



*The
Ford
Amateur
Astronomy
Club
Newsletter*



Happy Holidays!

Volume 2 Number 12 December 1993

SKY & TELESCOPE NEWS BULLETINS

MERCURY TRANSIT OBSERVED

Observers in Hawaii and Australia have reported their success in watching the transit of Mercury across the Sun on November 6th. The event was visible throughout the western Pacific Ocean and most of Asia. One of the more unusual observations came from space. Images obtained by the Yohkoh spacecraft -- an X-ray satellite jointly operated by Japan, England, and the United States -- reveal a trail of tiny dots, where Mercury blocked the X-ray emission as the planet crossed the Sun's southwestern limb.

IO FLUX TUBE

In November 13th's issue of Science magazine, astronomers report on direct observations of the "flux tube" that extends between Jupiter and its moon Io. John Connerney of NASA's Goddard Space Flight Center and three colleagues from the University of Hawaii explain that their observations using the 3-meter Infrared Telescope Facility atop Mauna Kea revealed a spot in Jupiter's atmosphere that glows with the emission of ionized hydrogen molecules. The appearance and location of this spot is directly linked to Io. The spot moves with the satellite like a ghost image, indicating that it is the foot of an enormous current flow -- some 5 million amperes, or about 2 million megawatts of power -- between the two bodies. These observations will help astronomers lock in on this interesting area of Jupiter's atmosphere once the Galileo spacecraft reaches the planet in 1995.

MARS 94 ON THE ROPES

The international Mars 94 mission is in danger of cancellation. Last fall Russian space officials announced that their Mars-exploration program was running out of funds. The French

space agency CNES has already invested substantial development funds. Even if other nations can supply the money to keep Mars 94 alive, the mission will likely be delayed until the 1996 launch window. Mars 94 is to include the first probe to land on the Martian surface since Viking 2 touched down in September 1976.

SUPERNOVA HAT-TRICK

Astronomers at Cerro Tololo Inter-American Observatory in Chile had a recent string of good luck, discovering a pair of supernovas in separate galaxies on Schmidt plates taken just 40 minutes apart. Then a third supernova showed up on a plate taken 20 hours later. All three are quite faint.

LUNAR ECLIPSE HIGHLIGHTS

Although clouds plagued the Northwest, much of the United States was clear for November's lunar eclipse. It was also viewed from England and western Europe. From the reports we've received so far, the eclipsed Moon was a stunning sight high in the sky between the Hyades and Pleiades star clusters. Some say it was the darkest eclipse they'd ever seen, while others said it was rather bright -- especially along the southern rim. Some observers say the eclipsed Moon looked slate gray, and others report hints of blue, orange, and red. The most prominent display of red seemed to come as totality neared its end. If you have reports or photographs of the eclipse, we'd like to hear from you soon! Send them to: Sky & Telescope, P. O. Box 9111, Belmont, MA 02178. Be sure to mark "eclipse" on the outside of the envelope.

PREDICTING THE CRASH

Dynamicists are beginning to hone their calculations of precisely when the "string of pearls" comet, Shoemaker-Levy 9, will plow
(continued on page 2.)

STAR STUFF

Monthly Publication of the
Ford Amateur Astronomy Club
Star Stuff Newsletter

P. O. Box 7527

Dearborn, Michigan 48121-7527

1993 CLUB OFFICERS

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

GENERAL MEETINGS

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

OBSERVING SITE

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

OBSERVING HOTLINE NUMBER (313) 248-1941

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

MEMBERSHIP AND DUES

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

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

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

NEWSLETTER STAFF

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

NEWSLETTER SUBSCRIPTION

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

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SKY & TELESCOPE NEWS BULLETINS...

(Continued from page 1.)

into Jupiter next July. Brian G. Marsden calculates that the nine brightest nuclei will hit from July 18.7 to July 23.2 (Universal Time), with the brightest and presumably largest fragment striking on July 21.6. Moreover, he now feels "absolutely certain" that these nine nuclei, and by implication the others, will collide with the planet's backside. Another set of predictions comes from Zdenek Sekanina, Paul W. Chodas, and Donald K. Yeomans (Jet Propulsion Laboratory). They conclude that impacts of the 21 best-observed nuclei will fall into Jupiter between July 18.5 and 23.9 UT, with the brightest one hitting on July 22.4. The JPL team's times are about a day later than Marsden's, an indication that much uncertainty remains. Right now the comet is too close to the Sun to observe. But once observations resume later this month, the impact predictions should improve dramatically.

VICE PRESIDENT'S CLOSET

Filling in for Greg this month, and on behalf of all the FAAC & Star Stuff staff I would like to thank our entire membership for making this year very successful. We hope that you will renew your memberships come next year as we are planning even more exciting events such as contests, outings, hands-on workshops, and family nights. As astronomy clubs go, our club has a respectable number of members and the list continues to grow. Thank you again and have a pleasant and joyous holiday season. Ad Astra!

Brian Gossiaux

Off Axis

The following was found in the Spy Glass Network newsletter:

Jingle Bells

Observing in the cold
Through the winter Milky Way
O'er star fields we go
Gasping all the way

Fingers start to sting
Streetlights are too bright
What fun it is to laugh and sing
A scoping song tonight, oh

Jingle Bells, Nova Shells
Split that double star
Oh how nice it looks inside
But we're in our backyard, oh

Jingle Bells, Sure are Swell
Tripods in the snow
Where the heck's that 'Horsehead'
I no longer feel my toes

by Douglas Bock
PROFS=DBOCK1

Observing Log from the Northern Cross Observatory

Hello again. This last month was fairly eventful with a star party and the Lunar eclipse, plus a couple of other nights of general observing. There were other astronomy related projects going on also.

