTINE 2

According to the weekly trade journal SPACE NEWS, the Ballistic Missile Defense Organization, often nicknamed Star Wars, has decided *not* to launch a follow-on to the Clementine 1 spacecraft. Clementine officials are now looking to other government agencies for support, in the hope of sending a second low-cost explorer into interplanetary space.

From Doug's Declination

Observing log from the Northern Cross Observatory
July 1, 1994

Hello fellow observers. The last couple of months have had a many clear night, of which several were used for observing.

The summer solstice star party was partly clear to mostly cloudy, but it was clear during the day and we had about 20 to 25 people there for the festivities at the Northern Cross Observatory. We had a cookout at about 4:30 and did quite a bit of solar observing. There were a few sunspots to look at. Mike Odowd had a hydrogen alpha filter which gave spectacular views of prominences on the solar limb. Later on in the evening I opened the observatory up and Roger Tanner put his CCD on his 17 inch. He took images of M51 and showed them to the crowd. Many people observed Jupiter before the clouds rolled in. Roger then put a slide show together of the Texas Star Party. This included several slides of very unusual telescopes that were there. The skies clouded up and everyone put there equipment away. Just in time I might add, since it started raining as people left.

The next star party I have scheduled is September 3rd. This will be the Autumnal Equinox star party. This is the same format as the Summer Solstice Star Party. We get started at about 2:00 pm for outdoor activities, a cookout at 4:30, and observing until dawn. I hope to see you there.

In the mean time Roger and I are working on the controller for the 12 inch again. It has become pretty flaky, so we are looking at other alternatives for powering the scope. We may end up getting an LX-200 instrumentation set for the scope if we can fit the motors to the existing drive and Meade is willing to sell it to us. In either case this will be happening for the next month, before Roger leaves us for Arizona.

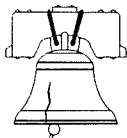
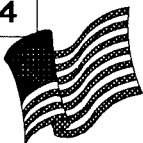

I would like to take this opportunity to thank Roger Tanner for all the work and effort he has put into the observatory over the last 10 years. He has brought a great deal of expertise and enthusiasm to the project since we started it in 1984. I will truly miss his enthusiasm and friendship that I have come to know over the years. The trips up north to dark skies. The first shuttle launch in 1981. The solar eclipse of 1984. The trip to Kitt Peak in 1986 for Comet Halley. The many observing sessions at my house. All the prototypes he built. (ha ha). He is an excellent example of what amateur astronomy is all about. When you needed help with something he always pitched in. He brings the essence of amateur astronomy to everyone he meets. The thrill of discovery. Whether it be Telescope building, astro-photography, CCD imaging, companionship, or just the love of the wonders of the universe. I feel honored and privileged to have been his observing companion over the last decade. I doubt I will meet anyone like you again. Good luck Roger in all your future endeavors.

Until next time, hope you have clear weather.



July 1994



SUN	MON	TUE	WED	THUR	FRI	SAT
					1	2
3 Moon at apogee	4 	5 Mars 0.3° N. of Moon Earth at aphelion	6	7 Mercury 1.3° S. of Moon	8 NEW MOON	9
10 Venus 1.1° N. of Regulus	11	12 Venus 7° N. of Regulus	13	14 Neptune at opposition	15 FIRST QUARTER MOON	16 
17 Uranus at opposition Mercury at greatest western elongation (21°)	18 Moon at perigee	19 Summer Solstice, 10:48am	20	21 BUT IN JUNE NOT JULY	22 FULL MOON	23
24	25	26 Saturn 7° S. of Moon	27 Delta Aquarid meteors	28 The Ford Amateur Astronomy Club meeting. Delta Aquarid meteors	29 Delta Aquarid meteors	30 LAST QUARTER MOON Moon at apogee
31						

NEXT MONTH

The Ford Amateur Astronomy Club general meeting is August 25th!

MEETING ANNOUNCEMENT -- July 28, 1994

The Ford Amateur Astronomy Club holds regular general meetings on the fourth Thursday of each month. Our next meeting will be Thursday, July 28th, at 5:00 p.m.

The program for the meeting will be a presentation by Greg Burnett on Time: What is it, how's it measured, and it's relation to astronomy. Topics will include explanations of sidereal time and sundials. (Hope he's on time! Hope he doesn't take too much time! Hope you've got time to come!)

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 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 out 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 meandering, 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 southward 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 site 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 Solar 'Transit' of May 1994 by John Paul St. Peter

Transit? It was an eclipse! You may say so, but are you sure? This is a brief story about the exchanges that took place between myself and Greg Burnett prior to the event. What makes it interesting is that in the act of nitpicking at a definition, we ended up learning a fascinating fact about the Solar System.

It started out at Island Lake several weeks before the event. Greg mentioned that since the Moon will not cover the Sun maybe the event could also be called a Transit, just as when Mercury or Venus cross the solar disk, but with a much larger transiting body. I reluctantly agreed. It made sense but never hearing it used in this form I thought I would take up the challenge and refute it. The first step was looking up as many references to Annular Eclipses as I could. The word 'transit' was never found. But absence of evidence is not evidence of absence, so that wouldn't work. I fell back on a definition of Transit in Muirden's Handbook.

Transit. There are three meanings of the word. A star or planet transits when it crosses the meridian; a detail on a planets disk transits when it is carried across the planet's meridian by its rotation; and a satellite (or its shadow) transits when it crosses in front of its PRIMARY'S disk.

The third meaning is what I needed. It covered Mercury and Venus over the Sun and the Galilean satellites and their shadows over Jupiter. The key word, and the caps are mine, is Primary. The Moon's primary is the Earth, not the Sun. I thought I had it made. But Greg retorted, "What about asteroids?" If an asteroid passed in front of Jupiter as viewed from the Earth that would be just like an inner planet transiting the Sun, a very small body in front of a large one. And Jupiter is surely not the asteroid's primary. He had me. But these being e-mail exchanges it gave me time to return his serve and I elected to go with a lob. Never happened! Never heard of it! And then invoked wobulations and windage.

