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# Martian Chronicles

Newsletter of the Museum Astronomical Resource Society  
Volume 18, Number 8  
August 2002

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## UPCOMING EVENTS

### AUGUST 2002

- Sat. 08/03, evening - MARS SkyWatch at MOSI
- Fri. 08/09, 7:30 p.m. - Monthly Meeting at MOSI, Program: "Building a Scout Telescope" by Mark Dixon, "Voyager: 25 Years and Beyond"
- Sat. 08/10, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)
- Sat. 08/17, evening - MOSI SkyWatch
- Sat. 08/24, evening - MARS SkyWatch at MOSI
- Sat. 08/31, evening - MARS SkyWatch at MOSI

### SEPTEMBER 2002

- Sat. 09/07, SPAC Star Party, from dusk until dawn, at Hickory Hill (possible, call SPAC to confirm)
- Fri. 09/13, 7:30 p.m. - Monthly Meeting at MOSI, Program: 2003 Mars Exploration Rover Mission
- Sat. 09/14, evening - MOSI SkyWatch
- Sat. 09/21, evening - MARS SkyWatch at MOSI
- Sat. 09/28, evening - MARS SkyWatch at MOSI

**MOSI SkyWatch:** Observing sessions are normally held on the Saturday evening nearest the First Quarter Moon and the two Saturday evenings following. SkyWatch sessions are held at MOSI. Call to check on any schedule changes. The Saunders Planetarium: 813-987-6360; MOSI Information Desk: 813-987-6012

**SPAC Star Parties:** Hosted by the St. Petersburg Astronomy Club (SPAC). Held on the Saturday evenings nearest the new moon, at Hickory Hill near Brooksville. For more information call the SPAC hotline: 813-792-0721

## FIRST LIGHT

Hello, friends.

August 20 marks the 25th anniversary of the launch of Voyager 2, first of the two robot spacecraft to provide us with the "Grand Tour" of all the outer planets of our solar system, except for Pluto. The discoveries of this mission re-wrote our astronomy text books with each planet that was passed. Their mission is not over yet, however, as they seek out the edge of solar system—where the solar system ends and

interstellar space begins. We will learn more about this at the August 9 meeting, but for now you may enjoy the review of Voyager's accomplishments in the **NASA Mission Update** section of this month's issue.

Clear Skies,

*Jimmy Thomas*

## **MARTIAN HAPPENINGS**

### **LAST MEETING**

We meet in MOSI's Science Works Theater for the July 12 meeting because construction in the Learning Center (East Wing) prevented access to The Saunders Planetarium. We recognized all of the contributions that made this year's Astronomy Day a great success. We then reviewed the Comet Nucleus Tour (CONTOUR) mission, which launched July 3. Read more about the meeting in the **MARS Minutes** section.

### **NEXT MEETING**

At the August 9 meeting our own Mark Dixon will present an overview of the Newtonian telescope that he constructed as a Boy Scout project. In addition, we will also review the Voyager mission, which celebrates its 25th anniversary in August. We will also learn about the current Voyager mission as the two spacecraft look for the heliopause, the edge of our solar system and the beginning of interstellar space.

### **SEPTEMBER MEETING**

At the September 13 meeting we will vote on two issues reviewed in the On the Record section. In addition, we will review the 2003 Mars Exploration Rover mission, which will send two autonomous rovers to the Martian surface.

### **WHAT PRESENTATIONS DO YOU WANT TO SEE?**

Do you have a particular astronomical topic that you would like to learn more about? Get studying! We need presentations for our monthly meetings and our best ones come from enthusiastic and knowledgeable members. Why not start right now? Decide on a topic, schedule yourself for a particular month, and then get to work. You can do it. And we all will benefit.

