STAR STUFF

The Ford Amateur Astronomy Club Newsletter

November

Volume 3 Number 11 November 1994

MOON NAMES

Most people have heard of the "harvest moon" and perhaps the "hunters moon." Did you know that the full moon in each month has a name? All of the names are associated with Indian lore and a couple are from the lore that the early pioneers invented.

January - Wolf Moon This was the time of year when the Indians heard the howl of the wolf as they searched in large packs for scarce food. It is said that with snow on the ground sounds are amplified, and I am sure that the wolf howl echoed loudly through the wilderness.

February - Snow Moon This is another Indian phrase. The month of February adds more snow from January's total and makes it the deepest snow of the year.

March - Worm Moon This is the month when the weather starts to change. With the warming days the ground turns to mud and worms come to the surface.

April - Pink Moon The first month of Spring and the blooming of the pink Spring flowers such as rhodora and azaleas.

May - Flower Moon If April showers bring May flowers it's easy to see how they came up with this one.

June - Hot Moon As anyone knows, June is the beginning of the hot and sticky days of summer.

July - Buck Moon This one is not well known. It is believed that buck deer were fat at this time and their meat could be dried and stored for the Winter.

August - Sturgeon Moon This is roughly the same as the Buck Moon. The sturgeon were fat at this time and their meat could be dried and stored for the winter.

September - Harvest Moon Due to the angle of the moon, for a couple of days the full moon would be up for the entire night giving farmers time to bring the crop in. As you can probably tell this name came from pioneer culture.

October - Hunters Moon This is another pioneer name. It was the time when you could hunt all night with a full moon and empty fields.

November - Beavers Moon This was the time of year that the beaver pelts were at their prime. It was also the time that the beavers were stocked and prepared for winter and you should be too.

December - Cold Moon In the natural year the full moon in December begins the new year with long cold nights.

As most people are aware, we cannot use the moon as a calendar. Its time from full moon to full moon will not equal the number of days in a year. The early people were also aware of it too and every once in a while they had to put in a moon to bring the seasons back into balance. The moon they used was called the **Corn Moon** and it was put in between the Sturgeon and Harvest moons.

From the book Twelve Moons of the Year by Hal Borland. Provided to Star Stuff by Ken Anderson.

SKY & TELESCOPE'S NEWS BULLETINS

ASTRONOMERS DISCUSS COMET CRASH

The American Astronomical Society's Division for Planetary Sciences met in Maryland this week. Many of the scientists gathered to discuss results from last summer's crash between Jupiter and Comet Shoemaker-Levy 9. In fact, the meeting featured more than 100 papers on the Great Crash. One interesting finding was that many of the comet fragments created fireballs of the same height, regardless of the size of the incoming fragments. Also, water was detected with certainty in at least one of the plumes. That water may have come from the comet, or from Jupiter itself, which is thought to have a cloud layer of water deep in its troposphere. But it's also possible that the water was synthesized in the hot fireballs from oxygen-bearing compounds carried by the comet and hydrogen present in Jupiter's atmosphere.

HOW MUCH DOES IDA WEIGH?

Astronomers also announced new results about the asteroid 243 Ida and its tiny moon Dactyl. The double nature of Ida was discovered in August 1993, when the Galileo spacecraft encountered it, but only recently have all the flyby data been radioed to Earth for analysis. According to Galileo scientists, Dactyl's orbit allowed them to determine the mass of Ida and thus its density. That value is somewhere between 2.2 and 2.9 grams per cubic cm, a loose range because Dactyl's orbit is only crudely known. But that's good enough to rule out the possibility that Ida is a stony-iron body, even though that's what its spectrum suggests. Instead, Ida could well have a composition like that of ordinary chondrite meteorites, which are primitive and largely unaltered. Interestingly, the spectra of Ida and Dactyl are similar but different. It's thought that the binary system formed during the collision and breakup that created a family of asteroids with very similar orbits, to which Ida belongs.

HUBBLE VIEWS TITAN

And observers using the Hubble Space Telescope showed remarkable views of Titan at the meeting and what appears to be the surface of Saturn's largest satellite. Titan is enveloped in a dense haze that even the Voyager cameras could not peer through. But in the near infrared the haze becomes more transparent, and HST's pictures suggest that a huge bright "continent" exists on the hemisphere of Titan that faces forward in its orbit. The planet-size world is though to have considerable liquid on its surface, or perhaps oceans, composed of liquid hydrocarbons. The new Hubble results don't prove that the seas exist, however, only that it has large bright and dark regions on its surface.

ASTRONOMICAL EVENT!!!

CONGRATULATIONS to John & Barb!.....

Barbara & John Paul St. Peter announce the latest member of the FAAC,

Harrison Philip St. Peter

Born on 11-14-1994, 7:08 pm at Sinai Hospital, Detroit
8 pounds 2 ounces and 20 1/2 inches long, blue eyes.

Mom and Baby are doing great, Dad is a bit shaky.

PRESIDENT'S CORNER

Well, Fall is upon us and the cold and snow will be here soon. What wag did I recently hear prattling about "crisp, clear Autumn nights"? Hah!! The weather has been, shall we say, less than conducive to astronomy the past couple of weeks. With the holidays coming up, folks will have many things to do with family and friends that will conflict with their observing schedule, so observing time will be at a premium. Unfortunately, some of the best objects come into view during the Winter. We need to adopt the Norwegian adage, "There's no such thing as bad weather, just bad clothes." So, dress for success (parkas, long-johns, even electric undies!) and take advantage of every observing opportunity, even if it's just walking down you street with your binos. At least there won't be any mosquitoes for a while! Hope to see you soon!

P.S. This space will become available in January if nobody claims it!
Greg Burnett

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LANDING SITE CHOSEN FOR PATHFINDER

From the "JPL Universe" September 23, 1994

An ancient flood plain on Mars has been selected as the landing site for the 1996 mission of JPL's Mars Pathfinder, one of the first in a new generation of small, low-cost spacecraft.

Eons ago, when water flowed on Mars, great floods inundated the landing site, located on a rocky plain in an area known today as Ares Vallis. The site is 850 kilometers (527 miles) southeast of the location of Viking Lander 1, which in 1976 became the first spacecraft to land on Mars. Pathfinder will be the first to land on Mars since the twin Viking landers arrived almost 20 years ago.

The spacecraft, scheduled to arrive at Mars on July 4, 1997, will parachute down to Ares Vallis at the mouth of an ancient outflow channel chosen for the variety of rock and soil samples it may present. The purpose of the new Pathfinder mission is to demonstrate an inexpensive system for cruise, entry, descent and landing on Mars, said Project Manager Anthony Spear and Project Scientist Dr. Matthew Golombek.

The lander, carrying the microrover, will aerobrake in the upper Martian atmosphere, using an aeroshell and a parachute. Just before impact, airbags will inflate to cushion the landing. The microrover will then roll out to examine the rocks and soil nearby. Both lander and rover will carry scientific instruments and cameras. The lander will make atmospheric and meteorological observations during descent and function as a weather station on the surface, as well as a radio relay station for the rover.