I stuck my neck out but got lucky. The answer was to be found in the book Asteroids, edited by Gehrels. The first basic fact is that for an asteroid to stay in a stable orbit it must keep as far away from Jupiter as possible. We already know what Jupiter does to Comets. The minimum distance is about one A.U. The second fact is that Jupiter impresses its own orbit's ellipticity and orientation on the asteroid belt but not its inclination. The last fact is that nearly all asteroids orbit in resonance with Jupiter's orbit; 3:2, 4:3, 5:4, and many others. What happens is that because of the orbital resonances the asteroids always pass Jupiter at nearly the same place in their respective orbits and at these areas the inclinations of the asteroid's orbits are at their maximum limits. The reason for the inclinations requires a mathamagician so I'll skip that, but it has the effect of causing the asteroids to maintain their absolute maximum distance from Jupiter and as viewed from Earth they pass well above or below the planet. Thus stable orbits and no transits. Neither of us knew that about asteroidal orbits.

In the end I decided to call a cease fire. After all, the event actually was a Transit. If you viewed it from the Sun! What do you think?

Radio Telescope Open House
by Steve Nagi
32-29825;
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Fax: 33-79572

Recently I contacted U of M regarding an open house they have for their radio telescope (I think it is right off of N. Territorial Rd, you can see it from the road). They are having one this year on the 3rd Sunday of September from 2:00-4:30. Their number is 426-8441. If I can I plan on attending that.

Observing by Roger Tanner

The Lowbrows had a public open house at the Leslie Science Center in NE Ann Arbor Saturday. We only had a few public show up but, the observing was excellent for a few hours after sunset. We were looking at the moon and Jupiter and the seeing was excellent. Things had a slow frequency swim but the small details were sharp. Later the seeing deteriorated. Looking in a friends 5" f15 refractor I could swear I could see Jupiter's moons as discs. We could clearly see Io move over the planet when it was near the limb. We lost it near the middle 80% but found the shadow when it appeared on the edge. We recovered Io on the opposite limb while it was still was on the planet!. We were on a grassy field with lots of vegetation around, which probably helped the seeing as the grass doesn't heat up during the day. The details on the moon were also excellent and I was bummed that I didn't bring higher power eyepieces for my 6" f5 Newton.

Texas Star Party by R. Tanner

The Texas Star Party was held from Sunday May 8 through Saturday the 14th. I left for the party a few days early to get a good spot on the upper field and to snag some electrical power from a RV spot. This year the rules were all tents and trailers are to be set up in a 14 foot wide strip are at the edge of the field, leaving the rest of the field for scopes. Also people with computers are not to be connected to the general field power which is intended for low power telescopes. I also wanted to be on the upper observing field as the dust is the least bothersome there and the horizons are the best. I figured that getting there the day before the party was to start would do the trick. The telescope, CCD camera and two computers take about 500 watts so I am concerned about my electrical supply. I caravanned down with Brian Close and a friend of his from Chicago. We arrived on Saturday afternoon as planned only to find that most of the spots at the edge of the upper field near the RV's were already occupied. I managed to catch a spot someone had just vacated to move to another spot on the field. I ended up next to Tom Clark's 36" f5 DOB. This sounds nice, (the views are spectacular), but the scope and the 12 foot step ladder it needs takes up a lot of room. I had to move my scope over to clear his 40 foot turning circle. Unfortunately, I didn't have much time to look through other scopes as I have become a CCD Junkie.

The first few days at the party we had clouds for a good part of the night but toward the end of the party each night was mostly clear. The skies were darker than at the TSP last year but not as dark as I remember them before Pinatubo. The CCD camera was working very well and I succeeded in getting several images of Shoemaker Levy 9. The night before the eclipse was one of the first good clear nights so the group elected to stay up and observe and drive to Carlsbad Caverns in the morning. We planned to watch the eclipse and then take the cavern tour. Well, when we got to Carlsbad it was cloudy and we drove like mad in the direction it was reported to be clear but didn't make it. So we watched the clouds get dark and then took the tour. Most of the group had seen the 84 annular in Georgia and were not too depressed. The one person in the group who had not seen any eclipses threatened to not allow any one on any subsequent eclipse tour with him, double for anyone who had also been clouded out in Hawaii in 91. The cavern tour was great and is a experience not to be missed if you are in the area. One of the biggest rooms underground has the area of 16 football fields and it takes about 2 hours to walk through it. It was a 3.5 hour drive from the ranch. Several of the people went on the Mac Donald tour which was a special version for the star party members. Mac Donald Observatory can be seen from the top of the hill behind the main observing field. One of the interesting sights is to get a picture of the mirror for the 84" which has five bullet chips in it! Evidently one day a observatory employee went mad and went around to kill some one with a 45 caliber gun and when he couldn't find the person, he shot the main mirror. They tested the mirror (which is fused silica) and it's figure is fine, and they just painted the bullet pits black.

The images of Shoemaker Levy 9 sparked the interest of several of the star party members who had taken up the challenge of trying to see a 18th magnitude comet. Several people came by to see exactly where the comet was and to check their hand drawn maps of the area to see if they had glimpsed the brightest part of the comet. This was a difficult task as the brightest component was reported to be 18.5 magnitude. Eagle eyed Stephen J. Omara stopped by and was looking for it with Tom Clark's 36" and thought he glimpsed one of the components, but wasn't sure. The camera was giving excellent results compared to the SBIG ST-4 which, in its defense, was not designed for imaging. I found that I needed to take flat fields which are difficult if not impossible to do with the ST-4. The flat fields correct for the vignetting in the scope and the spots from dust inside the camera. The flat fields are simply a short exposure image of the blue sky after the sun has set. This caused me to miss a good talk on the comet one evening. The life of a CCD Junkie is not easy, but somebody has to do it.