## **MARS MINUTES**

### **July 2002 Meeting of M.A.R.S.**

**July 12, 2002**

**Jimmy Thomas, President**

**Wade Holland, Vice President**

**Jerry Scalzo, Treasurer**

**Alvin Dozier, Secretary**

**Reported by Jimmy Thomas**

The meeting was held in the Science Works Theater at MOSI in Tampa. The meeting was held at this location rather than in The Saunders Planetarium because of construction that was in progress in The Learning Center (East Wing). Jimmy began the meeting informally as attendees gradually made their way to the substitute location. The meeting officially began at 8:00 pm. There were 20 persons present.

The group discussed two club issues. They considered the changing of the annual membership renewal date to a fixed time of year. The group was favorable to the idea and also suggested that September would be the best month of the year for membership renewals. The group also considered the suggestion to increase the club annual dues from \$12 to \$15. This was also thought of favorably. It was finally agreed that both issues should be put to a club vote at the September 13 meeting.

Jimmy presented certificates of appreciation to all of those persons present who participated in Astronomy Day 2002, held Saturday, April 20. In addition, the group presented a special appreciation card to Joe Wasielewski for all of his hard work for Astronomy Day. Joe also received an adjustable dual red/white light led flashlight along with an engraved brass tag recognizing Joe and his efforts.

Jimmy then gave a presentation on the Comet Nucleus Tour (CONTOUR) mission, which launched on July 3. Graphics on the mission were reviewed and a short video with an overview of the mission.

The meeting adjourned at 9:00 pm.

## **ON THE RECORD** by Jimmy Thomas, President

We had a good discussion at the July 12 meeting on the issues of club membership rates and having a fixed dues payment time. Both issues were considered very positively and it was agreed that a vote on both issues would be held at the September 13 meeting. Here is a review of the two issues:

### **CLUB MEMBERSHIP RATES**

A proposal has been made to increase of club annual dues from \$12 to \$15 per year. This modest increase would compensate for cost increases in the distribution of club newsletters. Most importantly, this increase would allow the club to create and maintain a ready fund for offsetting the cost of club-related events, especially those costs associated with the annual Astronomy Day activities. Should this issue be voted upon and passed at the September 13 meeting, the new policy will be put into affect at that time.

#### **DUES PAYMENT TIME**

A proposal has been made to change the club's dues process so that, like many other organizations, all club membership dues are required during a single month each year. This change would ease the process of tracking membership renewals and allow the club to know what funds are available at any given time. Those who join the club during the year would pay an agreed upon fraction of the dues amount based upon the number of quarters remaining in the current year. For example, members joining with 5 months remaining in the current year would pay the equivalent of 2 quarters, or one half of the annual dues amount, to extend their membership to the renewal month.

Furthermore it has been discussed and agreed upon that the month of September is the ideal month for annual renewals. Should this issue be voted upon and passed at the September 13 meeting, the new policy will be put into affect at that time. This means that all paid-up members would be required to make additional fractional payments on their current memberships in order to extend them to September 2003, at which time they can renew their dues in full.

#### **SEPTEMBER 13 VOTE**

All paid-up members who are present are eligible to vote. Any paid-up members wishing to vote by proxy must contact a current club officer and inform them of their vote. The verbal or written proxies will be recorded at the time of voting. Issues will pass or fail based upon a simple majority vote. We hope to see you September 13 for consideration of these important issues.

### ***NASA MISSION UPDATE*** by Jimmy Thomas

#### **Voyager**

Launch: Voyager 1, September 5, 1977; Voyager 2, August 20, 1977  
Jupiter Closest Approach: Voyager 1, March 5, 1979; Voyager 2, July 9, 1979  
Saturn Closest Approach: Voyager 1, November 12, 1980; Voyager 2, August 25, 1981  
Uranus Encounter: Voyager 2, January 24, 1986  
Neptune Encounter: Voyager 2, August 25, 1989  
Heliopause Encounter: before 2022?

The twin spacecraft Voyager 1 and Voyager 2 were launched by NASA in separate months in the summer of 1977 from Cape Canaveral, Florida. As originally designed, the Voyagers were to conduct closeup studies of Jupiter and Saturn, Saturn's rings, and the larger moons of the two planets.

