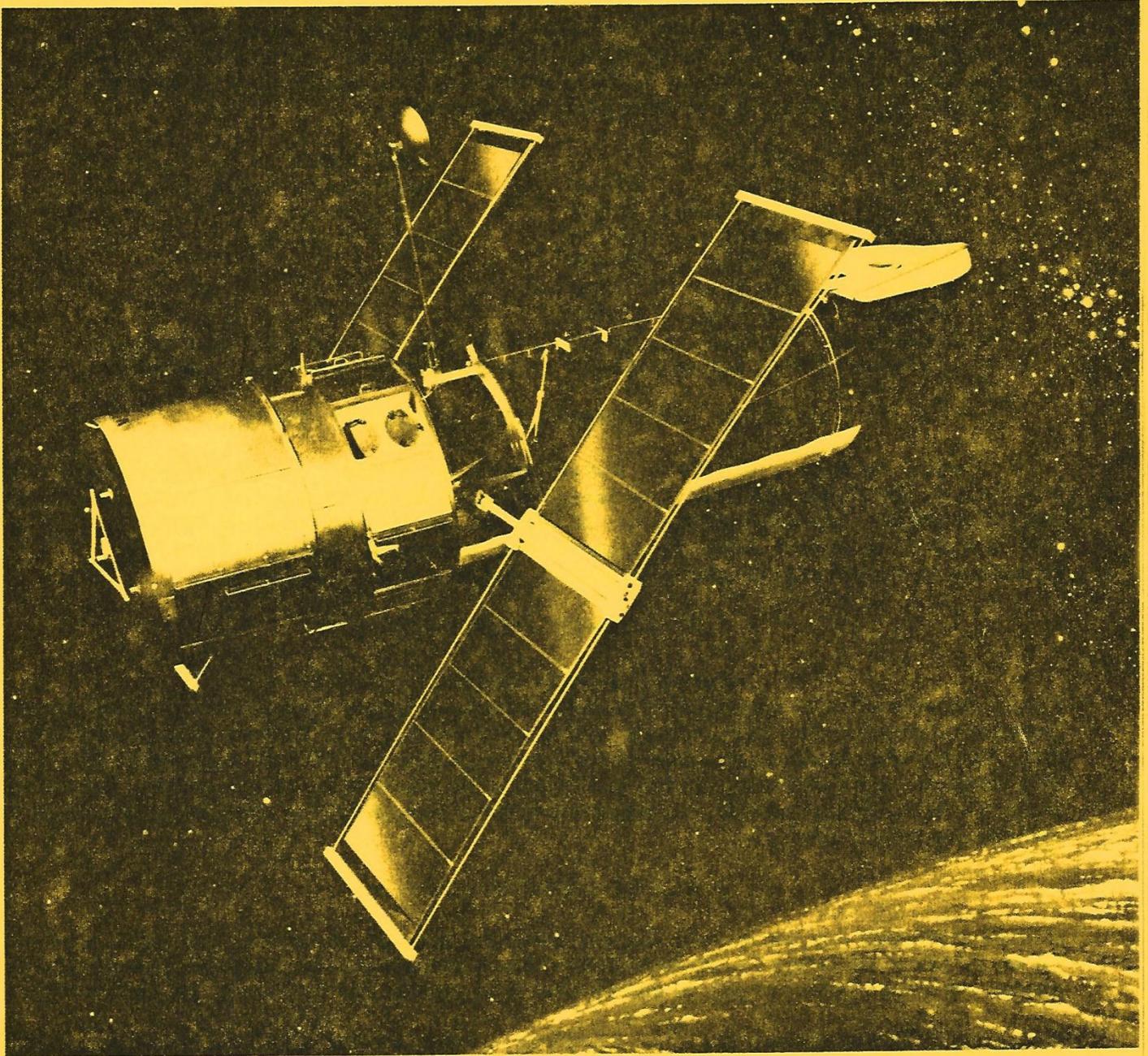


# Warren Astronomical Society Paper

S E P T E M B E R 1 9 8 6



*Space telescope shown in orbit. Space Telescope will have no distortion problem and its images and spectral data will be sent to Earth by electronic means. It will be able to see objects 50 times dimmer than anything seen now.*