One of the first images I got was a image of M51 with the supernova. Later I happened to bump into Jerry Armstrong and Tim Puckett, two of the amateurs to discover it. Jerry recounted how he was processing an image taken with a SBIG ST-6 and a 16" f6 scope and noticed a new star near the nucleus of the main galaxy. I am amazed that any one knows the star patterns well enough to realize there is an extra star.

Speaking of talks there were several good talks on the new projects happening at the Mac Donald Observatory. They are building a 13 Meter (11 meter usable) infrared telescope with a budget of only about 20 million (compared to about 80 million for the Keck). To do this they had to make several compromises, one is to make the scope with a spherical segmented primary, so all of the segments are identical. Another is to make the alt-az mount fixed at an altitude of 40 degrees. By scanning the receivers on a boom like they do at Aricebo, they can see a ring of the sky about 20 degrees wide. With the earth rotation they can survey about 40% of the sky with which they can do significant research. The project is funded and they are expecting first light in 2 years. The design appears to be a combination of several ideas from radio astronomy and optical telescopes. It has actively controlled mirror collimation like the Keck. There is a tower adjacent to the dome with the laser source for null testing the collimation of the scope.

I found a several interesting scopes at the star party, John Gregory's 8 " Gregory-Maksutov scope on a Springfield mount he designed and built himself. In a Springfield mount the observer looks down the polar axis and the eyepiece never moves no matter where the scope is pointed. The light path is pulled from the main scope by a diagonal in the tube and directed up to the eyepiece by another diagonal in the mount. He used 4" inside diameter Kaden bearings in each axis to give the mount high stiffness and light weight, (ask Tom Ryan what they are). The mount also had 11" research grade Beyers worms gears. The mount has a turret focusing mount with several eyepieces, most which John had made himself. By sliding the first diagonal mount out the back of the main scope, the same eyepiece would look through a 3" finder scope which protruded out the top of the main scope like a periscope. By moving another small knob under the scope, the internally lit Declination and RA circles could be viewed at the same eyepiece. All of the clutches and variable speed drive were controlled by small knobs on the bottom of the central optics box. The mount had all of the mechanics enclosed to protect from the dust and dirt which is really important at the TSP.

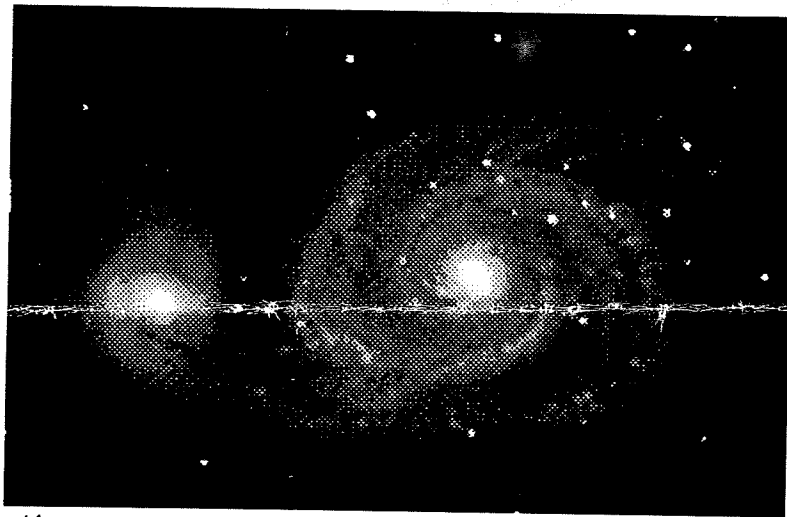
There was the typical array of large scopes, two 36", a 33" , four 25" scopes and several 20" dobs. One of the times I looked through Tom Clark's 36" the view of the Omega nebula was outstanding. He was using a UHC filter and a 20mm Nagler and the wispy stuff away from the main body of the omega was very detailed and extended out much farther than the omega itself. There were two unusual optical designs at the star party this year, a 10" tetra shiefspiegler, and 20" Mersenne with a Genesis refractor to do the final imaging. The shiefspiegler uses 4 tilted mirrors to give an unobstructed light path and refractor like images. The Mersenne uses a 20" parabolic primary like any Newtonian, but the secondary is a convex paraboloid which converts the light back into a parallel beam. A third flat mirror mounted in front of the main mirror directs the beam out the side pivot of the Dobsonian mount and a fourth flat mirror send the light back into a 5" refractor which forms the image. The guy that built it made all of the optics except the refractor. He said the parabolic secondary took as much time as the rest of the mirrors put together. It took him about 2 hours to get it collimated. It seems like a lot of work to get a comfortable eyepiece position.

Brian Close and George Semple had made some of the LED collimators that were described in the last ATM magazine, and had them for sale at the star party. The neat thing about these collimators is that you can use them at night to collimate without using a flashlight to illuminate the Cheshire and dot on your mirror. Brian was also selling some Helical focusers made by a guy in Chicago. They had three tilted rollers which rolled on the eyepiece draw tube. Rotating the draw tube would move the eyepiece in and out at a reasonable rate. Brian was also selling an optics program written by Keith Serra of Science Lab Software. This is a Windows program intended to allow people to experiment with optics like in a science lab and see what happens. There are various types of light sources, lenses, observation planes, and, mirrors. The program is still in Beta testing and had a few rough edges, but was interesting to play with.

The swap meet was held Friday noon instead of Saturday morning and was well attended with many bargains available including some LED collimators. At the vendors booth a representative of Beyer was selling the last of Beyer's gears for half off prices, like 9" research grade gear and worm sets for \$300. He also had 11.5" sets (with 3 arc sec of periodic error) for \$900. All of the 9" gears were gone when I got there and am still kicking myself about it. The door prizes were great and ended in a 4" Schmidt Cassegrain being given away as the grand prize. They spread the prize distribution out over two days so it wouldn't delay people getting out to observe the last night.