To accomplish their two-planet mission, the spacecraft were built to last five years. But as the mission went on, and with the successful achievement of all its objectives, the additional flybys of the two outermost giant planets, Uranus and Neptune, proved possible -- and irresistible to mission scientists and engineers at the Voyagers' home at the Jet Propulsion Laboratory in Pasadena, California.

As the spacecraft flew across the solar system, remote-control reprogramming was used to endow the Voyagers with greater capabilities than they possessed when they left the Earth. Their two-planet mission became four. Their five-year lifetimes stretched to 12 and more.

Eventually, between them, Voyager 1 and 2 would explore all the giant outer planets of our solar system, 48 of their moons, and the unique systems of rings and magnetic fields those planets possess.

Had the Voyager mission ended after the Jupiter and Saturn flybys alone, it still would have provided the material to rewrite astronomy textbooks. But having doubled their already ambitious itineraries, the Voyagers returned to Earth information over the years that has revolutionized the science of planetary astronomy, helping to resolve key questions while raising intriguing new ones about the origin and evolution of the planets in our solar system.

The Voyager mission was designed to take advantage of a rare geometric arrangement of the outer planets in the late 1970s and the 1980s which allowed for a four-planet tour for a minimum of propellant and trip time. This layout of Jupiter, Saturn, Uranus and Neptune, which occurs about every 175 years, allows a spacecraft on a particular flight path to swing from one planet to the next without the need for large onboard propulsion systems. The flyby of each planet bends the spacecraft's flight path and increases its velocity enough to deliver it to the next destination. Using this "gravity assist" technique, first demonstrated with NASA's Mariner 10 Venus/Mercury mission in 1973-74, the flight time to Neptune was reduced from 30 years to 12.

While the four-planet mission was known to be possible, it was deemed to be too expensive to build a spacecraft that could go the distance, carry the instruments needed and last long enough to accomplish such a long mission. Thus, the Voyagers were funded to conduct intensive flyby studies of Jupiter and Saturn only. More than 10,000 trajectories were studied before choosing the two that would allow close flybys of Jupiter and its large moon Io, and Saturn and its large moon Titan; the chosen flight path for Voyager 2 also preserved the option to continue on to Uranus and Neptune.

From the NASA Kennedy Space Center at Cape Canaveral, Florida, Voyager 2 was launched first, on August 20, 1977; Voyager 1 was launched on a faster, shorter trajectory on September 5, 1977. Both spacecraft were delivered to space aboard Titan-Centaur expendable rockets.

The prime Voyager mission to Jupiter and Saturn brought Voyager 1 to Jupiter on March 5, 1979, and Saturn on November 12, 1980, followed by Voyager 2 to Jupiter on July 9, 1979, and Saturn on August 25, 1981.

Voyager 1's trajectory, designed to send the spacecraft closely past the large moon Titan and behind Saturn's rings, bent the spacecraft's path inexorably northward out of the ecliptic plane -- the plane in which most of the planets orbit the Sun. Voyager 2 was aimed to fly by Saturn at a point that would automatically send the spacecraft in the direction of Uranus.

After Voyager 2's successful Saturn encounter, it was shown that Voyager 2 would likely be able to fly on to Uranus with all instruments operating. NASA provided additional funding to continue operating the two spacecraft and authorized JPL to conduct a Uranus flyby. Subsequently, NASA also authorized the Neptune leg of the mission, which was renamed the Voyager Neptune Interstellar Mission.

Voyager 2 encountered Uranus on January 24, 1986, returning detailed photos and other data on the planet, its moons, magnetic field and dark rings. Voyager 1, meanwhile, continues to press outward, conducting studies of interplanetary space. Eventually, its instruments may be the first of any spacecraft to sense the heliopause -- the boundary between the end of the Sun's magnetic influence and the beginning of interstellar space.