## HUBBLE SPACE TELESCOPE

## WARREN ASTRONOMICAL SOCIETY

The Warren Astronomical Society is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month, starting at 7:30 P.M., as follows:

1st. Thursday  
Cranbrook Institute of Science  
500 Lone Pine Rd.  
Bloomfield Hills, MI

3rd. Thursday  
Macomb County Community College  
South Campus  
Building B, Room 21b  
14500 Twelve Mile Rd.  
Warren, MI

Membership is open to those interested in astronomy and its related fields. Dues are as follows:

Student ....\$8 College ....\$12 Senior Citizen... \$12 Individual ....\$17 Family ...\$22

Sky and Telescope Magazine is available for \$14.50 per year, and Astronomy Magazine for \$12.00 per year. Send membership applications and dues to the Treasurer, for faster service.

	OFFICERS		MAILING ADDRESS
President	: Ken Strom	977-9489	Warren Astronomical Society
1st. V.P.	: Alan Rothenberg	355-5844	P.O. Box 474
2nd. V.P.	: Riyad Matti	548-7511	East Detroit, MI 48021
Secretary	: Ken Kelly	839-7250	
Treasurer	: Alice Strom	977-9489	
Librarian	: John Wetzel	882-6816	
Deep Sky Group	: Doug Bock	758-9369	-Meets at Northern Cross Observatory, Fenton, MI
Lunar Group	: Frank McCullough	683-4082	-Meets at Stargate Observatory, Ray Center, MI

## WARREN ASTRONOMICAL SOCIETY PAPER

Editor: Ken Kelly / 839-7250 Send all articles to: THE WASP, P.O. Box 474, East Detroit, MI 48021  
The W.A.S.P. is the official publication of the Warren Astronomical Society and is available free to all club members.

NEWSLETTER EXCHANGES: Send your Newsletter to: THE WASP, P.O. Box 474, East Detroit, MI 48021.

NOTE: Newsletters or change of address notices sent to other addresses may not reach the Editor.

All articles and changes should be submitted at the Cranbrook meeting or before.

## STARGATE OBSERVATORY

Observatory Chairman: Riyad Matti / 548-7511

Stargate Observatory is owned and operated by the Warren Astronomical Society in conjunction with Rotary International. Located on the grounds of Camp Rotary, Stargate features a 12.5 inch club-built Cassegrain telescope under an aluminum dome. The Observatory is open to all members of the club in accordance with 'THE STARGATE OBSERVATORY CODE OF CONDUCT'. Those wishing to use the observatory must call by 7:00 P.M. on the evening of the observing session. Lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday night, depending on the weather and the lecturer's personal schedule.

## LECTURER'S LIST

Lecturers should check with Camp Rotary to determine whether the Scouts are staying at the camp and to inform the Ranger the day and time of the lecture. If you cannot lecture on your scheduled weekend, please make arrangements to switch weekends with another lecturer or call the Chairman as early as possible. The lecturers for the coming weekends are:

Aug. 22/23	Mike Bennett.....	651-7991	Sep. 19/20	Alan Rothenberg ..	355-5844
29/30	Ken Kelly.....	839-7250	26/27	Ken Strom.....	977-9489
Sep. 5/6	Clyde Burdette.....	747-3295	Oct. 3/4	Jon Root.....	464-7908
12/13	Frank McCullough...	683-4082	10/11	Riyad Matti.....	548-7511

# GREAT REASONS WHY...

There will be no Cranbrook Meeting.

- Sep. 5/6 W.A.S. 25th Anniversary Celebration,  
Camp Rotary - \$5.00 for Cookout.  
Lodging for weekend, \$6;00.  
See Flyer for details.
- Sep. 18 - General Meeting at Macomb Community  
College, 7:30 P.M. Bldg B, Room 216.  
Nominations for Officers will be made.
- Oct. 2 - Meeting at Cranbrook Institute of  
Science, 7:30 P.M.  
How to observe the Solar Eclipse.
- Oct. 3 - Partial Solar Eclipse, 1:45 P.M. to 4:15 P.M.
- Oct. 16 - General Meeting at Macomb Community  
College, 7:30 P.M. Bldg. B, Room 216.  
Election of Officers for 1987.