The constraints on the location have to do with engineering considerations, Spear said. Since the spacecraft are solar- powered, the best site is one with maximum sunshine, and in July 1997, the sun will be directly over the 15 degrees-north latitude region of the planet. The elevation must be as low as possible, Spear added, so the descent parachute has sufficient time to open and slow the lander to the correct terminal velocity. The landing will be within a 100- by 200-kilometer (60- by 120-mile) ellipse around the targeted site due to uncertainties in navigation and atmospheric entry.

Ares Vallis, which meets the engineering constraints, was chosen after a workshop earlier this year that involved the invited participation of the entire scientific community concerned with Mars. More than 60 scientists from the United States and Europe attended. The Ares Vallis site, according to Golombek, is also a "grab bag" location, set at the mouth of a large outflow channel in which a wide variety of rocks is potentially within the reach of the rover. Even though the exact origins of the samples would not be known, he said, the chance of sampling a variety of rocks in a small area could reveal a lot about Mars.

The rocks would have been washed down from highlands at a time when floods moved over the surface of Mars. Several potential sites were listed where ancient flood channels emptied into Chryse Planitia, having cut through crustal units and ridged plains where the water would have picked up material and deposited it on the plain. Other sites that were considered included Oxia Palus, a dark highlands region that contains highland crust and dark wind-blown deposits; Maja Valles Fan, a delta fan that drained an outflow channel; and the Maja Highlands, just south of Maja Valles. All of the sites were studied using Viking orbiter data.

Both the Pathfinder lander and rover have stereo imaging systems. The rover, additionally, carries an alpha proton X-ray spectrometer with which it will examine the composition of the rocks. The imaging system will reveal the mineralogy of surface materials, as well as the geologic processes and surface-atmosphere interactions that created and modified the surface. The instrument package will also enable scientists to determine dust-particle size and water-vapor abundance in the atmosphere.

STAR STUFF

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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 Editors:	Patti Smith Greg Burnett	Doug Bock

NEWSLETTER SUBSCRIPTION

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

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

November 1994

SUN	MON	TUE	WED	THUR	FRI	SAT
		1	2 Venus in inferior conjunction Mercury 4° N. of Moon	3 Moon at perigee NEW MOON	4	5
6	7	8	9	10 FIRST QUARTER MOON	11 Saturn 7° S. of Moon	12
13	14	15	16 Leonid Meteors	17 Leonid Meteors	18 Moon at apogee Leonid Meteors FULL MOON	19
20	21	22	23	24	25 Mars 8° N. of Moon	26 LAST QUARTER MOON
27	28	29	30 Venus 2° N. of Moon			

NEXT MONTH

The Ford Amateur Astronomy Club general meeting is December 8th!

MEETING ANNOUNCEMENT -- October 27, 1994

The Ford Amateur Astronomy Club holds regular general meetings on the fourth Thursday of each month, except in November and December when that schedule collides with holidays. Our next meeting will be Thursday, December 8, at 5:00 p.m. This is a combined Nov/Dec meeting and will be the last meeting of 1994.

The program for the meeting has not yet been determined, but have we ever let you down?

The Ford Amateur Astronomy Club meets in the Ford Motor Credit Company (FMCC) building, **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 way 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 dial 0911 on the security phone and say that you are here to attend a Ford club meeting, and security 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.
Hope to see you at the meeting!
Greg Burnett

OUR GANG

From Greg Burnett: Ran across this and thought I'd share it. Poul Anderson is a well-known scifi writer.....

Camped high on a mountain, from my sleeping bag I look out at the stars. Out, not up; they are everywhere around this planet. Knowing their vastness and what immensities reach among them, knowing that they are nuclear furnaces and that older suns long gone have forged the stuff of our bodies, makes them infinitely wonderful and beautiful to me.

The eyesight of a friend is failing so badly that now he cannot read print. However, he is getting a scanner which will project text onto a large screen and so let him back into the world of books.

I was there when a ship departing for the moon filled the night with radiance, thunder, and glory.

In the beasts of the field we see our kin; the very grass is of our own lineage.

Toil throughout our waking hours, in order to scrape out a bare and precarious living, has become unnecessary.

We are, at the most, only some hours' travel from anyone we love.

The left mastoid bone lies near the speech center of the brain. In a few years after a persistent infection had set in, death would have been the least unpleasant possibility for me. Surgery with precision instruments under a special microscope removed the danger.

Now that their writings have been deciphered, people dust these thousands of years are speaking to us.

We, who thought we understood the atom, are finding mystery within mystery--endless challenge.

The day is not so very far off when no child need ever again be born defective.

The greatest musicians play my beloved Bach for me in my living room.

Intellectuals assure us that modern science and technology are dehumanizing.

-- POUL ANDERSON

From: Harry Kindt <73521.1710@compuserve.com>
Subject: Mars & M44
Greg:
Here's today's atrocious analogy... "Mars seen buzzing beehive". I guess working the midnight shift has certain advantages after all. For example last night I was able to see Mars as it was passing through the Beehive cluster. Around 3:00am EDT I left my work bench and grabbed a pair of 10 x 50 binoculars (7deg FOV) and went outside to view this neat celestial event. After locating the red/orange disc I knew to be Mars and my eyes became more adjusted to the dark, I began to see the many stars that make up this huge cluster. Mars was clearly visible a bit north and west of the center of the cluster. I then proceeded to make a crude--very crude--sketch of what I was seeing. I continued my vigil every half-hour or so to see if I could discern any movement of the planet across the cluster. Around 5:30am the infamous Michigan weather took control of the situation and the clouds rolled in ending my viewing for the night. Weather permitting, I'll be out again this evening for another peek.
'till later.
Harry

From: Chuck Boren III
Subject: How to detect your blind spot (which everyone has)
How do you see the normal optic-nerve blind spot "open loop", with no gadget? Get a piece of white paper and draw an X and an O about 1/2" high and 2-3" apart, side-by-side, with the X on the left. Use a black magic marker so the contrast is high. Look directly at the X and close your LEFT eye and move your face closer and further to the page and at some point (about 6-12"), you will see the O disappear. This happens because the light from the O is falling on the optic nerve area on the focal plane and there are no light cones/rods in that one area. Thus, the O disappears from view.

Submitted to the LINKAGE EDITOR newsletter of the Ford Credit Systems Office.....

So What's Up?

Observations and Ruminations of an Astronomical Nature provided by the Ford Amateur Astronomy Club

Star Stuff: The Complete History of the Universe (In ONE Linkage Editor Column!)

Scientists generally accept the "Big Bang" cosmology, wherein the universe began as a ball of pure energy. (There was no "before" so don't worry about that. If in doubt, consult Stephen Hawking.) It began to expand, and matter in the form of hydrogen and a little helium condensed out. It continued to expand, and most of the matter congealed into stars because of gravity. The stars began to shine by nuclear fusion, whereby light atoms are combined ("fused") into heavier ones, releasing energy (lots of it!) in the process.

Since then many stars have come and gone, and every element other than hydrogen or helium has been cooked up in these stellar furnaces. This includes, of course, all the carbon, oxygen, nitrogen, and everything else of which we are constructed. It includes the food we eat, the water we drink, and the air we breathe. As stars evolve and die, they blow this material out into space, where it is available to form planets like ours.