Roger Tanner has been working on the controller for the 12.5 inch scope, adding a digital display for R.A., DEC. and Sidereal time. That project is not done yet, but he is still plugging away at it. My contribution was to hound him about getting it done. I am pretty good at nagging people.

The November 13th star party started with clouds in the afternoon until about 5:30 pm, but was clear after that until about midnight. Unfortunately no one knew that from the Detroit area, since it was cloudy down there. So we didn't get a turnout for it. But I opened up the observatory anyway and had a nice evening. It was not a good night for observing faint objects since it was windy and somewhat hazy the entire night. I rated the sky conditions about a 4 to 5 on a scale of 0 to 10. I have never rated Michigan skies as high as 10, at least not from this location. A good night out here is usually an 8 to 9. The things I take into account for sky conditions are transparency, humidity, sky glow, and steadiness of the image. A zero rating has never been recorded here since those conditions mean it is probably raining, or snowing or in general, fairly nasty. I would end up filling 300 pages of logs with zeros each year. ha ha. Comet Mueller is up and I gave that a try. No luck. But I did see some of the old favorites again.

On November 27th, Roger and I tried for the comet again with a fairly bright moon, however it never became evident to us. We either don't have a good set of coordinates or it is fainter than predicted. Possibly more diffuse than other comets I have seen. We will try again for this in the next couple of weeks, when the moon is more favorable. If I can find it I will try to photograph it.

The lunar eclipse, on the 28th-29th, was next on the agenda. Sunday evening started off partially clear and became progressively worse as the evening went on. But I decided to wait it out. The cloud cover was approximately 85 percent at about 9:00 pm. I put the camcorder piggy-backed on the 12 inch and set it up to take interval frames every 30 seconds starting at about 10:00 pm. I also put the OM-1 at prime focus of the 12 inch. I used ekta-chrome 400 in that camera. Roger piggy-backed one of his cameras on the 12 also. Unfortunately, he found out the next day that this camera didn't have any film in

it. Later he setup his 6-inch and ran 2 cameras on the back of that scope. The plan was to wait for holes in the clouds and shoot while we could see it. This meant paying attention to the sky constantly. I had to trigger the cam corder and fire the OM-1 when an opening in the clouds appeared. This looked allot like a chinese fire drill.

We got enough holes in the sky to catch a significant amount of the partial phases. Then at about 12:45 the sky cleared for about 45 minutes. So I set the timer on the camcorder to every 30 seconds and let it fly on its own. Meanwhile I could concentrate on several exposures on the olympus. We used the LFK guide as a general rule of thumb for exposures, but had to vary them according to the cloud density. Needless to say, this was not an ideal way of photographing this event. But it made it a little more exciting. We followed the eclipse all the way into totality. In previous eclipses the moon showed more copper color, but in this eclipse it seemed mostly gray and much darker. The sky conditions weren't great so the haze may have taken some of the color out. The contrast was poor also. We did see several bright stars around the moon during mid eclipse though.

Finally at about 1:45 the clouds came in for good. In fact it started snowing on us before we got everything packed away. It was worth staying up for and was allot of fun. Hopefully I managed to get a few good shots on film. The video wasn't very impressive but did show the progression of the eclipse.

We have a star party scheduled for Dec. 11 and Dec. 18. I'll let you know how they go.

Don't forget to look for Comet Mueller and Comet Encke in January.

Until next time, hope you have clear weather.

□

REQUEST FOR ARTICLES/PICTURES

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

ASTRONOMY WORKSHOP



Sir Isaac Newton

By Gary W. Miller, Star Gazer

PROFS: gmille12

FAX: 84-55349

(call to let me know something has been sent)

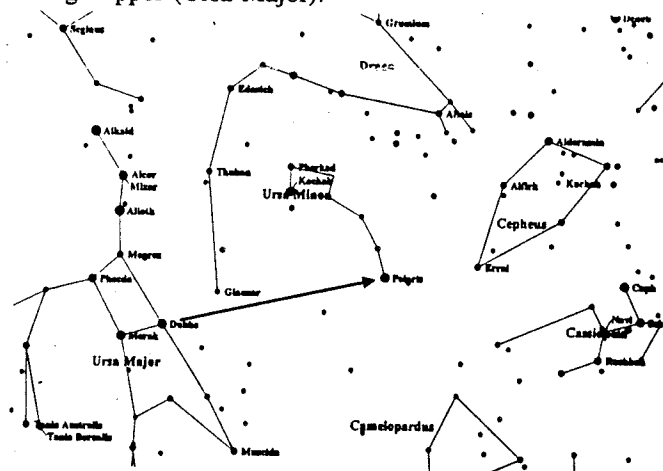
PHONE: 84-54150

This is the fourth installment of this column. I received two more questions from one of our readers and they will appear in this column. See, instant

response from the editor! Hopefully others of you out there in computer land will see the willingness of the editor to respond and loosen up a bit and submit some additional questions and maybe some answers too. As I indicated in the last column, only one question from each of you would be VERY helpful. Here are this months offerings:

Q9. How do you find the north star and get set up to find your way around the sky?

A9. Telling how to find the North Star without a diagram is somewhat difficult. It can be found by looking straight north, about 45 degrees up from the horizon. It is a reasonably bright star, and is the last star in the handle of the Little Dipper (Ursa Minor). It can also be found by following the "pointer stars" in the Big Dipper (Ursa Major).