## MARS MANIA HITS METROBEACH!!

BY A. STROM

Once again our club has hosted a successful viewing session and slide show for the general public at Metrobeach. This time Mars was the topic, since this was its closest approach in fifteen years, as well as it being the tenth anniversary of the Viking lander.

A few hundred people attended each Saturday night session (July 19 and 26th). The slide show brought out some important basic facts and a review of the planets in general, and then the club had about ten telescopes out for viewing, focused on such objects as Venus, Mars, Saturn and the moon.

Most of the public who came were very appreciative of our efforts. Several said they had an interest in astronomy for a while but hadn't had a chance to find a group to spur them on. Hopefully we will provide that chance.

Thanks to all the people who showed up with their scopes to help out; Russ Patton, Alan Rothenberg, Colleen Nicolai, Riyad Matti, Ken Kelly, Dan Frezza, Paul Strong, Tim Skonieczny, Clyde Burdett, Chuck DuCharme, Roger Tanner, John Manske, Tim Salusky, Jeff Parker and the Stroms.

## MINUTES OF THE AUG 7 CRANBROOK MEETING

A planning session for our 25th anniversary celebration Sep. 5-7 at Camp Rotary started the meeting, with a call for volunteers for several Acommittees. They stand as follows:

PROGRAM COMMITTEE: Ken Strom, Alan Rothenberg

FOOD COMMITTEE: Russ Patton, Bob Miller, Barbara Clark

HISTORY COMMITTEE: Doug Bock, Frank McCullough, Ken Strom, Alice Strom, Beverly Bakanowicz, Gary Morin, Tim Skonieczny

STARGATE RENOVATION COMMITTEE: Riyad Matti, Russ Patton, Chuck Audet, Clyde Burdette

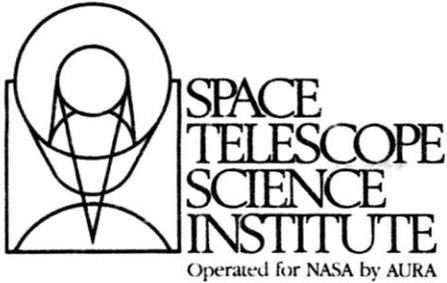
There will be no Cranbrook Meeting Sep 4 since the club anniversary activities will be Sep. 5,6, and 7th.

The Perseid meteor shower observation party this year will be at Seven Ponds Nature Center Aug. 12, 8pm-1am.

A call for articles for the newsletter was made. Please sign your name and give references where appropriate.

A slide show on the planets was given by Ken Strom. Astronomical slides of various objects taken by club members *were* shown by Bob Miller, Russ Patton, and Marty Kunz.





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## HUBBLE SPACE TELESCOPE

## NEWS RELEASE

Contact: Dr. Mark Littmann  
301-338-4757

Laura Fournier  
301-338-4714

For release:  
August 7, 1986  
2:30 p.m.

Release No. 86-03

### AMATEUR ASTRONOMERS TO HAVE OBSERVING TIME ON HUBBLE SPACE TELESCOPE

NASA and the Space Telescope Science Institute (Baltimore, Maryland) today announced plans for American amateur astronomers to participate in many aspects of the Hubble Space Telescope project.

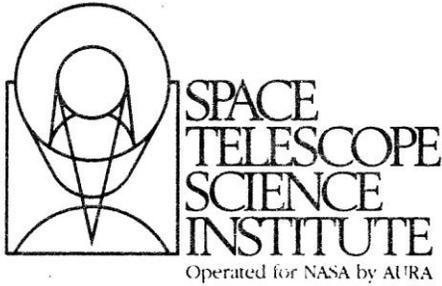
Amateur astronomers will have opportunities:

- (1) To make observations with the Hubble Space Telescope. A few hours of observing time is being reserved for amateur astronomers by Dr. Riccardo Giacconi, Director of the Space Telescope Science Institute, from Director's Discretionary Time, which is set aside for astronomical targets of opportunity.
- (2) To use the Space Telescope data and picture archives.
- (3) To conduct cooperative observing projects in which amateur astronomers would use their telescopes to examine special celestial objects in concert with Space Telescope observations.