In particular, everything heavier than iron (e.g. copper, zinc, tin, iodine, silver, gold, mercury, etc.) has been forged in supernova explosions. Stars larger than a certain size end their lives in a huge explosion called a supernova (becoming a pulsar or a black hole in the process). During such an explosion, some of the energy goes into producing the elements heavier than iron.

Stars are the ONLY source of elements other than hydrogen and helium; they are not contributors, they are the sole providers.
We are all, in the most literal sense possible, made of star stuff!

Greg Burnett
COMPASS

★

FAAC Telescope Builders Special Interest Group

FROM: Chuck Boren III
Subject: (U)Meeting Schedule

I would like to announce the first meeting of our telescope making sig will be December 3 1994 1:00 pm at George Korody's home (garage) in Northville. He is located at 19560 Meadowbrook (right side) north of Seven Mile Rd. and west of Haggerty. This meeting place is a private home and as such, parking and work space is limited so car pooling will be helpful. Also for this first meeting please bring your own folding chair as seating is minimal. If you have any questions please get in touch with me. I hope to have prices of mirrors, cells, tubes, focusers and the like by that meeting.

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GALILEO MISSION STATUS November 1, 1994
PUBLIC INFORMATION OFFICE, NASA

A preliminary analysis and comparison of data from Galileo's ultraviolet spectrometer, photopolarimeter-radiometer and near-infrared mapping spectrometer on the July impact of Comet Shoemaker-Levy 9's fragment G at Jupiter has allowed the scientists to characterize a comet impact directly for the first time. The ultraviolet instrument and photopolarimeter saw the fireball first, when it was about 7 kilometers (5 miles) across with a temperature of at least 8,000 degrees Kelvin (14,000 Fahrenheit), which is hotter than the sun's surface. Five seconds later the infrared spectrometer detected it and monitored its expansion, rise and cooling for a minute and a half.

Results of the observations by these three instruments plus the imaging system of several Shoemaker-Levy events are being reported at a meeting this week of the American Astronomical Society's Division of Planetary Sciences. Other Shoemaker-Levy data stored on Galileo's on-board tape recorder will be transmitted to Earth through January 1995.

Galileo continues to operate normally, spinning at about 3 rpm and transmitting at 10 bits per second to ground stations of the NASA/JPL Deep Space Network. The spacecraft is currently 866 million kilometers (538 million miles) from Earth, and 197 million kilometers (122 million miles) from Jupiter. It will reach Jupiter on December 7, 1995, when its probe will descend into the Jovian atmosphere and the orbiter spacecraft will begin two years of observation and measurement of the planet, its moons and magnetosphere.

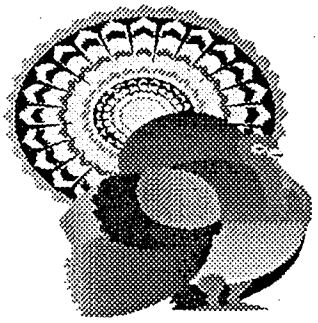
★

VIDEO

Charley Harp informs us that he has "twelve-hour raw and two-hour edited" videos from the SL-9 Jupiter impact. If you're interested in copies, contact Charley at PROFS CHARP

ASTRONOMY WORKSHOP

by Greg Burnett



PROFS=GBURNETT
InterNet USFMC6SH@IBMMAIL.COM

The Workshop takes a little different twist this month, addressing all those annoying questions posed by the great unwashed when they encounter us at our 'obby. To wit...

[NOTE: The opinions expressed here are those of the author(s) and, as with many things, are issue upon which reasonable people can disagree. We invite your opinions. -G.B.]

Why are you out here in the dead of night with a cannon?
[*We heard Saddam was in town.*]

(Most frequent question from kids) Can you see the moon with that thing?
[*No, dumb kid, it's too far away!*]

(Always asked in the presence of your spouse) How much did this cost?
[*Could I interest you in a donut? Right over here....*]

Years ago, when Apollo went to the moon, neighbors and friends asked: "Can you see the lander?" "Can you see the astronauts?" "Can you see the American flag?"

Do you, like, get paid to do this, or what?
[Hmmm...]

Can you see the dark side of the moon?
[*Only on fourth Thursdays.*]

How much power is that telescope?
[*It's more powerful than a locomotive,...*]

How many stars can you see when it rains?
What kinda image does the neighbor present?
Can you see the Apollo landing sites?
Any green men on Mars?
What is that thing, a cannon?

Someone asked me if I ever saw a UFO. Another thought only perverts use telescopes. Wow! That's a big scope. Can you see through the clouds with that? Can you see the moon with that?

Bet you can see meteors pretty good with that, huh?
Ever try to see if ya can look into airplane windows?
What power is that baby?
So how long have you been into astrology?
You guys come out here at night?
The Big Dipper should look pretty good in that.
Bet you can see the stars pretty big in that.

Q: Where do I look?
A: Through that thing that just poked you in the eye.
A: Just look for the beam of light coming out of one of the tubes, and there is the moon.
Q: How big is that thing?
A: The Scope? Oh, its 12.5 inches in diameter, and 75 inches long.
Q: Did this cost alot of money?
A: NO...YES...NO...Well it doesn't have to. But it could. This one didn't.
Q: How did you find that thing we are looking at? Is it a picture?
A: An extraterrestrial implanted the maps of the universe in my brain. I just know where it is.
Q: Who turned off the moon?
A: I did, mom, I was standing in front of the telescope. Sheesh.
Q: Can you see the U.S. flag on the moon, with this telescope?
A: All the time, but you can't see it tonight, because it is on the other side of the moon right now.
Q: Do you ever see the space shuttle through this thing?
A: All the time. They wave to me as they go by.
Q: Do you ever use this for looking at things like birds or deer?
A: No. By the way, how is that rash on your lower back doing?

True story: I once had a GF who asked me if when you take a picture of the moon thru a telescope you needed a flashbulb (long time ago) and if the flash would reach all the way there!

Can you see the flag on the moon?
I'll bet this equipment costs a lot of money.
Can you point it at the plane passing overhead?

Q: How far can you see with that thing?
A: To the edge of my universe, and yes, they are smiling back at us.
Q: Can you see flying saucers?
A: Not right now, but I'll let you know when I do.
Q: Do you do this professionally?
A: No, I can't afford to.
Q: Do you know Carl Sagan?
A: Fortunately, NO.
Q: Have you ever been visited by strange creatures?
A: Every time I leave my house.
Q: Did you ever see an eclipse of the sun?
A: Yes, that's why I wear glasses now.
Q: Why do you need to wear glasses now? Because of the brightness of the sun?
A: No, some stupid neophyte hit me in the eyes when he tried to cover them so I wouldn't look at the sun during the eclipse. He said his entire school district was keeping the kids inside to protect them.
Q: Do you have a PHD in Astronomy?
A: No, I wanted to look at the sky.

A neighbor, who I have had limited conversations with asked me a question which I couldn't answer. After a short glimpse through the eyepiece she asked me why each star looked like a dot? Her request left me some what bewildered. Perhaps her hair color had something to do with it.
That can't really be out there, you must be hanging something up inside there somewhere.