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

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

Q11. Which way does the Earth rotate on it's axis, east to west or west to east?

A11. The Earth rotates toward the east (counter-clockwise if you're looking down on the North Pole), as evidenced by the general motion in the opposite direction of everything not attached to the Earth, e.g. Sun, Moon, stars, etc.

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

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

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

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

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

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

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

Q18. What basic star charts do recommend?

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

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

Q21. What are "deep-sky" objects?

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

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

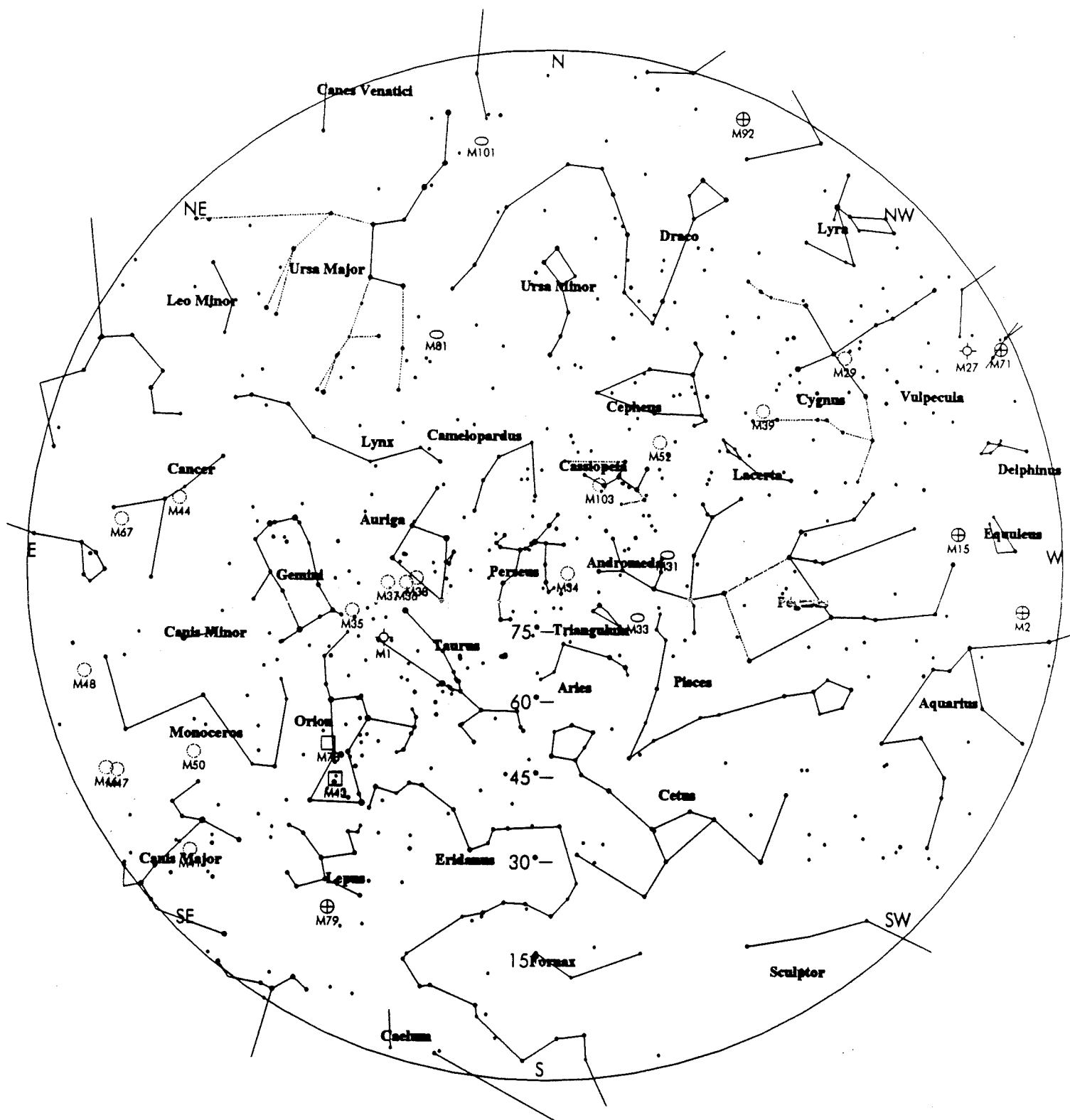
Q24. What are "enhanced coatings" and what do they do?

Q25. What are your suggestions to reduce light pollution?





OBSERVATIONS

As I write this column the lunar eclipse is scheduled for Sunday night. Looks like it will be wishful thinking on my part to see anything due to the inclement weather also scheduled for the same time. Oh well, maybe next time. Sometimes it's really difficult to stay interested in this hobby because of the weather. If outdoor observing were my only interest, I would have given in a long time ago. Needless to say, there are other ways to enjoy astronomy. One of my other interests is to learn as much as possible to be able to be as productive under the stars when the opportunity presents itself. Several book line my shelves to keep me gainfully occupied while the clouds are here. I plan some observing sessions for each season ahead of time too. One thing that has not been kept up to date is my logbook. I "keep starting over" each time I observe. Even though the sessions are planned, the notebook suffers. Someday I will combine the two. Until next time.....clear skies.