Following Voyager 2's closest approach to Neptune on August 25, 1989, the spacecraft flew southward, below the ecliptic plane and onto a course that will take it, too, to interstellar space. Reflecting the Voyagers' new transplanetary destinations, the project is now known as the Voyager Interstellar Mission.

Voyager 1 is now leaving the solar system, rising above the ecliptic plane at an angle of about 35 degrees at a rate of about 520 million kilometers (about 320 million miles) a year. Voyager 2 is also headed out of the solar system, diving below the ecliptic plane at an angle of about 48 degrees and a rate of about 470 million kilometers (about 290 million miles) a year.

The Voyager mission, now in its 25th year, continues its quest to push the bounds of space exploration. Voyager 1, now the most distant human-made object in the universe, and Voyager 2, close on its heels, continue their ground-breaking journey with their current mission to study the region in space where the Sun's influence ends and the dark recesses of interstellar space begin.

Both spacecraft will continue to study ultraviolet sources among the stars, and the fields and particles instruments aboard the Voyagers will continue to search for the boundary between the Sun's influence and interstellar space. The Voyagers are expected to return valuable data for two more decades. Communications will be maintained until the Voyagers' nuclear power sources can no longer supply enough electrical energy to power critical subsystems.

For more information on Voyager visit the mission Website at URL: [voyager.jpl.nasa.gov](http://voyager.jpl.nasa.gov)

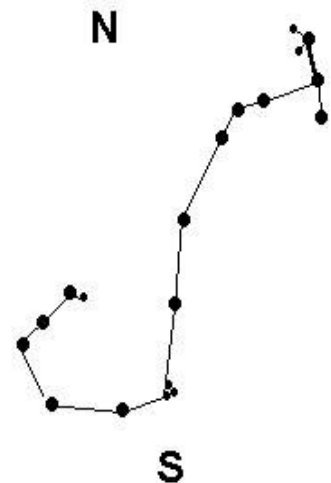
For more information on missions managed by NASA JPL visit URL: [www.jpl.nasa.gov](http://www.jpl.nasa.gov)

## **CONSTELLATION OF THE MONTH** by Craig MacDougal

### **Scorpius**

I have waited for this month to roll around with great anticipation. That's because I get to tell you about my favorite constellation in the whole sky: **SCORPIUS** (SKOR-pe-us), the scorpion. Why is it my favorite? Because it really looks like a scorpion! Go outside at 9:30 PM and face south. A little to the right of due south, and not quite half way up the sky you should see a bright reddish (or orange) star twinkling madly at you. This is the brightest star of Scorpius: **ANTARES** (an-TAIR-eez). Off to the right a couple of finger widths are three stars that form a sort of vertical line. The middle one can be thought of as the head of the scorpion, the other two, the start of the scorpion's two claws. Head back through Antares and the stars form a graceful curve downward toward the horizon and then back up again to form the curving tail. There are even two stars relatively close together that represent the stinger that the scorpion uses with great effect. Be advised that Scorpius is a **BIG** constellation. It covers more sky than you can cover with your hand stretched as wide as it can.

(Unless you can grip an inflated basketball with one hand; then Scorpius is about as big as your hand.) The mythology of Scorpius however, is even skimpier than the mythology of Orion. You may remember that the most agreed upon part of Orion's story is that he was done in by a scorpion. Well, here he is! This collection of stars has been depicted as a scorpion for over 5000 years, going back to the Sumerians. Of course not everybody saw a scorpion in these stars. For example, many cultures



of the islands of the south Pacific (where fishing is a way of life) saw this as a giant fish hook in the sky. Because the center of our galaxy lies a little above, and to the left of the tail of Scorpius, there are lots of things to see with binoculars. To the left and above the "stinger" are two open star clusters. These are collections of a few hundred stars apiece that easily show themselves to the binocular viewer. Current age estimates of these clusters indicate that the stars in them are quite a bit younger than our solar system. In fact Earth was pretty much done forming when these stars started to shine. As Walter Scott Houston of *Sky & Telescope* put it: "I can go out in my yard, and pick up rocks that are older than most open clusters." Sweep your binoculars all around this constellation, and you will run across many more wonders of the universe. It's too boring for me to try to tell you about them. Go out "cruising" around Scorpius, and get the thrill of finding them for yourself.