(Before clock drive) Why is it moving so fast out of view.
How much did you pay for this?
Are the mosquitos biting?
Can you put any more power (magnification) on it?
Don't stay out too late...
It doesn't look like the pictures.

Thanks to the many contributors to this month's workshop:
Bill Colwell, Dick Harris, Gary W. Miller, Ken Anderson, Brian Gossiaux, Douglas Bock, John Ghesquiere, Paul Mrozek, Chuck Boren, Joe Kulczycki, Allen Henderson

Left over questions.....

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? *[John Paul will be disappointed [illegible] doesn't take a stab at this question!]*

MEETING MINUTES for October 27, 1994

The meeting was called to order at 5:00pm by President Greg Burnett. There were 32 members present.
President's Report: The use of the script 'Ford' oval logo by FERA clubs was [illegible] at the last FERA general council meeting. Photos from the recent Fish Lake [illegible] the ILSP II were passed around.
****** Due to the holidays the next meeting will be December 8th ******
Nominations for the election of club officers for 1995 has started
So far the nominations are;

President	none yet
Vice-president	John St. Peter
Secretary	Harry Kindt
Treasurer	Al Czajkowski

Telescope building SIG, Chuck Boren: The book 'Build your own [illegible] by Richard Berry was recommended. Chuck has plans available for a Dobsonian. Meeting times and location will be decided before the next club meeting. Some prices and pooling purchasing power were discussed. John St. Peter displayed some of the hardware for the Cookbook CCD [illegible] he is building and gave an update on its progress.
Harry Kindt showed a video of the latest finding of the Hubble [illegible] research on the size of the Universe.

STATISTICALLY SPEAKING....

Dearborn, MI

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

Local Time = UT -5.00 hours(~~EDT~~ EST) Elevation: 180 meters

Times are in 24 hour format.

Abbreviations used in reports:

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

Calendar Report for 11/ 1/1994 to 11/30/1994

November 1994

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
		SR: 7:06	SR: 7:08	SR: 7:09	SR: 7:10	SR: 7:11
		SS: 17:27	SS: 17:25	SS: 17:24	SS: 17:23	SS: 17:22
		MR: 4:42	MR: 5:56	MR: 7:12	MR: 8:26	MR: 9:35
		MS: 16:11	MS: 16:49	MS: 17:34	MS: 18:25	MS: 19:23
				NM: 8:36		
				SE: 8:39		
6	7	8	9	10	11	12
SR: 7:13	SR: 7:14	SR: 7:15	SR: 7:16	SR: 7:18	SR: 7:19	SR: 7:20
SS: 17:21	SS: 17:19	SS: 17:18	SS: 17:17	SS: 17:16	SS: 17:15	SS: 17:14
MR: 10:37	MR: 11:30	MR: 12:15	MR: 12:53	MR: 13:26	MR: 13:56	MR: 14:24
MS: 20:27	MS: 21:34	MS: 22:41	MS: 23:47	MS: None	MS: 0:51	MS: 1:53
				FQ: 1:15		
13	14	15	16	17	18	19
SR: 7:21	SR: 7:23	SR: 7:24	SR: 7:25	SR: 7:26	SR: 7:28	SR: 7:29
SS: 17:13	SS: 17:12	SS: 17:11	SS: 17:10	SS: 17:10	SS: 17:09	SS: 17:08
MR: 14:51	MR: 15:19	MR: 15:49	MR: 16:21	MR: 16:56	MR: 17:36	MR: 18:20
MS: 2:53	MS: 3:52	MS: 4:51	MS: 5:49	MS: 6:46	MS: 7:41	MS: 8:34
					FM: 1:58	
20	21	22	23	24	25	26
SR: 7:30	SR: 7:31	SR: 7:32	SR: 7:34	SR: 7:35	SR: 7:36	SR: 7:37
SS: 17:07	SS: 17:07	SS: 17:06	SS: 17:05	SS: 17:05	SS: 17:04	SS: 17:04
MR: 19:09	MR: 20:03	MR: 20:59	MR: 21:59	MR: 23:01	MR: None	MR: 0:04
MS: 9:23	MS: 10:08	MS: 10:49	MS: 11:26	MS: 12:00	MS: 12:31	MS: 13:02
						LQ: 2:05
27	28	29	30			
SR: 7:38	SR: 7:39	SR: 7:40	SR: 7:42			
SS: 17:03	SS: 17:03	SS: 17:02	SS: 17:02			
MR: 1:10	MR: 2:19	MR: 3:29	MR: 4:43			
MS: 13:33	MS: 14:05	MS: 14:40	MS: 15:21			

Solar Eclipse Report for 1994

Solar eclipse on 11/ 3/1994
Sun rise: 7:09
Sun set: 17:24
Time of maximum eclipse: 8:39
Eclipse is total
Eclipse is visible in the southern hemisphere

Planet View Info Report for 11/ 1/1994 to 11/30/1994

Mercury

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	5:34	16:51	13h20m46s	-6°34'05"	17°18'30"	0.350	0.85467
11/ 8/1994	5:36	16:40	13h42m44s	-8°14'50"	18°40'36"	0.655	1.04214
11/15/1994	5:59	16:35	14h18m40s	-11°52'24"	16°08'07"	0.837	1.20150
11/22/1994	6:29	16:33	15h00m00s	-15°49'44"	12°22'40"	0.929	1.31733
11/29/1994	7:00	16:35	15h43m51s	-19°23'39"	8°24'21"	0.973	1.39369

Venus

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	7:35	17:00	14h28m34s	-20°44'57"	6°33'56"	0.006	0.27137
11/ 8/1994	6:41	16:30	14h13m59s	-17°58'30"	9°05'57"	0.012	0.27284
11/15/1994	5:53	16:04	14h03m37s	-15°12'16"	18°31'22"	0.050	0.28813
11/22/1994	5:14	15:42	14h00m14s	-13°04'54"	26°55'50"	0.108	0.31525
11/29/1994	4:46	15:24	14h04m11s	-11°53'22"	33°30'33"	0.173	0.35132

Mars

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	23:48	14:13	9h09m26s	18°00'54"	83°55'49"	0.891	1.34393
11/ 8/1994	23:37	13:55	9h22m45s	17°11'26"	87°40'05"	0.892	1.28688
11/15/1994	23:25	13:36	9h35m08s	16°23'50"	91°38'33"	0.893	1.22877
11/22/1994	23:12	13:17	9h46m28s	15°39'25"	95°52'49"	0.896	1.16994
11/29/1994	22:57	12:57	9h56m39s	14°59'41"	100°25'17"	0.900	1.11071

Jupiter

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	8:11	18:04	15h17m03s	-17°21'08"	13°09'36"	1.000	6.35370
11/ 8/1994	7:52	17:41	15h23m16s	-17°45'14"	7°41'44"	1.000	6.37054
11/15/1994	7:32	17:18	15h29m34s	-18°08'39"	2°18'07"	1.000	6.37682
11/22/1994	7:12	16:55	15h35m55s	-18°31'15"	3°25'55"	1.000	6.37252
11/29/1994	6:53	16:33	15h42m16s	-18°52'55"	8°54'26"	1.000	6.35761