DECEMBER'S SKIES



DECEMBER 1993

SUN	MON	TUE	WED	THUR	FRI	SAT
			1	2	3	4
5	6 LAST QUARTER MOON 	7	8 HANUKKAH	9 The Ford Amateur Astronomy Club meeting	10 Jupiter 4°N. of Moon Moon at perigee	11
12 Mercury 5°N. of Antares Geminid Meteors	13 NEW MOON Geminid Meteors 	14 Geminid Meteors	15	16	17	18 Saturn 7°S. of Moon
19	20 FIRST QUARTER MOON 	21 Winter Solstice, 3:28 pm	22 Moon at apogee	23	24	25
26 Mars in conjunction with Sun	27	28 FULL MOON 	29	30	31	CHRISTMAS DAY

NEXT MONTH

The Ford Amateur Astronomy Club general meeting is January 27th!
January 8th and 15th. Invitation to star parties at Doug Bock's place.

MEETING ANNOUNCEMENT -- DECEMBER 9, 1993

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

The Ford Amateur Astronomy Club meets in the Ford Motor Credit Company (FMCC) "Systems K" conference room, located on the lower floor in the far NorthEast corner of the building. FMCC is the low building immediately northeast of (but not attached to) Ford World Headquarters in Dearborn. The FMCC building is secured with a card entry system. The easiest way to enter the building for meetings is to park in the northeast lot (Employee Lot 7) and enter through the lower northeast door. At 5:00 p.m. no one seems to have much trouble getting in because many people are leaving around that time. If it becomes a problem we will just prop the door open. You may, of course, find your way into the building any way you see fit, but I will post direction signs only between the lower northeast door and the meeting room.

Hope to see you at the meeting!

STATISTICALLY SPEAKING....

Dearborn, MI

Latitude: 42022'00" N Longitude: 83017'00" W

Local Time = UT - 5.00 hours Elevation: 180 meters

Planet View Info Report for 12/ 1/1993 to 12/31/1993

December				1993				
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
			1	2	3	4		
			SR: 7:43	SR: 7:44	SR: 7:45	SR: 7:46		
			SS: 17:02	SS: 17:01	SS: 17:01	SS: 17:01		
			MR: 19:25	MR: 20:29	MR: 21:35	MR: 22:43		
			MS: 9:38	MS: 10:20	MS: 10:58	MS: 11:31		
		5	6	7	8	9	10	11
SR: 7:47	SR: 7:48	SR: 7:49	SR: 7:50	SR: 7:51	SR: 7:52	SR: 7:52	SR: 7:52	
SS: 17:01	SS: 17:01	SS: 17:00	SS: 17:00	SS: 17:00	SS: 17:00	SS: 17:00	SS: 17:01	
MR: 23:52	MR: None	MR: 1:03	MR: 2:14	MR: 3:27	MR: 4:40	MR: 5:52		
MS: 12:03	MS: 12:33	MS: 13:03	MS: 13:35	MS: 14:11	MS: 14:52	MS: 15:39		
		LQ: 10:49						
12		13	14	15	16	17	18	
SR: 7:53	SR: 7:54	SR: 7:55	SR: 7:55	SR: 7:56	SR: 7:57	SR: 7:57	SR: 7:57	
SS: 17:01	SS: 17:01	SS: 17:01	SS: 17:01	SS: 17:01	SS: 17:02	SS: 17:02	SS: 17:02	
MR: 7:00	MR: 8:01	MR: 8:54	MR: 9:37	MR: 10:14	MR: 10:46	MR: 11:14	MR: 11:14	
MS: 16:34	MS: 17:36	MS: 18:41	MS: 19:47	MS: 20:53	MS: 21:56	MS: 22:57		
		MD: 4:28						
19		20	21	22	23	24	25	
SR: 7:58	SR: 7:59	SR: 7:59	SR: 8:00	SR: 8:00	SR: 8:01	SR: 8:01	SR: 8:01	
SS: 17:03	SS: 17:03	SS: 17:04	SS: 17:04	SS: 17:05	SS: 17:05	SS: 17:05	SS: 17:06	
MR: 11:40	MR: 12:05	MR: 12:30	MR: 12:57	MR: 13:27	MR: 14:00	MR: 14:36	MR: 14:36	
MS: 23:57	MS: None	MS: 0:56	MS: 1:54	MS: 2:53	MS: 3:52	MS: 4:50		
		FQ: 17:27						
		DSO:15:27						
26		27	28	29	30	31		
SR: 8:01	SR: 8:02	SR: 8:02	SR: 8:02	SR: 8:02	SR: 8:02	SR: 8:02		
SS: 17:07	SS: 17:07	SS: 17:08	SS: 17:09	SS: 17:10	SS: 17:10	SS: 17:10		
MR: 15:24	MR: 16:16	MR: 17:14	MR: 18:18	MR: 19:25	MR: 20:34			
MS: 5:48	MS: 6:42	MS: 7:33	MS: 8:18	MS: 8:58	MS: 9:34			
		FM: 18:07						

Date	Twilight		Report for 12/		1/1993 to 12/31/1993		Civil	
	Sun Rise	Set	Astronomical Begin	End	Nautical Begin	End	Begin	End
12/1/1993	7:43	17:02	5:58	18:47	6:32	18:13	7:06	17:38
12/8/1993	7:40	17:00	6:04	18:46	6:38	18:12	7:13	17:37
12/15/1993	7:55	17:01	6:13	18:49	6:43	18:14	7:18	17:33
12/22/1993	8:00	17:04	6:13	18:51	6:47	18:17	7:17	17:41
12/29/1993	8:02	17:09	6:16	18:55	6:50	18:21	7:25	17:46