NASA's Hubble Space Telescope, scheduled for launch by Space Shuttle when it returns to service, will be by far the largest astronomical telescope ever placed in space. With its 94 1/2-inch mirror unobstructed by the Earth's atmosphere, Space Telescope should be able to detect celestial objects 50 times fainter and see them with 10 times more clarity than any ground-based telescope. Space Telescope will be deployed in Earth orbit 368 miles high and operate as a remotely controlled international observatory.

Amateur astronomers have made significant contributions to astronomy since the telescope was invented nearly four centuries ago. There are more than 300,000 amateur astronomers in the United States.

3700 San Martin Drive Baltimore, Maryland 21218 USA (301) 338-4707



# HUBBLE SPACE TELESCOPE

# FACT SHEET

## **Amateur Astronomer Contributions to Astronomy**

Historian of astronomy Rudolf Thiel observed that from 1780 to 1840 “the progress of astronomy was almost exclusively the work of amateurs.”

Here are just a few of the leaders in the advancement of astronomy for that period and onward into the 20th century who spent all or a substantial part of their lives as amateurs.

**William Herschel (1738-1822)**

Organist and orchestra conductor until age 45. He discovered Uranus; built the largest and finest telescopes of his day; and surveyed the heavens, discovering hundreds of new nebulae and analyzing the structure of the Milky Way.

**Caroline Herschel (1750-1848)**

Singer; younger sister of William. Assisted her brother with his observations and discovered eight comets and one of the satellite galaxies of the Great Spiral in Andromeda. Became the first woman professional astronomer.

**John Goodricke (1764-1786)**

Student who, despite deafness and lack of speech, laid the foundations of variable star astronomy by discovering the periods of Algol, Beta Lyrae, and Delta Cephei, and explaining Algol and Beta Lyrae as eclipsing binary stars. Died at age 21 of a cold caught while observing.

**Heinrich Schwabe (1789-1875)**

Pharmacist. Observed the Sun daily for more than 20 years and discovered the 11-year sunspot cycle.

**William Lassell (1799-1880)**

Brewer. Telescope maker. First to take his telescopes away from city lights and cloudy climates for better observing. Discovered largest moon of Neptune, a moon of Saturn, and 600 new nebulae.

**William Parsons (Third Earl of Rosse) (1800-1867)**

Estate manager, politician, philanthropist. Builder of largest telescopes of his day and discoverer of the spiral shape of some nebulae (now known to be spiral galaxies).

William Huggins (1824-1910)

Silk and linen merchant. He sold his business in 1854 and devoted the rest of his life to the analysis of light. He was the first to apply spectroscopy to the stars, nebulae, and the motion of celestial objects.

Percival Lowell (1855-1916)

Businessman, anthropologist, and diplomat until age 39. Founder of a large observatory in Arizona, to take advantage of the best viewing conditions. His calculations predicting the existence of a planet beyond Neptune led to the discovery of Pluto in 1930 at his observatory.

Milton Humason (1891-1972)

Mule driver for supply pack trains, then janitor at Mt. Wilson Observatory. He stayed up nights helping astronomers make observations and became one of astronomy's greatest observers. His spectra of galaxies provided Edwin P. Hubble with the evidence he needed to propose the concept of the expanding universe.

The contributions of amateurs to the progress of astronomy did not end in the early 20th century, even though they had decreasing access to the largest telescopes and best instruments in the field. Here are some examples of the work of amateur astronomers and their organizations today:

- Mapping portions of the Moon not adequately covered by lunar probes and Apollo missions.
- Observing occultations of stars by the Moon to refine the diameter and orbit of the Moon, to detect double stars, and to measure star sizes.
- Timing the eclipses of Jupiter's four largest moons to improve our knowledge of the moons' orbits.
- Calculating and observing when asteroids pass in front of distant stars. These occultations provide information about asteroid sizes and orbits.
- Monitoring special types of variable stars for flares and eruptions, crucial to an understanding of stellar evolution.
- Pioneering automated equipment to scan galaxies in search of exploding stars that give us information about stellar evolution and the distance to those galaxies.
- Working to design, build, and fly aboard Space Shuttle an 18-inch Amateur Space Telescope.