Saturn

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	15:00	1:45	22h31m58s	-11°17'32"	117°06'19"	0.998	9.23613
11/ 8/1994	14:33	1:17	22h31m44s	-11°17'55"	110°02'14"	0.998	9.34245
11/15/1994	14:05	0:50	22h31m49s	-11°16'24"	103°01'58"	0.998	9.45363
11/22/1994	13:38	0:23	22h32m13s	-11°12'57"	96°05'35"	0.997	9.56797
11/29/1994	13:11	23:53	22h32m57s	-11°07'39"	89°12'56"	0.997	9.68385

Uranus

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	12:52	22:04	19h38m43s	-22°00'48"	74°26'17"	0.999	19.92608
11/ 8/1994	12:25	21:38	19h39m32s	-21°58'43"	67°36'59"	0.999	20.04011
11/15/1994	11:58	21:11	19h40m31s	-21°56'17"	60°48'36"	1.000	20.14869
11/22/1994	11:32	20:45	19h41m39s	-21°53'28"	54°01'04"	1.000	20.25039
11/29/1994	11:05	20:19	19h42m54s	-21°50'19"	47°14'06"	1.000	20.34388

Neptune

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	12:39	21:59	19h29m40s	-21°15'25"	72°28'58"	1.000	30.45853
11/ 8/1994	12:12	21:32	19h30m12s	-21°14'28"	65°35'32"	1.000	30.57042
11/15/1994	11:45	21:05	19h30m50s	-21°13'17"	58°42'15"	1.000	30.67631
11/22/1994	11:18	20:38	19h31m34s	-21°11'52"	51°49'09"	1.000	30.77473
11/29/1994	10:52	20:12	19h32m23s	-21°10'14"	44°55'57"	1.000	30.86434

Pluto

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
11/ 1/1994	8:04	19:20	15h51m49s	-6°32'55"	22°57'08"	1.000	30.71609
11/ 8/1994	7:37	18:53	15h52m50s	-6°37'36"	17°55'00"	1.000	30.74679
11/15/1994	7:11	18:26	15h53m53s	-6°41'59"	14°18'03"	1.000	30.76414
11/22/1994	6:45	18:00	15h54m57s	-6°46'01"	13°20'30"	1.000	30.76788
11/29/1994	6:19	17:33	15h56m01s	-6°49'39"	15°33'54"	1.000	30.75788

Planet Conjunction/Opposition Report for 11/ 1/1994 to 11/30/1994

Venus

Date	Hour	Event
11/ 2/1994	18	Inferior Conjunction

Jupiter

Date	Hour	Event
11/17/1994	18	Conjunction

Pluto

Date	Hour	Event
11/20/1994	18	Conjunction

Moon Apsides Report for 11/ 1/1994 to 11/30/1994

Date	Hour	Apsis	Distance (km)	Diameter
11/ 3/1994	19	Perigee	357235	0.5575°
11/18/1994	0	Apogee	406351	0.4901°

Meteor Showers Report for 11/ 1/1994 to 11/30/1994

Date	Meteor Shower	ZHR	RA	DEC	Illum. Frac	Longitude
11/ 3/1994	Taurids	8	3h44m	14°	0.00	[illegible]
11/17/1994	Leonids	10	10h08m	22°	1.00	[illegible]

Twilight Report for 11/ 1/1994 to 11/30/1994

Date	Sun Rise	Sun Set	Astronomical Begin	Astronomical End	Nautical Begin	Nautical End	Civil Begin	Civil End
11/ 1/1994	7:06	17:27	5:27	19:06	5:59	18:34	6:32	[illegible]
11/ 8/1994	7:15	17:18	5:34	18:59	6:07	18:26	6:41	[illegible]
11/15/1994	7:24	17:11	5:42	18:53	6:15	18:20	6:49	[illegible]
11/22/1994	7:32	17:06	5:49	18:49	6:22	18:16	6:57	[illegible]
11/29/1994	7:40	17:02	5:56	18:47	6:29	18:13	7:04	[illegible]

NEW HUBBLE IMAGES SHOW RARELY SEEN RINGS AND MOONS OF URANUS

Three spectacular new images of the planet Uranus taken by NASA's Hubble Space Telescope (HST) reveal the planet's rings, at least five of the inner moons and clouds and a high altitude haze above the planet's south pole.

Hubble's new views were imaged by the Wide Field Planetary Camera in 1994, when Uranus was 1.7 billion miles (2.8 billion kilometers) from Earth. The rings previously have been photographed in visible light and seen in such detail by the Voyager 2 spacecraft as it flew by the planet in 1986. Since then only the planet's inner satellites has been observed and no high resolution observations have been possible. In the new Hubble images, several of Uranus' rings are seen, including the outermost Epsilon ring. The planet, which has a total of 11 rings of dark dust, is tipped such that its rotation axis lies in the plane of the rings appear nearly face-on as seen from Earth and HST.

The detail in the HST observations will allow astronomers to determine the moons more precisely, leading to a better understanding of the unusual Uranus' complicated satellite system.

ULYSSES MISSION STATUS November 1, 1994
PUBLIC INFORMATION OFFICE, NASA

The Ulysses spacecraft, the first probe to explore the sun's environment at high latitudes, continues to perform well, transmitting data on energetic particles and solar phenomena occurring in regions never before studied.

Today the spacecraft is about 71.2 degrees south of the sun's equator and is leaving the area of high scientific interest in that part of the polar region. Over the next four months, Ulysses will be heading for its nearest approach to the sun's equator, which will occur on March 12, 1995. At that time Ulysses will fly within 1.3 astronomical units (192 million kilometers, or 120 million miles) of the sun's equator and begin its northern ascent to traverse the sun's northern pole beginning on June 19, 1995.

The spacecraft is traveling at a heliocentric velocity of about 90,000 kilometers per hour (57,000 miles per hour) and is carrying nine scientific instruments that have been continuously measuring the solar wind, magnetic field, energetic particles and radio and x-ray emissions from the sun. Using its unique vantage point in space, Ulysses is also measuring the characteristics of the flow of matter (atoms, ions, dust and energetic particles) and gamma radiation, which pass through the solar system from the outer reaches of the galaxy.

All spacecraft operations and science experiments continue to go well. Ground controllers are tracking Ulysses 24 hours a day to ensure that an onboard control system
continues to keep the spacecraft stabilized and pointed at Earth while Ulysses' axial boom is illuminated by the sun. Minor power reconfigurations, such as turning off instrument heaters, have also been performed now that the spacecraft is getting closer to the sun.

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IS THE SUN CHANGING SIZE?

From the Winter-Spring 1994 issue of USRA QUARTERLY.

An astronomer at Yale University, Sabatino Sofia, together with colleagues there and at Goddard Space Flight Center, is attempting to find out whether the Sun is currently expanding or contracting. There is no need to run for cover, at least on this regard, since the diameter changes they are looking for are extremely small. But there is historical data that suggests the Sun may slowly expand and contract with a cycle amplitude of about 0.05 per cent (700 km) and a period of around 90 years. If confirmed, this would have important implications for terrestrial climate, because changes in the Sun's total energy output -- a variability that climate modelers could not ignore.