NGC 4565



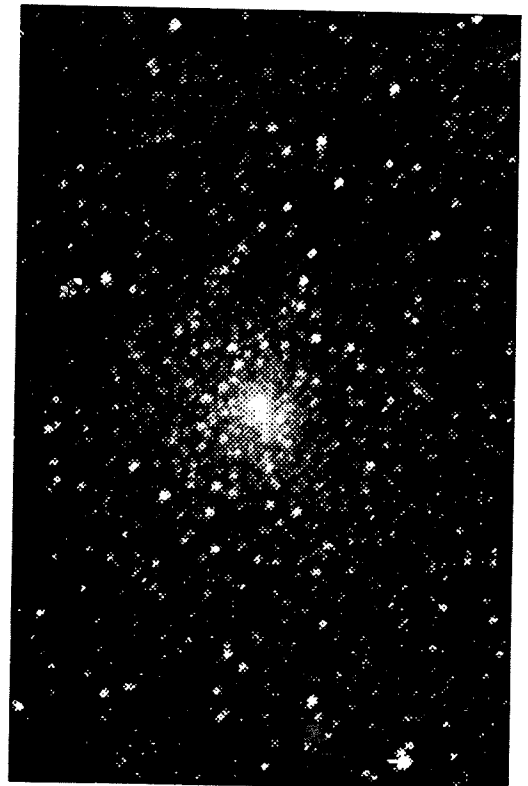
M51



M27



M16



M28

ASTRONOMY WORKSHOP

by Greg Burnett



PROFS=GBURNETT

InterNet

USFMC6SH@IBMAIL.COM

Question and answer submissions were pretty thin this month; keep those cards and letters comin'! 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!

Q21. What are "deep-sky" objects.

There is not a strict technical definition of "deep sky" but it is generally considered to include all the stuff outside the solar system: galaxies, nebulae, star clusters, etc. The term connotes a segment of amateur astronomy that implies the need for larger apertures to view faint objects at great distances. -G.B.

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

Normally, the date changes in two places on the Earth: as you cross the midnight line, and as you cross the International Date Line (It does NOT change when you cross the Prime Meridian in Greenwich, England). You can think of each new day being "generated" at the date line and spreading westward over the globe as time progresses. The leading edge is the midnight line. If you step forward (westward) across it you are moving into the tail end of the previous day. If you step backward (eastward) across it, you move into the a.m. of the new day, just as you do if you stand still and let it move under you as it progresses westward.

From this analysis we can see that it will be the same date everywhere on Earth only when the moving midnight line and the stationary date line correspond. Then when you step across the midnight line, you would also be stepping across the date line, and the effects would cancel. This would work, except that the International Date Line is defined in the middle of the +12/-12 time zone, so as you cross it, the time does not change! The midnight line always falls on the border between time zones, so it never exactly corresponds with the date line. So, the answer is "no" it is never the same date everywhere on the Earth; it is always two different days at different places within the +12/-12 time zone. -G.B.

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?

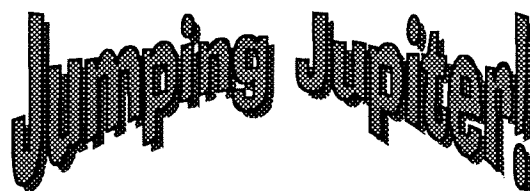
You've built a variant of the Herschelian reflector, named for William Herschel who used such telescopes to make many important

discoveries. Herschel's telescopes, however, had no diagonal mirror, and some were also used without eyepieces! The mirrors (made of metal) were configured to bring the image to focus at the front edge of the main tube, where the observer was positioned. The observer looked straight back down the main tube, receiving an unobstructed view reflected from the mirror. -G.B.

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?

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NOTES AND INFORMATION REGARDING THE GREAT JUPITER COMET CRASH

Predicted Impact Times for Fragments of Shoemaker-Levy 9
-submitted by Chuck Boren

P.W. Chodas and D.K. Yeomans / JPL
Predictions as of 1994 June 25

Fragment	Impact Time (EDT)	Best Locations for Viewing Jupiter at Impact Time
A	July 16 3:30 p.m.	Africa (except W. Africa), Middle East, Eastern Europe
B	10:34 p.m.	Eastern N. America, Mexico, Western S. America
C	July 17 2:49 a.m.	New Zealand, Hawaii
D	7:13 a.m.	Australia, New Zealand, Japan
E	11:10 a.m.	India, Southern China, S.E. Asia, Western Australia
F	8:12 p.m.	S. America
G	July 18 3:30 a.m.	New Zealand, Hawaii
H	3:26 p.m.	Africa (except W. Africa), Middle East, Eastern Europe
K	July 19 6:21 a.m.	Australia, New Zealand
L	6:18 p.m.	Brazil, W. Africa, Spain
N	July 20 6:08 a.m.	Australia, New Zealand
P2	10:52 a.m.	India, Southern China, S.E. Asia, Western Australia
Q1	4:04 p.m.	Africa (except W. Africa), Middle East, Eastern Europe
Q2	3:37 p.m.	Hawaii, West coast N. America
R	July 21 1:31 a.m.	
S	11:18 a.m.	India, Southern China, S.E. Asia, Western Australia
T	2:01 p.m.	Africa (except W. Africa), Middle East, Eastern Europe
U	5:52 p.m.	Brazil, W. Africa, Spain
V	11:44 p.m.	Western U.S., Mexico
W	July 22 4:12 a.m.	New Zealand, Hawaii, Eastern Australia

Note: These predictions are accurate to plus or minus half an hour.