# GETTING STARTED IN ASTROPHOTOGRAPHY

by  
Larry F. Kalinowski

## PART I - SOME CAMERA BASICS

Everyone knows that light is needed to record an image on film if we want to take a picture. If you're just getting started in photography and want to venture into the realm of outer space photography, then you'll have to have a better understanding of how a camera works than the average person needs for snapshotting with their Instamatic camera.

Today's modern camera is loaded with time saving electronics. Unfortunately, all that electronics is just about useless when it comes down to astrophotography. They simply aren't designed for the low light levels that are encountered in the night sky. As a result, the astrophotographer has to understand his camera because he must have the knowledge to override all the automation. Once you know the how and why of the mechanics of photography, it becomes much easier to understand the unusual methods night sky photography requires.

The amount of light required for producing a well exposed negative or slide is related to the A.S.A. rating of the film. A.S.A. is short for American Standards Association. Sometimes the word "speed" is used loosely and interchangeably with the term A.S.A. A "fast" film is one that requires relatively little light to record an image. A "slow" film has to have more light because the crystals of silver salt in the film do not react to light as quickly as the larger grains of salt in the "fast" films. A.S.A. ratings are expressed in whole numbers. A 100 A.S.A. film only requires half the light that a 50 A.S.A. film needs. The amount of light needed is inversely proportional to the A.S.A. rating of the film.

The camera's adjustable diaphragm is the method used to determine how much of the lens area will be used for passing light to the film. It plays only a partial role in determining how much light reaches the film because the diaphragm opening doesn't close completely. Light continues to pass through the lens, no matter what setting the diaphragm is at. The size of the opening determines the "f" ratio of the lens. The f ratio is always the camera lens focal length divided by the diameter of the diaphragm opening. For this reason, one of the setting scales around the lens barrel is called the f stop setting. Changing the index on the f stop scale will change the size of the diaphragm diameter or lens opening. On the average adjustable camera, the f stops have been chosen so that each stop will double or halve the amount of light passing through the lens, depending on whether the diaphragm opens larger or smaller. The standard f stops are 1.4, 2, 2.8, 4, 5.6, 8, 11, 16 and 22. There are stops between the values mentioned, but these aren't whole stops, they're half stops. Some cameras can even go higher or lower than the values I've given. Whether you need them or not depends on the kind of photography you're doing.

Finally, the mechanism that has the most influence over the light reaching the film, is the shutter. The amount of time that the shutter stays open is called the shutter speed. It's always expressed in seconds and fractions of seconds. They've also been standardized and the range usually found on cameras are 1, 1/2, 1/4, 1/8, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, and 1/1000 seconds. Again, some cameras will have a greater range of exposure time settings, but they'll cost a little more. As before, the amount of time the shutter stays open is doubled or halved depending on which direction you move in the speed range.

## SOME CAMERA BASICS (Cont'd)

All shutters aren't the same. Some are mounted right next to the camera lens and some next to the film. There really is no set rule for shutter placement. The designer makes the decision and it's strictly a matter of engineering and designer preference. However, the camera user has to decide what he wants and it could mean choosing another camera just because of the type of shutter it has. If the shutter is mounted in front of, or between the lenses of the camera, it makes it difficult to design an interchangeable lens system. As a result, most cameras of this design won't have the ability to change lenses for telephoto or wide angle work. Some manufacturers get around this difficulty by designing an interchangeable front lens element only. This only provides for a very narrow selection of lenses primarily made by the original camera manufacturer. If the shutter is mounted just behind the lens, you may get lens interchangeability, but the price of the camera could be quite high because of intricate engineering. On the other hand, this type of shutter is the quietest and the least subject to vibration...advantages most photographers would like to have.