The Solar Disk Sextant developed by the Yale-Goddard team measures the apparent angular diameter of the Sun with a precision of 0.003 arc-sec, and a long-term stability of better than 0.01 arc-sec per year. Lifted on a balloon to 120,000 feet, above most of the Earth's atmosphere, the instrument repeatedly calipers the solar disk.

This research is a collaborative effort between Yale, a USRA member institution, and Goddard. There have been several successful balloon flights, and additional flights are planned in order to monitor the Sun for possible changes. Eventually, the Yale-Goddard team hopes that the instrument will be carried into orbit on a spacecraft.

The Sextant images the Sun through a multiply reflecting optical wedge, thereby producing a series of images in the focal plane. The solar diameter is computed from the separation between the direct image and the first reflected image which is measured precisely by a pattern of linear CCD arrays.

The Solar Disk Sextant is the first precision instrument specifically designed to measure the Sun's diameter. However, many determinations have been made over the past two hundred years using other techniques: by timing transits of the Sun across the local meridian; by timing transits of the planet Mercury across the solar disk, an event that occurs about 13 times a century; and by timing the duration of total solar eclipses. According to Sofia, the solar eclipse measurements are the most reliable, and they appear to show a slow periodic cycle of solar expansion and contraction. Sofia hopes that repeated Solar Disk Sextant flights will be able to see evidence of this slow pulsation.

An important application of this work is to studies of terrestrial climate since, in principle, measurements of changes in solar diameter provide an indirect way of monitoring changes in solar luminosity. Sofia explained: "Since theory requires that all global parameters be related, if the Sun's luminosity varies, its diameter must also vary." But the relationship between variability in diameter and variability in luminosity has not yet been quantified. Sofia, who is the representative for Yale on USRA's Council of Institutions, said, "We tried to work out the connection theoretically, but not enough is known about solar structure to make this possible. So, in addition to theoretical modeling, we are combining solar diameter measurements with time-average data from satellite-borne cavity radiometers."

He continued, "My guess is that solar variability, although it does not dominate our climate change, is not a trivial factor. Climate modelers are concerned about possible greenhouse effects. But to truly understand any greenhouse effect, we must first remove natural effects such as solar variability." The question of whether the Sun is currently changing size should be answered by data from several balloon flights separated by a year or two. But to investigate the long-term changes that would apply to climate studies will require observations over a period of many years.

Besides measuring solar diameter, the Solar Disk Sextant can also compare the Sun's equatorial and polar diameters and thus determine to what degree our nearby star is out-of-round. Sofia's group finds that solar oblateness, defined as the relative difference between equatorial and pole-to-pole diameters, is about 8 parts per million. Solar oblateness, which results from mass movements within the Sun's interior, has been measured a number of times in this century with a scatter of results. But the Solar Disk Sextant brings new precision to this important measurement. Sofia noted that a major use of the Sextant results will be to provide information relating to the internal structure and dynamics of the Sun. And this work should apply to other stars as well since, according to Pierre Demarque, director of Yale's Center for Solar and Space Research, "Solar models provide the best means of calibrating stellar models."

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NEW INSIGHTS INTO STAR FORMATION

Goddard Space Flight Center, Greenbelt, MD
Space Telescope Science Institute, Baltimore, MD

NASA's Hubble Space Telescope has provided new insights into how stars might have formed many billions of years ago in the early universe. Hubble observations of a pair of star clusters suggest a new link in the stellar evolution processes.

The pair of clusters are 166,000 light-years away from Earth in the southern hemisphere constellation, Doradus, within the Large Magellanic Cloud (LMC). The clusters are unusually close together for being distinct and separate objects, according to Hubble astronomers.

A preliminary assessment of the HST observation indicates that these two compact clusters contain many more massive stars than expected. "If this were also the case billions of years ago, it could have altered drastically the early history of the universe," says Dr. Nino Panagia of the Space Telescope Science Institute (STScI) in Baltimore, MD, and the European Space Agency (ESA).

Panagia, R. Gilmozzi (also of STScI/ESA) and their co-investigators utilized HST's unique capabilities -- ultraviolet sensitivity, ability to see faint stars, and high resolution -- to identify three separate populations in this concentration of nearly 10,000 stars. (Previous observations with ground-based telescopes have been able to resolve less than 1,000 stars in this region.)

About 60 percent of these stars belong to the dense cluster called NGC 1850, estimated to be 50 million years old. However, Hubble found that a loose distribution of extremely hot, massive stars in a separate cluster within the same region --representing about 20 percent of the stars in the Hubble image--are only about 4 million years old. (The third group of stars observed by Hubble are simple field stars in the LMC.)

The significant difference between the ages of the two clusters suggests that they are two separate star groups that lie along the same line of sight. The younger, more open cluster probably lies 200 light-years beyond the older cluster, says Panagia, because if it were in the foreground, then dust from the younger cluster would obscure stars in the older cluster.

Having two well-defined star populations separated by such a small gap of space is very unusual. This juxtaposition suggests that the clusters might be linked in an evolutionary sense. The possible scenario proposed by the Hubble researchers is that an expanding "bubble" of hot gas from more than 1,000 supernova explosions in the older cluster triggered the birth of the younger cluster.

The bubble expanded across space for 45 million years before plowing into a wall of cool gas and dust. The resulting shock front then caused the gas to contract and precipitate a new generation of star formation. The massive, hot stars produced by this contraction are destined to explode in a few million years, and thus create yet another expanding bubble of gas.

Previously, such detailed studies of stellar population were restricted to nearby star-forming regions within the plane of our Milky Way Galaxy. However Hubble's high-quality images enable these studies to be extended a hundred times farther out the

universe, out to the distance of a neighboring galaxy.

The LMC is a natural laboratory for studying the birth and evolution of stars because it lies outside the clutter of the Milky Way and its stars have few heavy elements, so their composition is believed to be more like the primordial stars that formed in the early universe. The findings will be published in the Nov. 1, 1994 issue of the Astrophysical Journal Letters.

Co-investigators are R. Gilmozzi (STScI, Baltimore, MD and ESA), E.K. Kinney (STScI); S.P. Ewald (California Institute of Technology, Pasadena, CA), N. Panagia (STScI and ESA, and University of Catania, Italy); and M. Romaniello (University of Pisa, Italy). The Hubble Space Telescope is a project of international cooperation between NASA and the ESA.

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CASSINI MISSION UPDATE October 19, 1994

Jet Propulsion Laboratory, Pasadena, CA

The Draft Environmental Impact Statement (DEIS) for the Cassini mission to Saturn has been released by NASA and will be available for public review and comment for a 45-day period beginning Oct. 21. Cassini is a cooperative scientific mission of the U.S. and European space agencies scheduled for launch in 1997.

An Oct. 20 notice in the Federal Register will formally announce the issuance of the DEIS by NASA and give further details on where the public may locate a review copy. The DEIS addresses the potential environmental impacts associated with the planned Cassini mission and reasonable mission alternatives.

"We have prepared a comprehensive draft environmental impact statement that describes all of the alternatives that are under consideration as we shape the Cassini mission," said Dr. Earle K. Huckins, Cassini Program Director in the Office of Space Science at NASA Headquarters. "We look forward to the public comments on our draft statement during this review period."