## **CELESTIAL ALMANAC** by James M. Thomas

**For Reference:** EDT = eastern daylight time; Dist. = object distance from Earth; AU = astronomical unit, the average distance from Earth to the Sun, roughly 92.9 million miles; LLT = Light Travel Time = distance from Earth to the object in days (d), hours (h) and minutes (m); Mag. = scale indicating the brightness (or magnitude) of an object in the sky, with 6.00 indicating the dimmest objects visible to the naked eye, 1.00 indicating the brighter stars and some objects having a zero or even a negative magnitude number.

### **MOON PHASES**

Last Qtr - Aug. 1, 6:24 am EDT  
New Moon - Aug. 8, 3:15 pm EDT  
First Qtr - Aug. 15, 6:13 am EDT  
Full Moon - Aug. 22, 6:30 pm EDT  
Last Qtr - Aug. 30, 10:33 pm EDT  
New Moon - Sep. 6, 11:10 pm EDT  
First Qtr - Sep. 13, 2:09 pm EDT

### **MOON APOGEE AND PERIGEE**

Perigee - Aug. 10, 11:03 pm; 362,927 km or 225,512 mi from Earth  
Apogee - Aug. 26, 5:44 pm; 405,693 km or 252,086 mi from Earth  
Perigee - Sep. 8, 2:28 am; 358,744 km or 222,913 mi from Earth  
Apogee - Sep. 23, 3:27 am; 406,350 km or 252,494 mi from Earth

### **SUN** - in the constellation Leo

Aug. 1 - Rise 6:53 am EDT; Set 8:20 pm EDT; Length 13:27  
Aug. 15 - Rise 7:01 am EDT; Set 8:09 pm EDT; Length 13:09  
Aug. 31 - Rise 7:09 am EDT; Set 7:53 pm EDT; Length 12:44

### **MERCURY** - Rising and setting after the Sun, moving toward superior conjunction in September.

Aug. 1 - Rise 7:52 am; Set 9:04 pm EDT; Dist. 1.30 AU; LTT 0h 10m; Mag. -0.93  
Aug. 15 - Rise 8:46 am; Set 9:14 pm EDT; Dist. 1.16 AU; LTT 0h 9m; Mag. -0.16  
Aug. 31 - Rise 9:15 am; Set 9:00 pm EDT; Dist. 0.94 AU; LTT 0h 7m; Mag. 0.19

### **VENUS** - Rising and setting after the Sun, moving toward superior conjunction at the end of October.

Aug. 1 - Rise 10:22 am; Set 10:34 pm EDT; Dist. 0.84 AU; LTT 0h 7m; Mag. -4.14  
Aug. 15 - Rise 10:32 am; Set 10:16 pm EDT; Dist. 0.73 AU; LTT 0h 6m; Mag. -4.27  
Aug. 31 - Rise 10:39 am; Set 9:51 pm EDT; Dist. 0.60 AU; LTT 0h 5m; Mag. -4.44

### **MARS** - in the constellation Leo

Aug. 1 - Rise 7:09 am; Set 8:32 pm EDT; Dist. 2.66 AU; LTT 0h 22m; Mag. 1.74  
Aug. 15 - Rise 6:56 am; Set 8:06 pm EDT; Dist. 2.67 AU; LTT 0h 22m; Mag. 1.74  
Aug. 31 - Rise 6:41 am; Set 7:31 pm EDT; Dist. 2.66 AU; LTT 0h 22m; Mag. 1.78