The other shutter mentioned is the focal plane shutter. It sits right in front of the film. Since it has to be large in area to expose a section of film from top to bottom, this type is usually quite noisy. Vibration is the result of trying to move a large curtain back and forth inside the camera. But don't fret, with all its disadvantages, it's still the one chosen by most photographers. The designers and manufacturers have managed to tame the beast considerably by going to lighter materials such as Titanium foil. The main advantages for the focal plane shutter are lens interchangeability and low cost. Two factors that is hard to beat.

So the shutter, lens diaphragm and film work together to provide just the right amount of light needed for the final exposure. How much light? Only the light meter knows...and there's a limit there too. Built in light meters weren't designed for the extremely low light levels of the night sky. Astrophotographers end up paying for a part of their camera that can't be used under the astronomers' normal working conditions. If you can find a camera that has no automation at all, you just might have an astrophotographers dream.

There's only one more thing to worry about with night sky photography and that's focusing. When your subject is so dim that you can barely see it in the camera, focusing becomes a monumental job. Sure you could focus on a bright star, if there were a bright star near your subject. However, that's not always the case. This is one problem that has yet to be solved to everyone's satisfaction. If you can afford it, it's advisable to purchase a camera that features interchangeable focusing screens. Some screens are designed for easier focusing at low light levels.

# MINOR PLANETS FOR AUGUST - SEPT.

(CALCULATED BY KEN KELLY)

The following are positions for the four brightest Minor Planets for each Saturday during this time period. Note that (4) Vesta will be almost naked eye visibility at the end of September.

## (42) ISIS - Opposition Aug. 12

EPOCH MONTH	DAY	HR ET	EQUINOX & EQUATOR 1950.0			EQUINOX & EQUATOR 1986.5			V MAG
			RT. ASC.	DECLINATION		RT. ASC.	DECLINATION		
Aug	24	0	21h 16.83m	-31°	-32.8'	21h 19.04m	-31°	-23.5'	9.4
Aug	31	0	21h 12.69m	-31°	-51.3'	21h 14.91m	-31°	-42.1'	9.6
Sep	7	0	21h 9.94m	-31°	-53.3'	21h 12.16m	-31°	-44.2'	9.7
Sep	14	0	21h 8.88m	-31°	-39.9'	21h 11.10m	-31°	-30.9'	9.8
Sep	21	0	21h 9.63m	-31°	-12.9'	21h 11.n84	-31°	-3.8'	10.0

## (88) THISBE - Opposition Aug. 27

EPOCH MONTH	DAY	HR ET	EQUINOX & EQUATOR 1950.0			EQUINOX & EQUATOR 1986.5			V MAG
			RT. ASC.	DECLINATION		RT. ASC.	DECLINATION		
Aug	24	0	22h 23.37m	-1°	-46.6'	22h 25.26m	-1°	-35.4'	9.8
Aug	31	0	22h 17.55m	-2°	-9.5'	22h 19.44m	-1°	-58.4'	9.8
Sep	7	0	22h 11.96m	-2°	-36.0'	22h 13.86m	-2°	-25.1'	9.9
Sep	14	0	22h 7.00m	-3°	-3.8'	22h 8.90m	-2°	-53.0'	10.1
Sep	21	0	22h 2.97m	-3°	-30.8'	22h 4.87m	-3°	-20.1'	10.3

## (29) AMPHITRATE - Opposition Aug. 31

EPOCH MONTH	DAY	HR ET	EQUINOX & EQUATOR 1950.0			EQUINOX & EQUATOR 1986.5			V MAG
			RT. ASC.	DECLINATION		RT. ASC.	DECLINATION		
Aug	24	0	22h 44.nnm	-11°	-57.7'	22h 46.32m	-11°	-46.1'	9.1
Aug	31	0	22h 37.nnm	-11°	-19.3'	22h 39.71m	-12°	-7.8'	9.1
Sep	7	0	22h 31.nnm	-12°	-38.5'	22h 33.04m	-12°	-27.1'	9.2
Sep	14	0	22h 24.nnm	-12°	-53.7'	22h 26.69m	-12°	-42.5'	9.3
Sep	21	0	22h 19.nnm	-13°	-3.6'	22h 21.04m	-12°	-52.5'	9.5