The Cassini mission would send a robotic spacecraft on a seven-year journey to the ringed planet after launch aboard a Titan IV/Centaur from Cape Canaveral, FL, in October 1997. The spacecraft would use a series of gravity-assist swingbys of planets including Venus, Earth and Jupiter, to gain enough extra energy to reach Saturn, which orbits nearly one billion miles from the Sun.

Upon arrival at Saturn in 2004, the Cassini spacecraft would enter orbit around Saturn to conduct four years of intensive studies of the planet, its rings, magnetic environment and icy moons. About three weeks before Cassini's first flyby of Titan, Saturn's largest moon, the spacecraft would release the European Space Agency's Huygens probe to parachute to Titan's surface. The probe's scientific instruments would study Titan's atmosphere and surface, which are thought to share key characteristics with Earth's early environment before life began. The international mission would result in the most complete characterization ever undertaken of a planetary system beyond Earth and the Moon. The Jet Propulsion Laboratory in Pasadena, CA, manages the Cassini project for NASA.

Electrical power to operate the Cassini spacecraft systems would be provided by three radioisotope thermoelectric generators (RTGs). Such generators have been used on 23 previous U.S. space missions, including the Apollo lunar landings, the Voyager flybys of Jupiter, Saturn, Uranus and Neptune, the Pioneer missions to Jupiter and Saturn, the Galileo mission to Jupiter and the Ulysses solar mission.

The Cassini RTGs, provided to NASA by the U.S. Department of Energy, produce electricity from the heat emitted by a non- weapons grade isotope of plutonium. Spacecraft power source options have been extensively evaluated for the Cassini mission and are discussed in the DEIS. Detailed analysis showed that RTGs are the only reliable technology, presently available and tested for use in space, that can meet the spacecraft's power needs for traveling to Saturn and accomplishing the mission's scientific objectives.

Analysis provided in the DEIS found that the likely environmental impacts of the mission are limited to those associated with the normal launch of the Titan IV/Centaur launch vehicle. Furthermore, it indicated that the overall risks associated with the mission are low. Representative launch accident scenarios were evaluated for the planned mission and mission alternatives. Extensive Department of Energy testing and evaluation programs have demonstrated the effectiveness of RTGs in containing their plutonium under a wide range of accident conditions. In the unlikely case of a launch accident that resulted in the release of plutonium, the risk to public health is assessed to be negligible.

In the even less likely event of an inadvertent atmospheric reentry of Cassini during its Earth swingby, there is a small potential for public health effects, according to studies reported in the DEIS. However, NASA is designing the spacecraft and mission to ensure that the probability of an Earth reentry, after the spacecraft has left Earth orbit, is less than one in one million.

The Cassini DEIS is available for public review at each NASA Center. For more information on the DEIS or the Cassini mission, contact Dr. Peter B. Ulrich, Chief of Flight Programs in the Office of Space Science at NASA Headquarters, Code SL, Washington, DC, 20546.

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WIND SPACECRAFT LAUNCHED

The WIND spacecraft was launched this morning at 4:31 AM EST (0931 Nov 1 GMT) on a Delta II rocket from the Air Force base at Cape Canaveral.

Early orbit operations look good. Excellent orbital insertion, high gain antenna deployed, no big blinking alarm lights nor blaring klaxons at the control center.

The spacecraft, after a few lunar swingbys to gain energy, will settle into a halo orbit around the Sun-Earth L1 point, approximately 1 million miles from Earth in the direction of the Sun.

WIND carries a large number of instruments to measure the solar wind (magnetometers, electron and ion spectrometers, etc.) It also contains two Gamma-Ray Burst (GRB) experiments: TGRS and Konus. The spacecraft itself is a large cylinder (maybe 12 feet in diameter and 8 feet tall, I don't know the exact dimensions) with its curved side covered with solar cells. In operation its axis is aligned with the ecliptic pole so that the end planes of the cylinder are always edge-on to the Sun.

Konus is a pair of sodium iodide scintillators, mounted on the North and South faces of the spacecraft. The scintillators emit light when hit by gamma-rays, and this light is collected by phototubes for analysis, which can determine the energy of each gamma-ray to 5-10%. The scintillators are 5" in diameter and 3" long (12.5x7.5 cm), about the size of the Spectroscopy Detectors (not to be confused with the Large Area Detectors) of BATSE on Compton GRO. This Konus instrument is the latest in a long series of Konuses which have flown on many satellites and planetary and interplanetary probes.

TGRS is a solid-state Germanium detector. It is basically a large diode (215 cubic centimeters, in a 6.7 cm diameter, 6.1 cm long cylinder) which passes a pulse of current when a gamma-ray hits it. Germanium detectors have much better energy resolution than scintillators (~2 keV for a 1000 keV gamma-ray) but are harder to manufacture and only work at low temperatures. TGRS is on the South face of the space craft, surrounded on the sides by a sun shield, and has a radiator exposed to the Southern sky which will allow the detector to passively cool to about 80 Kelvin.

When a gamma-ray burst occurs, both instruments will collect data at high speed to be transmitted back to Earth. Timing information, when combined with times from other spacecraft around the solar system, will allow the GRB to be located by triangulation. TGRS will be the first instrument to return large numbers* of high-resolution GRB spectra, which may hold the clues to determining what these enigmatic sources are.

WIND was built at Martin Marietta, formerly GE Aerospace, soon to be Martin Lockheed. Konus was built in Russia, formerly USSR. TGRS was built at Goddard Space Flight Center/NASA.

*A GRB was recorded by a Germanium spectrometer on an Apollo mission, before the existence of GRBs was known. One strong GRB was measured by the Ge spectrometer on Mars Observer en route to Mars.