Date	Rise	Set	RA	Mercury Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	6:11	16:11	15h16m51s	-16d25°06'	17d42°10'	0.819	1.18719
12/ 8/1993	6:38	16:12	15h58m02s	-19d35°43'	14d29°36'	0.907	1.30014
12/15/1993	7:07	16:18	16h42m25s	-22d13°00'	10d55°44'	0.955	1.37741
12/22/1993	7:34	16:29	17h28m59s	-24d00°09'	7d16°18'	0.982	1.42375
12/29/1993	7:58	16:47	18h17m11s	-24d47°14'	3d39°42'	0.995	1.44210

Date	Rise	Set	RA	Venus Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	6:46	16:26	15h41m42s	-18d46'56"	11d20'14"	0.982	1.56369
12/ 8/1993	7:03	16:27	16h18m09s	-20d46'59"	9d37'28"	0.987	1.67553
12/15/1993	7:19	16:30	16h55m29s	-22d17'48"	7d55'23"	0.991	1.68732
12/22/1993	7:34	16:37	17h33m30s	-23d16'05"	6d14'03"	0.995	1.69605
12/29/1993	7:47	16:46	18h11m54s	-23d39'34"	4d33'44"	0.997	1.70284

Date	Rise	Set	RA	Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	8:20	17:22	16h58m12s	-23d15'19"	7d02'59"	0.998	2.44938
12/ 8/1993	8:18	17:15	17h20m41s	-23d46'01"	5d08'36"	0.999	2.44544
12/15/1993	8:14	17:09	17h43m30s	-24d04'40"	3d16'59"	1.000	2.44002
12/22/1993	8:10	17:04	18h06m33s	-24d10'46"	1d32'23"	1.000	2.43321
12/29/1993	8:05	17:00	18h29m46s	-24d03'58"	0d56'23"	1.000	2.42520

Date	Rise	Set	RA	Jupiter Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	4:43	15:19	14h09m11s	-11d53'21"	34d38'43"	0.997	6.22889
12/ 8/1993	4:22	14:55	14h14m25s	-12d19'59"	40d23'22"	0.997	6.15873
12/15/1993	4:01	14:31	14h19m27s	-12d45'00"	46d12'27"	0.996	6.07995
12/22/1993	3:40	14:06	14h24m15s	-13d08'13"	52d06'07"	0.995	5.99328
12/29/1993	3:18	13:42	14h28m46s	-13d29'33"	58d04'36"	0.994	5.89358

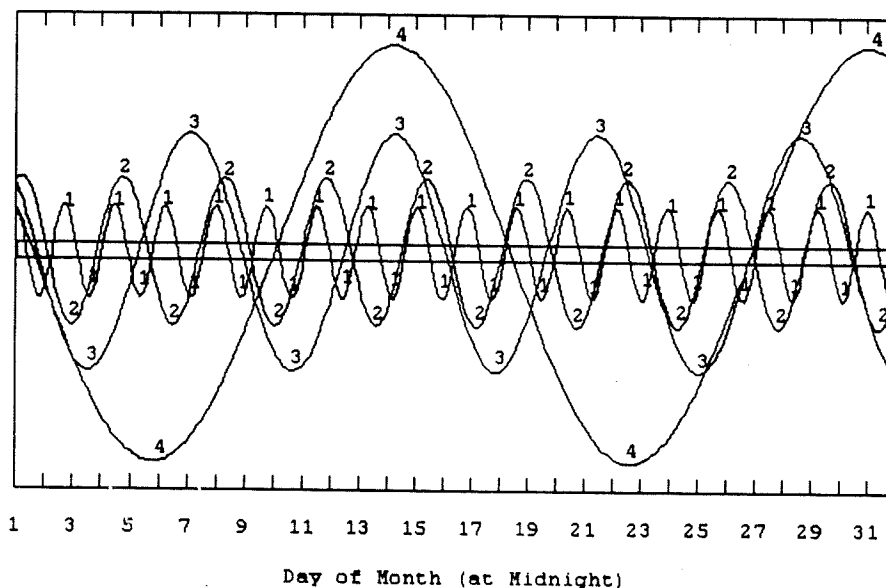
Date	Rise	Set	RA	Saturn Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	12:32	22:46	21h48m50s	-14d44'.55"	75d36'.28"	0.998	10.01926
12/ 8/1993	12:06	22:21	21h50m30s	-14d35'.47"	68d56'.20"	0.998	10.12977
12/15/1993	11:39	21:56	21h52m26s	-14d25'.16"	62d19'.23"	0.998	10.23548
12/22/1993	11:13	21:31	21h54m36s	-14d13'.27"	55d45'.43"	0.998	10.33494
12/29/1993	10:47	21:07	21h57m00s	-14d00'.28"	49d15'.21"	0.999	10.42688

Date	Rise	Set	RA	Dec	Uranus Elongation	Ill Fr	DIST (AU)
12/ 1/1993	10:42	19:51	19h26m26s	-22d24'49"	41d06'05"	1.000	20.36143
12/ 8/1993	10:16	19:26	19h27m56s	-22d21'41"	34d20'57"	1.000	20.43568
12/15/1993	9:50	19:00	19h29m30s	-22d18'19"	27d36'09"	1.000	20.49838
12/22/1993	9:24	18:34	19h31m10s	-22d14'45"	20d51'52"	1.000	20.54863
12/29/1993	8:58	18:09	19h32m52s	-22d11'01"	14d08'15"	1.000	20.58582