Galileo Set to Observe Comet Shoemaker/Levy Impacts

-submitted by Chuck Boren

Organization: Jet Propulsion Laboratory

June 3, 1994

Galileo set to observe 16 of 21 'pearls' in Shoemaker-Levy-9 string
JPL's Galileo spacecraft is scheduled to observe 16 of the 21 possible impacts of the fragments of Comet Shoemaker-Levy-9 with Jupiter this July, according to project scientist Dr. Torrence Johnson.

Speaking at the 1994 spring meeting of the American Geophysical Union in Baltimore last month, Johnson described plans for the only observation platform actually able to photograph the impact sites. "Galileo's imaging system and its near-infrared mapping spectrometer will divide up most of the opportunities," Johnson said, "while the photopolarimeter observes several other events." Galileo's ultraviolet spectrometer, plasma-wave sensors and dust detector will also be involved in the effort, as will other distant spacecraft and many observers on Earth. Galileo's camera will be used in several different ways, including time-lapse sequences with and without color filters, slow scans and very long, sweeping scans with an open shutter.

"We're hoping that one or more of our observational schemes will succeed in recording observations of the impact events themselves with their immediate consequences, possibly including large hot fireballs produced by the explosion of comet fragments as they are stopped by Jupiter's atmosphere," Johnson said. "Theories of what happens in such large atmospheric impacts," he continued, "are important to an understanding of the evolution of the early Earth and other planets, as well as the later Cretaceous-Tertiary extinctions (of dinosaurs and many other species). We hope for the first time to provide actual observations that can test and improve these theories."

Galileo will be about 240 million kilometers (150 million miles) from Jupiter, at an angle from which part of the night side, including the comet impact site, is visible. All the fragments will impact on the far side of Jupiter relative to the Earth and sun.

The spacecraft will tape-record its images and other science data, Johnson said, and play them back slowly over the next several months. Playback of selected Shoemaker-Levy data from Galileo may continue until the end of January 1995, using a sample-and-select approach like that employed with the pictures of asteroids Gaspard and Ida.

Voyager/Ulysses&DSN Also Will Watch SL9

-submitted by Chuck Boren

Organization: Jet Propulsion Laboratory

June 3, 1994

Galileo won't be alone in keeping its eyes on Jupiter

Although the Galileo spacecraft will be in the best position to view Comet Shoemaker-Levy-9's impact with Jupiter from July 16-22, two other JPL-managed spacecraft will record various measurements from the event.

On its way out of the solar system, Voyager 2 will be heading south, about 6 billion kilometers (3.7 billion miles) from Jupiter, and will have the comet's impact sites in its line of sight. The spacecraft will

observe with its ultraviolet spectrometer and planetary radio astronomy instrument, and numerical data will be returned in real time.

The Ulysses spacecraft, on its way to explore the sun's polar regions, will be able to make measurements of radio and plasma waves from the comet's impact from its position at about 75 degrees south of the sun's equator and about 800 million kilometers (500 million miles) from Jupiter.

JPL's Deep Space Network facility at Goldstone, Calif. will perform radio astronomy on the synchrotron emission from Jupiter's radiation belt, looking for disturbances caused by Shoemaker-Levy dust.

Numerous Lab astronomers and scientists will also play a role in observing the phenomenon. Among them are Drs. Paul Chodas and Donald Yeomans of the Navigation Systems Section 314, who will lead efforts to track ephemeris data, noting the times and locations of the comet's impacts.

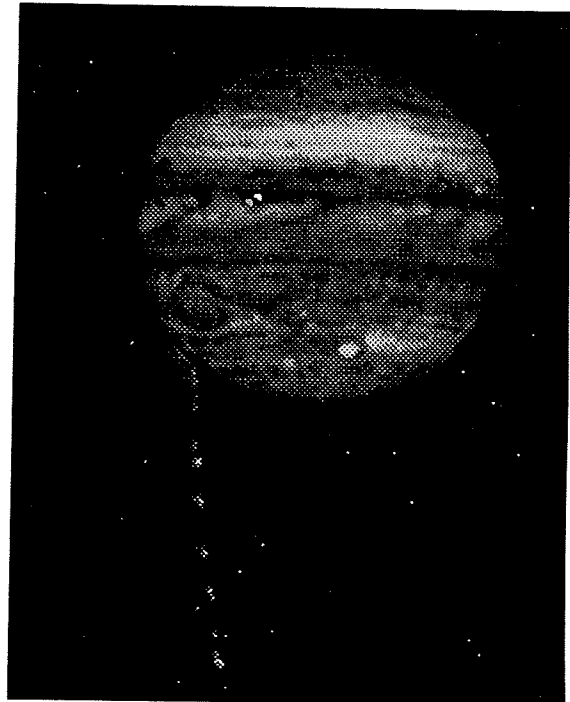
Also, Dr. Glenn Orton of the Earth and Planetary Atmospheres Research Element, Division 32, will chair both an atmospheric team for the International Jupiter Watch, a collaboration of Jupiter astronomers worldwide, and a science team at the Infrared Telescope Facility on Mauna Kea in Hawaii.

Hear the Impact

-submitted by Greg Burnett

For the HAMs and other folks of the RF persuasion, the July issue of QST has a short article entitled "Hear the Impact?" describing how to make radio observations of Jupiter during the impact of SL-9.
Page 62.