### **JUPITER** - in the constellation Cancer

Aug. 1 - Rise 6:13 am; Set 7:42 pm EDT; Dist. 6.24 AU; LTT 0h 51m; Mag. -1.82  
Aug. 15 - Rise 5:33 am; Set 6:59 pm EDT; Dist. 6.19 AU; LTT 0h 51m; Mag. -1.83  
Aug. 31 - Rise 4:45 am; Set 6:08 pm EDT; Dist. 6.08 AU; LTT 0h 50m; Mag. -1.87

### **SATURN** - in the constellation Taurus

Aug. 1 - Rise 3:38 am; Set 5:15 pm EDT; Dist. 9.76 AU; LTT 1h 21m; Mag. 0.93  
Aug. 15 - Rise 2:49 am; Set 4:26 pm EDT; Dist. 9.58 AU; LTT 1h 19m; Mag. 0.93  
Aug. 31 - Rise 1:51 am; Set 5:29 pm EDT; Dist. 9.35 AU; LTT 1h 17m; Mag. 0.90

### **URANUS** - on the border of constellations Aquarius and Capricornus

Aug. 1 – Rise 9:19 pm; Set 8:21 am EDT; Dist. 19:04 AU; LTT 2h 38m; Mag. 5.75  
Aug. 15 – Rise 8:23 pm; Set 7:23 am EDT; Dist. 19:00 AU; LTT 2h 38m; Mag. 5.75  
Aug. 31 – Rise 7:14 pm; Set 6:17 am EDT; Dist. 19:02 AU; LTT 2h 38m; Mag. 5.75

**NEPTUNE** - in the constellation Capricornus

Aug. 1 – Rise 8:19 pm EDT; Set 6:59 am EDT; Dist. 29.08 AU; LTT 4h 1m; Mag. 7.81  
Aug. 15 – Rise 7:19 pm EDT; Set 6:02 am EDT; Dist. 29.11 AU; LTT 4h 2m; Mag. 7.81  
Aug. 31 – Rise 6:14 pm EDT; Set 4:57 am EDT; Dist. 29.21 AU; LTT 4h 2m; Mag. 7.82

**PLUTO** - in the constellation Ophiuchus

Aug. 1 – Rise 4:15 pm EDT; Set 3:22 am EDT; Dist 29.92 AU; LTT 4h 8m; Mag. 13.80  
Aug. 15 – Rise 3:19 pm EDT; Set 2:26 am EDT; Dist 30.13 AU; LTT 4h 10m; Mag. 13.81  
Aug. 31 – Rise 2:16 pm EDT; Set 1:23 am EDT; Dist 30.39 AU; LTT 4h 12m; Mag. 13.83

**BRIGHT EVENING STARS**

RA - right ascension in hours (h) and minutes (m); Dec - declination, angle from the celestial equator in degrees (°) and minutes (') north (N) or south (S) of the celestial equator

**Altair / Alpha Aquilae** – in the constellation Aquila, the Eagle. The star's Arabic name comes from a phrase meaning "the flying eagle."  
Type: A7Vn (white/yellow, temp. 7550 Kelvin); Location: RA 19h 15m, Dec 8° 52'N; Mag. 0.77; Dist. 161 ly

**Vega / Alpha Lyrae** - in the constellation Lyra, the Lyre. The name Vega is derived from an Arabic phrase that means "the swooping eagle."  
Type: A0Va (white, 50 times the size and 2.5 the mass of the Sun, temp. 9500 Kelvin); Location: RA 18h 3m, Dec 38° 46'N; Mag. 0.3; Dist. 26 ly

**Antares / Alpha Scorpii** - in the constellation Scorpius the Scorpion. The star's Greek name means "like Ares" or "like Mars."  
Type: M1.5 Iab (red supergiant, temp. 3400 Kelvin); Location: RA 16h 29m, Dec 26° 24'S; Mag. 0.96 (variable); Dist. 330 ly