Date	Rise	Set	RA	Neptune Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	10:35	19:53	19h23m35s	-21d25'12"	40d35'25"	1.000	30.92316
12/ 8/1993	10:08	19:27	19h24m31s	-21d23'28"	33d42'43"	1.000	30.99553
12/15/1993	9:42	19:00	19h25m32s	-21d21'34"	26d49'56"	1.000	31.05586
12/22/1993	9:15	18:34	19h26m35s	-21d19'31"	19d57'22"	1.000	31.10357
12/29/1993	8:49	18:08	19h27m40s	-21d17'21"	13d05'17"	1.000	31.13766

Date	Rise	Set	RA	Pluto Dec	Elongation	Ill Fr	DIST(AU)
12/ 1/1993	5:58	17:19	15h47m24s	-5d55'05"	18d41'23"	1.000	30.68998
12/ 8/1993	5:32	16:52	15h48m26s	-5d58'11"	23d49'10"	1.000	30.65700
12/15/1993	5:05	16:26	15h49m27s	-6d00'48"	29d38'10"	1.000	30.61095
12/22/1993	4:39	15:59	15h50m26s	-6d02'54"	35d48'54"	1.000	30.55243
12/29/1993	4:12	15:32	15h51m21s	-6d04'28"	42d12'11"	1.000	30.48232

Jupiter Moons Orbit Graph for December 1993
1: Io 2: Europa 3: Ganymede 4: Callisto



Seems like I just get one issue out the door when its time again to get the next one going. While I have not been able to get out and observe with the scope at all last month, I will provide you readers with some interesting objects to try and locate. The article this month consists of circulars from the IAU detailing the positions of several periodic comets that will be visible in a telescope in the next two months. Also look at the recent issues of Astronomy and Sky & Telescope magazines for a list of coordinates for these and additional comet positions.

HOPEFULLY, next month, I will be able to return to some good old fashioned observing so as to get back to the original format of this monthly installment. Next month will feature the constellation of Orion. Good luck and good hunting.

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Circular No. 5893

PERIODIC COMET SHOEMAKER-LEVY 9 (1993e)

The new orbit computations (IAUC 5892) demonstrate that it is absolutely certain that all of the individual nuclei observed by Spacewatch will pass some 0.0002 AU from the center of Jupiter (the radius of which is 0.0005 AU) in July 1994, the computed collision times being as follows: nucleus 17, July 18.7 UT; 15, 19.1; 14, 19.6; 12, 20.2; 11, 20.9; 7, 21.6; 6, 22.1; 5, 22.7; 1, 23.2. On July 17.0 this portion of the train will extend 14 arcmin in p.a. 61-241 deg. The ephemeris below is for nucleus 7, but the magnitude is a guess for the total comet. Now that the basic dynamical history of the comet has been established, observers are requested to provide astrometric measurements (preferably using CCDs) only of the individual nuclei, not of the "center of the train"; separations between nuclei can be quoted with precision better than 0.1 arcsec if circumstances allow.

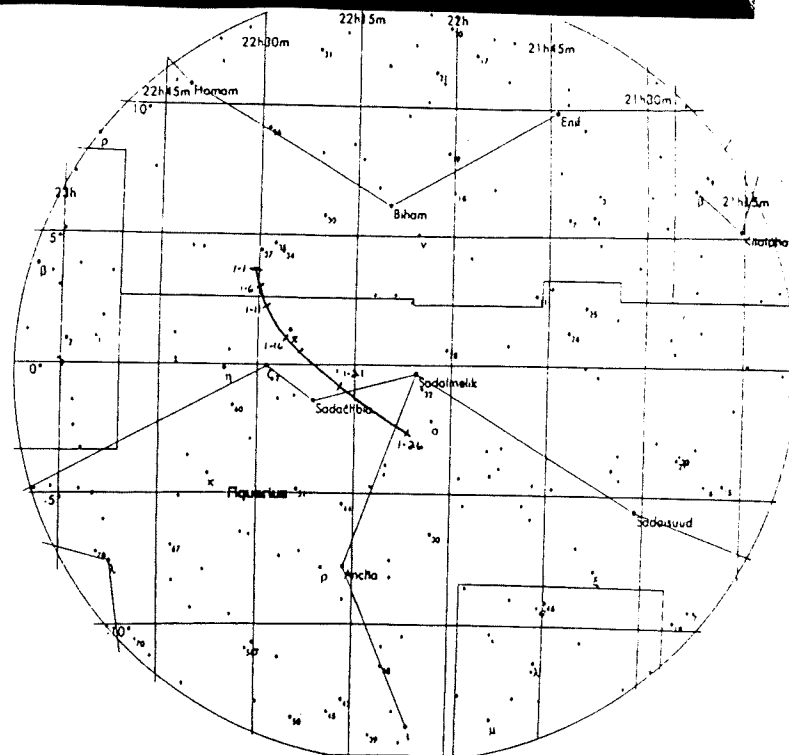
1993/94	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	mi
Nov. 29	13 58.25	-12 58.8	6.185	5.405	34.8	6.0	14.3
Dec. 9	14 05.83	-13 38.6	6.081	5.403	43.0	7.1	14.2
19	14 12.99	-14 15.2	5.960	5.400	51.3	8.2	14.2
29	14 19.59	-14 48.1	5.825	5.398	59.8	9.1	14.1
Jan. 8	14 25.52	-15 16.8	5.678	5.396	68.5	9.8	14.1
18	14 30.67	-15 40.9	5.522	5.394	77.4	10.3	14.0
28	14 34.90	-16 00.0	5.361	5.392	86.5	10.5	14.0
Feb. 7	14 38.11	-16 13.7	5.199	5.390	95.8	10.5	13.9
17	14 40.19	-16 21.7	5.040	5.388	105.4	10.2	13.8
27	14 41.07	-16 23.8	4.889	5.387	115.3	9.6	13.8
Mar. 9	14 40.74	-16 19.7	4.749	5.386	125.4	8.6	13.7
19	14 39.22	-16 09.7	4.626	5.385	135.8	7.4	13.6
29	14 36.62	-15 53.8	4.524	5.384	146.4	5.9	13.6
Apr. 8	14 33.13	-15 32.9	4.447	5.383	157.1	4.1	13.5
18	14 29.00	-15 07.9	4.397	5.383	168.0	2.2	13.5
28	14 24.54	-14 40.3	4.377	5.383	178.9	0.2	13.5
May 8	14 20.11	-14 11.7	4.387	5.384	170.2	1.8	13.5
18	14 16.04	-13 44.0	4.426	5.385	159.4	3.8	13.5
28	14 12.64	-13 18.8	4.493	5.386	148.9	5.6	13.6
June 7	14 10.13	-12 57.6	4.585	5.389	138.6	7.1	13.6
17	14 08.70	-12 41.2	4.698	5.392	128.7	8.5	13.7
27	14 08.47	-12 30.2	4.829	5.396	119.0	9.5	13.7
July 7	14 09.51	-12 24.3	4.973	5.401	109.7	10.2	13.8
17	14 11.96	-12 22.0	5.128	5.410	100.7	10.6	13.9