★



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		

July 1994						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
					SR: 6:00	SR: 6:00
					SS: 21:14	SS: 21:14
					MR: 1:12	MR: 1:40
					MS: 14:44	MS: 15:42
3	4	5	6	7	8	9
SR: 6:01	SR: 6:02	SR: 6:02	SR: 6:03	SR: 6:03	SR: 6:04	SR: 6:05
SS: 21:13	SS: 21:13	SS: 21:13	SS: 21:13	SS: 21:12	SS: 21:12	SS: 21:11
MR: 2:11	MR: 2:46	MR: 3:26	MR: 4:11	MR: 5:02	MR: 5:59	MR: 7:00
MS: 16:40	MS: 17:36	MS: 18:30	MS: 19:21	MS: 20:09	MS: 20:51	MS: 21:30
					NM: 17:38	
10	11	12	13	14	15	16
SR: 6:06	SR: 6:06	SR: 6:07	SR: 6:08	SR: 6:09	SR: 6:09	SR: 6:10
SS: 21:11	SS: 21:11	SS: 21:10	SS: 21:09	SS: 21:09	SS: 21:08	SS: 21:08
MR: 8:04	MR: 9:09	MR: 10:16	MR: 11:24	MR: 12:33	MR: 13:43	MR: 14:54
MS: 22:04	MS: 22:36	MS: 23:07	MS: 23:37	MS: None	MS: 0:09	MS: 0:43
					EQ: 21:12	
17	18	19	20	21	22	23
SR: 6:11	SR: 6:12	SR: 6:13	SR: 6:14	SR: 6:15	SR: 6:16	SR: 6:17
SS: 21:07	SS: 21:06	SS: 21:05	SS: 21:05	SS: 21:04	SS: 21:03	SS: 21:02
MR: 16:04	MR: 17:13	MR: 18:16	MR: 19:12	MR: 20:01	MR: 20:42	MR: 21:18
MS: 1:22	MS: 2:06	MS: 2:58	MS: 3:56	MS: 5:01	MS: 6:08	MS: 7:16
					FM: 16:16	
24	25	26	27	28	29	30
SR: 6:18	SR: 6:18	SR: 6:19	SR: 6:20	SR: 6:21	SR: 6:22	SR: 6:23
SS: 21:01	SS: 21:00	SS: 20:59	SS: 20:58	SS: 20:57	SS: 20:56	SS: 20:55
MR: 21:50	MR: 22:19	MR: 22:46	MR: 23:14	MR: 23:42	MR: None	MR: 0:12
MS: 8:23	MS: 9:28	MS: 10:31	MS: 11:32	MS: 12:32	MS: 13:31	MS: 14:29
					LQ: 8:42	
31						
SR: 6:24						
SS: 20:54						
MR: 0:45						
MS: 15:25						

Planet View Info Report for 7/ 1/1994 to 7/31/1994

Mercury						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	5:43	20:11	6h02m55s	18°43'42"	9°29'40"	0.036 0.58689
7/ 8/1994	5:10	19:42	5h57m46s	19°04'47"	16°42'52"	0.141 0.67146
7/15/1994	4:50	19:35	6h09m44s	20°16'21"	20°15'00"	0.301 0.80137
7/22/1994	4:47	19:46	6h39m57s	21°34'30"	19°45'13"	0.510 0.96295
7/29/1994	5:06	20:08	7h26m46s	21°58'47"	15°37'04"	0.745 1.13181

Venus						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	9:16	23:30	9h25m07s	17°04'24"	39°20'57"	0.725 1.11056
7/ 8/1994	9:31	23:22	9h56m20s	14°15'46"	40°41'05"	0.699 1.05871
7/15/1994	9:45	23:12	10h26m19s	11°11'22"	41°55'34"	0.672 1.00565
7/22/1994	9:59	23:01	10h55m09s	7°55'17"	43°03'17"	0.644 0.95156
7/29/1994	10:12	22:48	11h22m56s	4°31'24"	44°02'47"	0.615 0.89674

Mars						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	3:23	17:58	3h43m01s	19°16'16"	41°02'24"	0.942 2.03374
7/ 8/1994	3:11	17:56	4h03m36s	20°23'25"	42°44'41"	0.939 2.01011
7/15/1994	2:59	17:54	4h24m14s	21°20'54"	44°30'30"	0.935 1.98494
7/22/1994	2:49	17:50	4h44m52s	22°08'26"	46°19'58"	0.932 1.95819
7/29/1994	2:39	17:46	5h05m27s	22°45'56"	48°13'25"	0.928 1.92979

Jupiter						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	15:47	2:27	14h11m16s	-11°57'13"	115°43'04"	0.993 4.89844
7/ 8/1994	15:20	1:59	14h11m26s	-12°00'02"	109°05'47"	0.992 4.99778
7/15/1994	14:54	1:32	14h12m09s	-12°05'46"	102°37'10"	0.992 5.10129
7/22/1994	14:28	1:05	14h13m25s	-12°14'17"	96°16'58"	0.991 5.20743
7/29/1994	14:03	0:39	14h15m13s	-12°25'30"	90°04'29"	0.991 5.31488

Saturn						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	0:23	11:23	22h56m36s	-8°41'36"	116°52'42"	0.998 9.26161
7/ 8/1994	23:51	10:55	22h56m09s	-8°46'09"	123°40'58"	0.998 9.16089
7/15/1994	23:23	10:26	22h55m24s	-8°52'25"	130°33'53"	0.998 9.06791
7/22/1994	22:55	9:57	22h54m23s	-9°00'14"	137°31'05"	0.999 8.98412
7/29/1994	22:27	9:28	22h53m07s	-9°09'27"	144°32'25"	0.999 8.91078

Uranus						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	22:03	7:23	19h48m12s	-21°38'39"	163°56'33"	1.000 18.68452
7/ 8/1994	21:35	6:54	19h47m03s	-21°41'40"	170°53'00"	1.000 18.66012
7/15/1994	21:06	6:25	19h45m52s	-21°44'44"	177°47'27"	1.000 18.65001
7/22/1994	20:38	5:56	19h44m41s	-21°47'44"	175°09'26"	1.000 18.65433
7/29/1994	20:09	5:27	19h43m31s	-21°50'40"	168°12'47"	1.000 18.67297

Neptune						
Date	Rise	Set	RA	Dec	Elongation	Ill Fr DIST(AU)
7/ 1/1994	21:48	7:14	19h36m03s	-20°58'23"	166°36'35"	1.000 29.18716
7/ 8/1994	21:20	6:45	19h35m16s	-21°00'14"	173°27'20"	1.000 29.16665
7/15/1994	20:52	6:17	19h34m28s	-21°02'07"	179°17'18"	1.000 29.16042
7/22/1994	20:23	5:48	19h33m41s	-21°03'59"	172°45'21"	1.000 29.16852
7/29/1994	19:55	5:20	19h32m54s	-21°05'51"	165°53'57"	1.000 29.19078