**Arcturus / Alpha Boötis** - in the constellation Boötes, the Herdsman. Arcturus, the "Bear Watcher," follows Ursa Major, the Great Bear, around the pole, "arkto" being the Greek name for "bear," from which the word "arctic" is derived by reference with the constellation of the Great Bear.  
Type: K1.5 IIIp (orange giant, 24.5 times the size and about 1.5 times the mass of the Sun, temp. 4290 Kelvin); Location: RA 14h 15m, Dec 19° 10'N; Mag. 0.4; Dist. 36 ly

**Spica / Alpha Virginis** - in the constellation Virgo, the Virgin. The name Spica comes from Latin, meaning "ear of wheat," reflecting the fact that civilizations considered Spica a harvest symbol in ancient times, since the Sun passes Spica in the fall. Actually a binary with an orbital period of 4 days, both blue, at least one is a dying giant. Evidence shows that Spica has two other fainter components.  
Type: B1V (blue, temp. over 20,000 Kelvin); Location: RA 13h 25m, Dec 11° 9'S; Mag. 0.98 (variable); Dist. 260 ly

**CELESTIAL EVENTS**

Aug 01 - Alpha Capricornids Meteor Shower Peak  
Aug 02 - Neptune At Opposition  
Aug 03 - Comet Schwassmann-Wachmann 1 Closest Approach To Earth (4.804 AU)  
Aug 04 - Asteroid 2 Pallas At Opposition (9.4 Magnitude)  
Aug 06 - Southern Iota Aquarids Meteor Shower Peak  
Aug 07 - Comet de Vico-Swift Perihelion (2.146 AU)  
Aug 07 - Comet Spacewatch Closest Approach To Earth (1.364 AU)  
Aug 08 - Comet C/2001 U6 (LINEAR) Perihelion (4.406 AU)  
Aug 11 - Asteroid 2002 NW16 Near-Earth Flyby (0.289 AU)  
Aug 11 - Asteroid 1998 FF2 Near-Earth Flyby (0.298 AU)  
Aug 12 - Perseids Meteor Shower Peak  
Aug 12 - Comet C/2001 Q1 (NEAT) Closest Approach To Earth (5.364 AU)  
Aug 14 - Comet Wirtanen Closest Approach To Earth (1.634 AU)  
Aug 18 - Comet Churyumov-Gersaimenko Perihelion (1.292 AU)  
Aug 18 - Asteroid 2 Pallas Occults TYC 1097-00868-1 (9.5 Magnitude Star)  
Aug 18 - Asteroid 2002 NY40 Near-Earth Flyby (0.004 AU)  
Aug 19 - Comet C/2001 N2 (LINEAR) Perihelion (2.669 AU)  
Aug 20 - Uranus At Opposition  
Aug 20 - Comet C/2001 M10 (NEAT) Closest Approach To Earth (5.084 AU)  
Aug 22 - Venus Greatest Eastern Elongation (46 Degrees)  
Aug 24 - Comet Whipple Closest Approach To Earth (2.444 AU)  
Aug 24 - Asteroid 7 Iris At Opposition (7.8 Magnitude)  
Aug 25 - Northern Iota Aquarids Meteor Shower Peak  
Aug 25 - Comet P/1992 Q1 (Brewington) Closest Approach To Earth (1.563 AU)

Aug 25 - Comet Russell 2 Closest Approach To Earth (1.573 AU)  
Aug 26 - Comet Wirtanen Perihelion (1.059 AU)

## **METEOR SHOWERS** by James M. Thomas

### **Alpha-Capricornids**

This shower is caused by Periodic Comet Honda-Mrkos-Pajdusakova. Meteors from this shower may be visible from July 15 through Aug. 25 with the peak this month on Aug. 1/2. The meteor hourly rate may be about 8. The meteors will appear to originate from a point in the constellation of Capricornus (RA 20 hrs 36 min, Dec -10°).