Circular No. 5894

COMET MUELLER (1993a)

Ephemeris from orbital elements on MPC 22663:

1993/94	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	mi
Nov. 29	20 31.83	+46 30.3	1.783	2.015	88.5	29.3	8.8
Dec. 4	20 31.49	+41 54.9	1.833	1.999	84.7	29.4	8.8
9	20 30.22	+37 40.0	1.892	1.985	80.6	29.3	8.9
14	20 30.22	+33 46.8	1.960	1.972	76.2	29.0	8.9
19	20 30.75	+30 15.4	2.035	1.962	71.7	28.4	9.0
24	21 12.40	+27 04.9	2.113	1.953	67.1	27.6	9.0
29	21 19.16	+24 13.8	2.194	1.946	62.5	26.6	9.1
Jan. 3	21 25.88	+21 40.4	2.277	1.941	57.9	25.4	9.2
8	21 32.03	+19 23.0	2.359	1.938	53.3	24.0	9.2
13	21 37.95	+17 19.8	2.439	1.937	48.7	22.4	9.3
18	21 43.07	+15 29.1	2.517	1.938	44.3	20.7	9.4
23	21 49.21	+13 49.3	2.592	1.941	39.9	19.0	9.4
28	21 54.59	+12 19.1	2.662	1.946	35.5	17.1	9.5



TRACKING COMET ENCKE

Circular No. 5899

PERIODIC COMET ENCKE

Ephemeris from orbital elements on MPC 18256:

1993/94	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	mi
Nov. 29	22 40.37	+7 28.4	0.953	1.457	97.4	42.2	12.1
Dec. 4	22 36.28	+6 30.3	0.956	1.386	94.2	43.2	11.7
9	22 33.33	+5 50.8	0.956	1.316	85.4	48.2	11.3
14	22 31.34	+5 11.5	0.954	1.242	79.7	51.2	10.9
19	22 30.18	+4 37.6	0.947	1.166	74.2	54.3	10.5
24	22 29.64	+4 07.8	0.936	1.087	69.0	57.6	10.1
29	22 29.48	+3 40.0	0.918	1.006	63.8	61.3	9.6
Jan. 3	22 29.41	+3 11.6	0.893	0.921	58.6	65.6	9.2
8	22 28.98	+2 38.5	0.861	0.834	53.2	70.9	8.8
13	22 27.57	+1 53.9	0.821	0.744	47.6	77.7	8.3
18	22 24.12	+0 46.6	0.774	0.651	41.4	86.9	7.9
23	22 16.84	-1 03.1	0.721	0.558	33.9	99.9	7.4
28	22 02.96	-4 07.0	0.669	0.467	24.5	119.2	7.1

Circular No. 5896

COMET MUELLER (1993a)

1993/94	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	mi
Nov. 19	6 59.24	+20 32.1	4.061	4.789	132.9	8.7	17.8
29	6 56.42	+20 56.7	3.878	4.709	143.7	7.1	17.7
Dec. 9	6 52.16	+21 25.5	3.718	4.629	154.8	5.2	17.5
19	6 46.65	+21 57.9	3.587	4.549	166.3	2.9	17.4
29	6 40.22	+22 32.7	3.486	4.469	178.0	0.4	17.2
Jan. 8	6 33.34	+23 08.5	3.417	4.389	170.1	2.2	17.1
18	6 26.57	+23 44.1	3.379	4.309	158.3	4.8	17.0
28	6 20.47	+24 18.4	3.371	4.229	146.7	7.3	16.9
Feb. 7	6 15.56	+24 50.9	3.388	4.149	135.5	9.6	16.8

Circular No. 5897

PERIODIC COMET SPITALER (1993r)

Continuation to the ephemeris on IAU 5885:

1993/94	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	mi
Nov. 29	1 23.96	+13 30.5	1.351	2.182	137.4	17.8	17.0
Dec. 9	1 24.74	+13 50.9	1.421	2.167	127.6	21.1	17.1
19	1 28.71	+14 24.7	1.504	2.155	118.6	23.6	17.2
29	1 35.69	+15 11.5	1.597	2.146	110.3	25.5	17.3
Jan. 8	1 45.34	+16 09.3	1.696	2.139	102.6	26.7	17.4
18	1 57.36	+17 16.1	1.801	2.135	95.6	27.3	17.5
28	2 11.44	+18 29.1	1.910	2.133	89.0	27.5	17.7

Six days after grabbing the Hubble Space Telescope 592 km above the Earth, Endeavour's astronauts released it early Friday morning, December 10th. In five back-to-back space walks, Endeavour's crew completed *all* of their scheduled repairs -- a feat made possible by Hubble's design, intensive crew training, and old-fashioned good luck. Already telescope controllers at NASA have begun the long process of getting Hubble ready to resume making astronomical images and spectra.