Planet Apsides Report for 1994

Earth
7/ 4/1994 Aphelion Distance from Sun: 1.02 AU

Dearborn, MI Latitude: 42°22'00" N Longitude: 83°17'00" W
Local Time = UT - 4.00 hours Elevation: 180 meters

Planet Conjunction/Opposition Report for 7/ 1/1994 to 7/31/1994

Uranus		
Date	Hour	Event
7/17/1994	0	Opposition
Neptune		
Date	Hour	Event
7/14/1994	20	Opposition

Moon Apsides Report for 7/ 1/1994 to 7/31/1994

Date	Hour	Apsis	Distance (km)	Diameter
7/ 3/1994	1	Apogee	404689	0.4921°
7/18/1994	14	Perigee	367860	0.5414°

Meteor Showers Report for 7/ 1/1994 to 7/31/1994

Date	Meteor Shower	ZHR	RA	DEC	Illum. Frac.	Longitude
7/ 7/1994	Capricornids	5			0.01	106°
7/15/1994	Capricornids	5	20h44m	-15°	0.48	113°
7/20/1994	alpha-Cygnids	5	21h00m	48°	0.95	118°
7/25/1994	Capricornids	5	21h00m	-15°	0.90	123°
7/28/1994	delta-Aquarids	20	22h36m	-17°	0.66	126°
7/30/1994	Piscis Australids	5	22h40m	-30°	0.47	128°

Twilight Report for 7/ 1/1994 to 7/31/1994

Date	Sun		Astronomical		Nautical		Civil	
	Rise	Set	Begin	End	Begin	End	Begin	End
7/ 1/1994	6:00	21:14	3:42	23:32	4:36	22:38	5:20	21:54
7/ 8/1994	6:04	21:12	3:49	23:27	4:41	22:35	5:25	21:51
7/15/1994	6:09	21:08	3:58	23:20	4:48	22:30	5:31	21:47
7/22/1994	6:16	21:03	4:09	23:10	4:56	22:22	5:38	21:41
7/29/1994	6:22	20:56	4:20	22:58	5:05	22:13	5:45	21:33



MEETING MINUTES - June 23th, 1994

Great Galactic Editor,

Though I am not worthy to point your telescope for you, I humbly beg your forgiveness for the tardy submission of these ever so lowly meeting minutes. Should you find it in your heart to publish them in an extremely small point size my gratitude will be never ending. (Just had to print this John! Love it! -Ed.)

The meeting was called to order at 5:00pm by President Greg Burnett. There were 27 club members and visitors present.

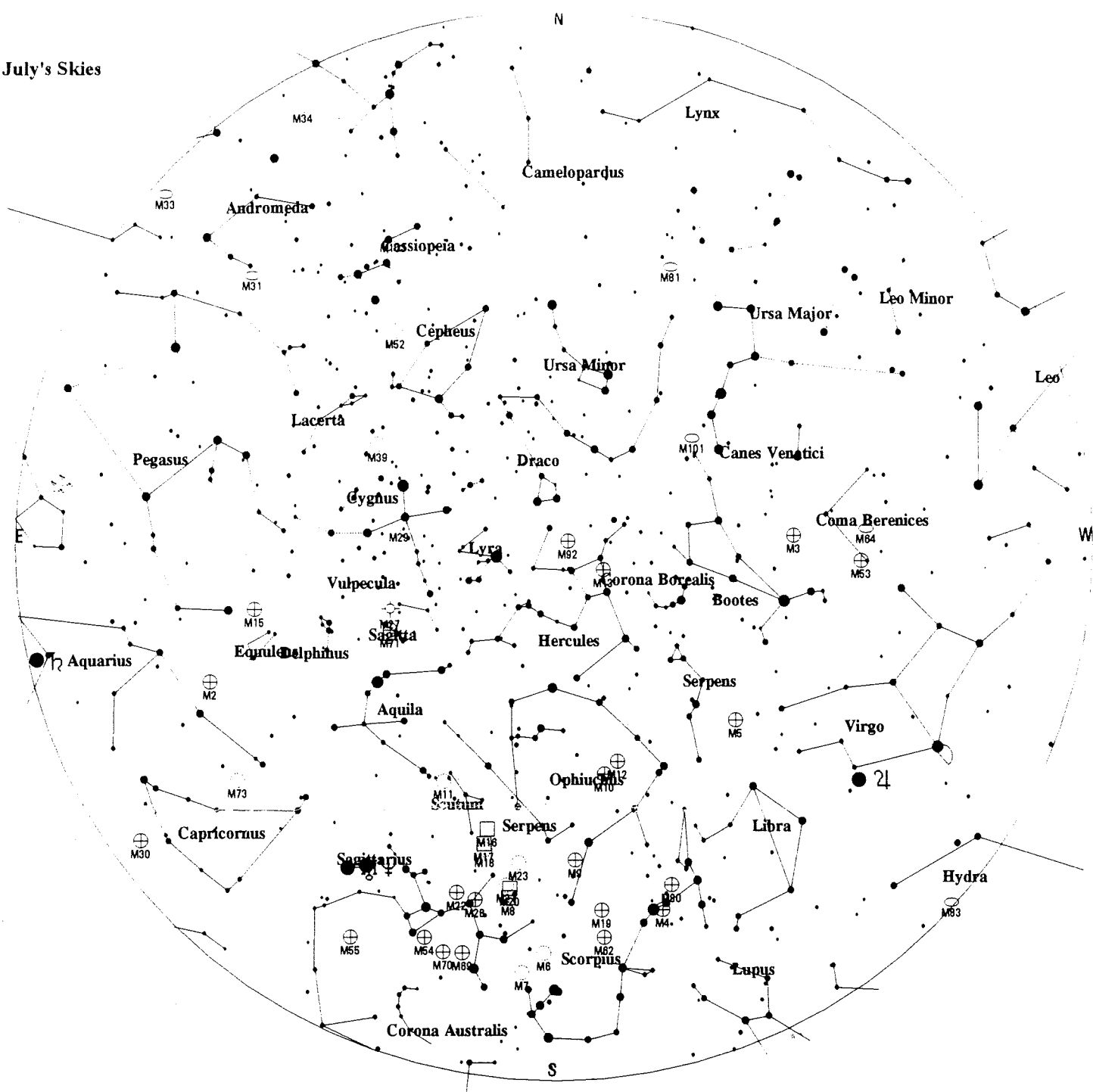
President's Report: Greg Burnett announced that the Club earned \$515.00 from the sale of eclipse viewers. The top sellers were Paul Mrozek (100) and Chuck Boren (98). If you wish to observe at Island Lake any night other than a scheduled Club observing night you must call the park in advance for permission. I.L. Park (810) 229-7067.