## (4) VESTA - Opposition Oct. 7

EPOCH MONTH	DAY	HR ET	EQUINOX & EQUATOR 1950.0			EQUINOX & EQUATOR 1986.5			V MAG
			RT. ASC.	DECLINATION		RT. ASC.	DECLINATION		
Aug	24	0	1h 17.75m	-3°	-1.5'	1h 19.61m	-2°	-49.9'	6.9
Aug	31	0	1h 16.22m	-3°	-40.7'	1h 18.09m	-3°	-29.1'	6.7
Sep	7	0	1h 13.31m	-4°	-25.6'	1h 15.17m	-4°	-14.0'	6.6
Sep	14	0	1h 9.11m	-5°	-14.0'	1h 10.97m	-5°	-2.4'	6.5
Sep	21	0	1h 3.84m	-6°	-3.6'	1h 5.69m	-5°	-51.8'	6.5

SOURCE: 1986 EMP



# NEWS! from the NAVAL OBSERVATORY

U.S. NAVAL OBSERVATORY

34TH AND MASSACHUSETTS AVE., NW

WASHINGTON, D.C. 20390

FOR IMMEDIATE RELEASE  
GAIL S. CLEERE 202/653-1541  
202/364-8832

## USNO OFFERS HELP TO THE ASTRONOMICALLY NEEDY

Imagine this scenario, if you will: You're all set to turn in for the night, and the dog decides he wants out, you fumble for the leash and walk out into the night. The dog howls. You look up. Hundreds of shooting stars are coming at you from all directions in a myriad of colors! You run home for the newspaper, but, is there a story about the night's event? No. Is there the slightest note anywhere on the weather page that forecasts this nighttime extravaganza? No. What do you do? Call the local radio station? They're taking only oldies requests. You try calling the news desk at the local paper. Drats! Yes, you're a Sagittarian, but that's not the question. You give up, decide it was indigestion and begin to wonder if you saw anything at all. What else can you do?

**CALL STAR WATCH!  
900-410-STAR !**

The Naval Observatory comes to the rescue. And we can take 14,000 of you on at once. Starting at Noon on 3 August 1986, the Observatory will bring up an AT&T 'Dial-It 900' service of astronomical event information, and it'll be served up in plain English-not scientific jargon. It will be brought up on the first Sunday of every month thereafter, and run on seven consecutive days of every month. There will be a bit of work involved-you must remember to call at the beginning of the month, and take a few notes. It'll be a monthly astronomy newsletter that will gently get you accustomed to the night sky. The program will be called **STAR WATCH**.

**STAR WATCH** is designed for the astronomically needy. If you don't know a star conjunction from a Hollywood opening, and find popular astronomical journals too technical, this should be the answer. We will bring you information on positions of the planets, meteor showers, eclipses, and whatever other astronomical events we think will interest the casual observer. (Our August **STAR WATCH** will tell our dog-walking friend all about the Perseid Meteors, the most spectacular of all the yearly meteor showers.) And just so you won't forget, write to the Naval Observatory and we'll send you your very own **STAR WATCH** calling card.

Note: For 'Dial-It 900' service, AT&T charges callers from the United States, Canada, Puerto Rico and the U.S. Virgin Islands 50 cents for the first minute and 35 cents for each additional minute on the line (All other countries can access the program at regular international long distance dialing rates.) 14,000 callers can be handled simultaneously, and can stay on the line for as long as they wish.

- END -

NAVOBSY REL16/86

The U.S. Naval Observatory is the authority in the United States for astronomical data required for timing, navigation, civil affairs, and legal purposes.

# WARREN ASTRONOMICAL SOCIETY -MEMBERSHIP APPLICATION

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Observatory Chairman: Riyad Matti / 548-7511

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## MEMBERSHIP APPLICATION

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & ZIP CODE \_\_\_\_\_

PHONE NUMBER \_\_\_\_\_

MEMBERSHIP CATEGORY & AMOUNT \_\_\_\_\_

You will receive a membership card.