Alignment and focusing of the HST's new, optically corrected camera should be completed by January's end. Assuming the optical fix works as intended, we'll see the first razor-sharp images from the telescope at that time. Among the likely targets are the giant elliptical galaxy M87 in Virgo and the Orion nebula. Then, throughout February and early March, the three remaining science instruments will be checked out with COSTAR, the package of corrective optics installed by the space-walkers. Then, finally, four years after its launch and the horrifying discovery of spherical aberration, the Hubble Space Telescope will begin to fulfill its promise as the most powerful astronomical instrument ever built.

After a long review in early December, a top-level board of astronomers has decided that thin, meniscus mirrors will be used in the construction of twin 8-meter telescopes known as the Gemini project. Earlier this year the astronomical community was sharply divided as to whether each mirror should be a thin meniscus of ultra-low-expansion glass or a thicker, honeycomb one made of borosilicate. That debate was first aired in SKY & TEL's May 1993 issue. Since then much work has been done by the Gemini Project to prove that the meniscus design will perform as expected. "I believe the meniscus is the better choice," says Alex Boksenberg, director of the Royal Greenwich Observatory, one of the project's international partners. "

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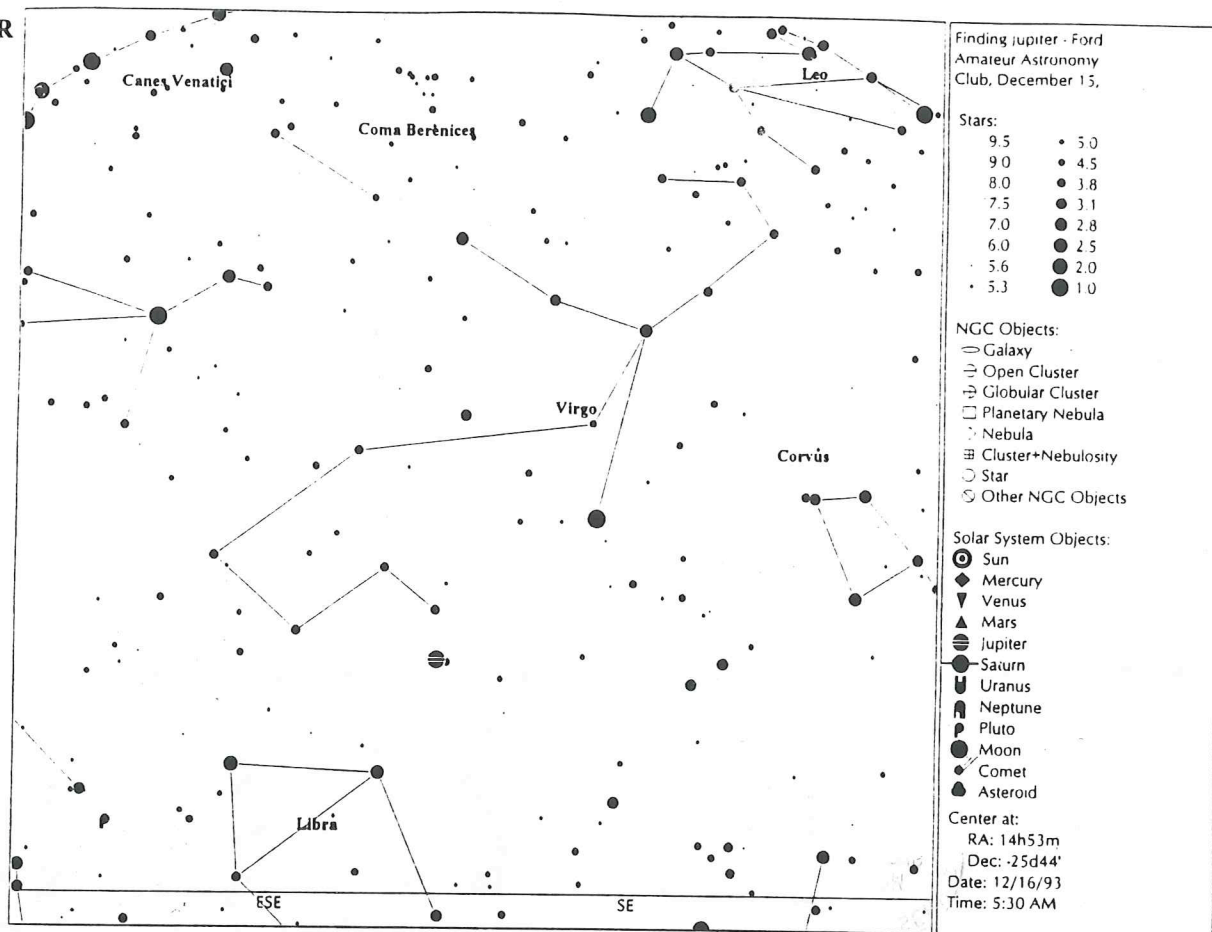
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