Treasurer's Report: Al Czajkowski stated the Club's financial standing and the report was placed on record.

Misc: 1995 Meteor Shower calendars are available from Chuck Boren. Carolyn Patterson is investigating car pool service for transportation to Island Lake observing sessions.

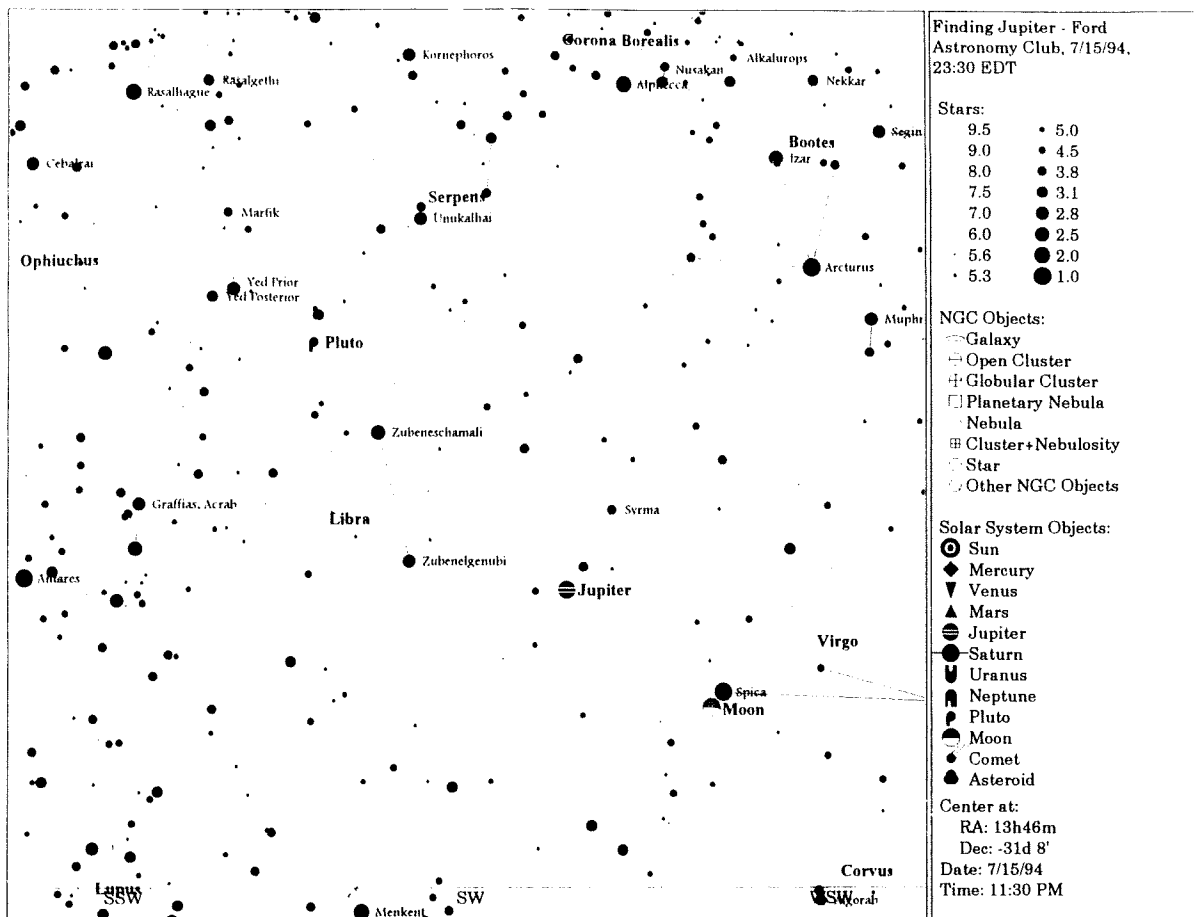
Awards: Brian Gossiaux was honored with a plaque commemorating his efforts as the Star Stuff Newsletter editor for the past two years. Atta Boy Brian!

Main Presentation: Roger Tanner gave a multi-media presentation on his trip to the Texas Star Party and the University of Arizona Mirror Lab along with First Light results of his Cookbook CCD camera.



STARS	SOLAR SYSTEM		NOTES
<ul style="list-style-type: none"> • <1 • 3.5 • 1.5 • 4 • 2 • 4.5 • 2.5 • >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 	
Local Time: 23:30:00 15-Jul-1994 Location: 42° 22' 0" N 83° 17' 0" W	UTC: 03:29:59 16-Jul-1994 Centre Az: 180.0° Alt: 90.0° Field: 180.0°		Sidereal Time: 17:31:51 Julian Day: 2449549.6458

Finding Jupiter



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

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1994