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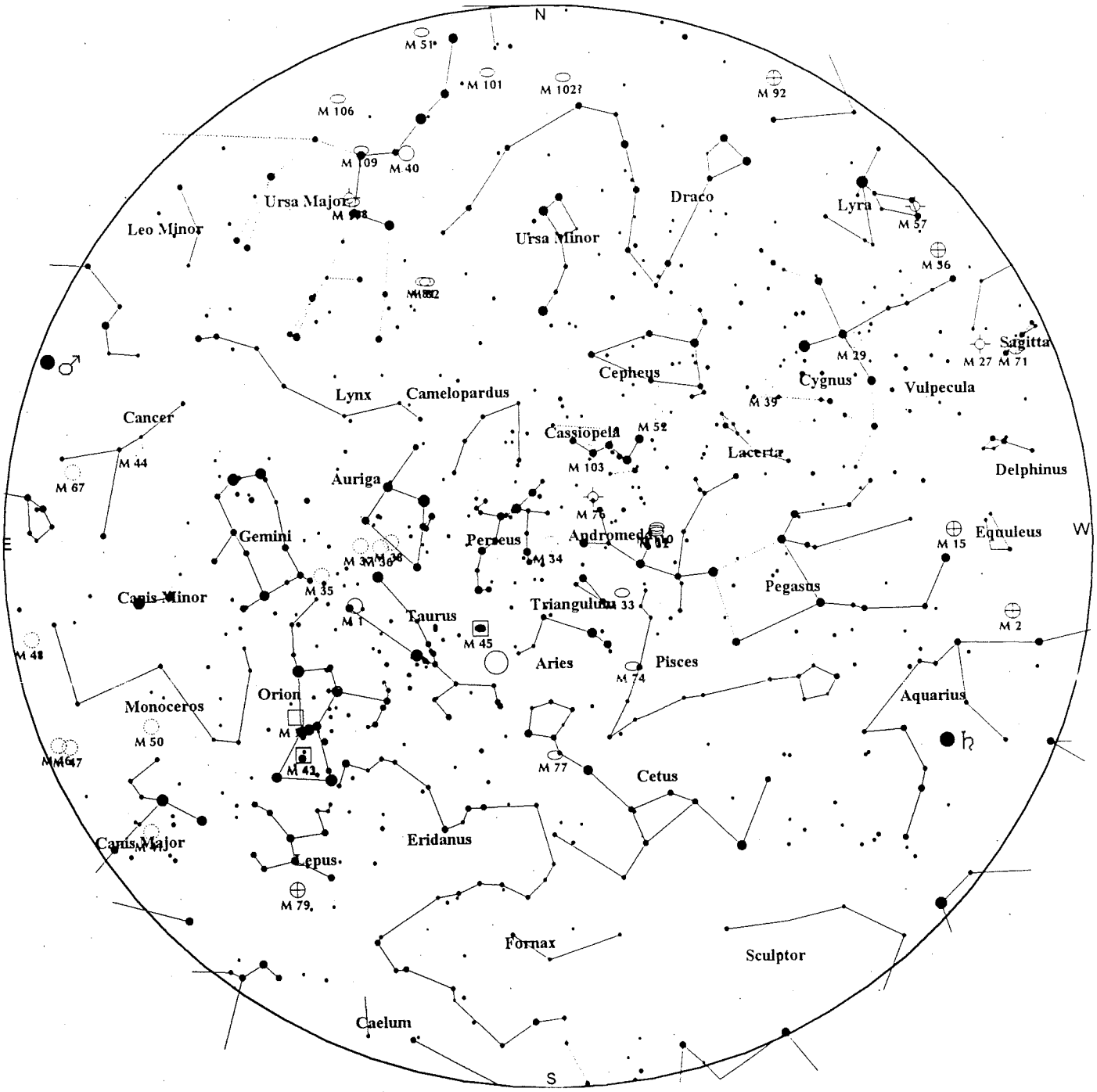
PHOTOGRAPHIC DARKROOM EQUIPMENT FOR SALE

A FAAC member has submitted an ad of a friend who is selling off their entire dark room equipment and chemicals. Included are: Beseler 67 Stabilizer, Honeywell Sable I Color printing mach., Elwood enlarger, print dryers, processing drums, filters, light box, Beslar 75mm f3.5 & 50mm f3.5 enlarging lenses, & much more.

Folks interested should contact Mike Florian at 313-822-7080 evenings.

November's Skies



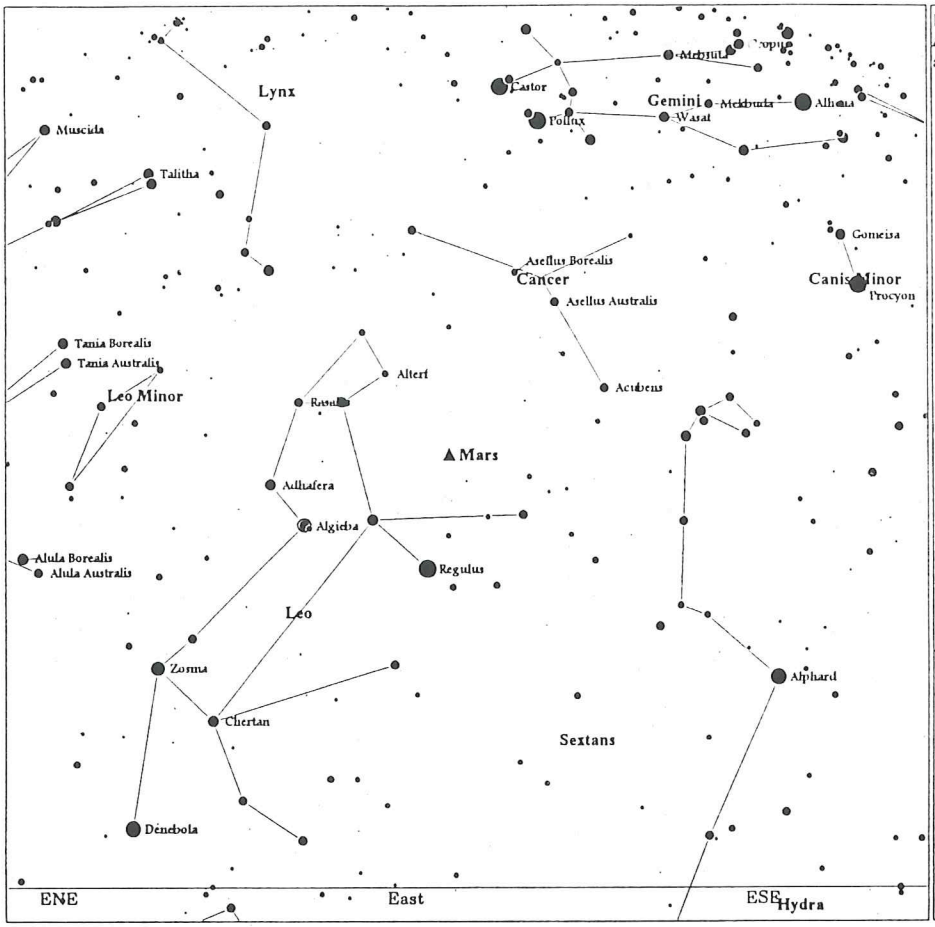
STARS	SOLAR SYSTEM		
• <1 • 3.5	☿ Mercury	♅ Uranus	Galaxy
• 1.5 • 4	♀ Venus	♆ Neptune	Globular Cluster
• 2 • 4.5	♂ Mars	♇ Pluto	Open Cluster
• 2.5 • >5	♃ Jupiter	☄ Comet	Planetary Nebula
• 3	♄ Saturn	⚴ Asteroid	Diffuse Nebula
			Other Object

NOTES

Local Time: 23:30:00 17-Nov-1994
Location: 42° 22' 0" N 83° 17' 0" W

UTC: 04:30 00 18 Nov 1994
Centre Az: 180.0° Alt 90 0' Field 180 0°

Sidereal Time: 02 44 50
Julian Day: 2449674 6875



Finding Mars - Ford Astronomy Club, 2:00 am EST

Stars:

9.5	5.0
9.0	4.5
8.0	3.8
7.5	3.1
7.0	2.8
6.0	2.5
5.6	2.0
5.3	1.0

NGC Objects:
- Galaxy
- Open Cluster
- Globular Cluster
- Planetary Nebula
- Nebula
- Cluster+Nebulosity
- Star
- Other NGC Objects

Solar System Objects:
- Sun
- Mercury
- Venus
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune
- Pluto
- Moon
- Comet
- Asteroid

Center at:
RA: 11h 2m
Dec: - 3d35'
Date: 11/18/94
Time: 2:00 AM

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