### **Southern Iota Aquarids**

Meteors from this shower may be visible from July 1 through September 18 with a peak this month on August 6. The meteor hourly rate may be about 7-8. The meteors will appear to originate from a point near the star Iota Aquarii in the constellation Aquarius (RA 22 hrs 28 min, Dec -12°).

### **Northern Iota Aquarids**

Meteors from this shower may be visible from August 11 through September 10 with a peak this month on August 25. The meteor hourly rate may be about 5-10. The meteors will appear to originate from a point near the star Iota Aquarii in the constellation Aquarius (RA 23 hrs 20 min, Dec 0°).

### **Perseids**

This shower is caused by Periodic Comet Swift-Tuttle, discovered on July 16, 1862 by Lewis Swift and then independently discovered three days later by Horace Tuttle. Meteors from this shower may be visible from July 25 through Aug. 21 with the peak on Aug. 11/12. The meteor hourly rate may be about 75. The meteors will appear to originate from a point in the constellation of Perseus (RA 03 hrs 04 min, Dec +58°).

### **Kappa Cygnids**

Meteors from this shower may be visible from Aug. 18 through Aug. 22 with the peak on Aug. 20. The meteor hourly rate may be about 5. Meteor speeds average 20 kilometers per second, one of the slowest moving streams. The meteors will appear to originate from a point west of the star Kappa Cygni in the constellation of Cygnus (RA 19 hrs 20 min, Dec -55°).

### **Observing Meteors**

Meteors are best viewed from a dark-sky location. Observers in for the duration of the evening, or at least for several hours, should bring along a few things: a sleeping bag or blankets for warmth, a recliner or lawn chair, a hot beverage to help cut the chill, and binoculars to view the smoke trails of just-past meteors.

## **THIS MONTH IN HISTORY** by James M. Thomas

**Aug 1, 1967** - Lunar Orbiter 5 Launch

**Aug 3, 431 B.C.** - The Greek fleet was embarking from the port of Athens under the command of the Grecian hero Pericles. A total eclipse occurred, frightening the crew. Pericles restored morale by a clever demonstration. He used his cloak to cover the eyes of the ship's pilot and asked him if he found anything terrible in the darkness and whether he interpreted it as a bad omen. The pilot answered "No," and Pericles then ridiculed the crew's hysteria by saying, "Where is the difference, then, between this and the other, except something bigger than my cloak causes the difference?"

**Aug 5, 1930** - Neil Armstrong was born

**Aug 6, 1961** - Gherman S. Titov was launched in Soviet spacecraft Vostok 2. Titov's flight was the first of more than 24 hours, with a total of 17 orbits and a total time of 25 hours, 18 minutes. Vostok returned to Earth the following day, Aug. 7. Titov ejected from the spacecraft after reentry and parachuted separately as was standard in all Vostok flights. (40th anniversary)

**Aug 7, 1996** - Announcement of Possible Microfossils Found in ALH84001 Martian Meteorite

**Aug 8, 1600** - Discovery Of Variable Star P Cygni

**Aug 8, 1978** - The U. S. spacecraft Pioneer Venus 2 was launched toward the planet Venus. The spacecraft Venus on Dec. 9 and dropped probes which studied the atmosphere and impacted on the surface.

**Aug 8, 1997** - Salyut 5 Space Station Burnup

**Aug 9, 1976** - Launch of Soviet spacecraft Luna 24, a Moon sample return mission

**Aug 10, 1966** - Launch of Lunar Orbiter 1

**Aug 10, 1990** - Magellan Venus Orbit Insertion

**Aug 10, 1992** - TOPEX/Poseidon Launch  
**Aug 10, 1995** - Saturn Ring Plane Crossing (2 of 3)  
**Aug 11, 1962** - Andrian G. Nikolayev was launched in Vostok 3. He was joined in orbit on Aug. 12 by the launch of Pavel R. Popovich in Vostok 4. The two spacecraft took part in the first group flight, coming within 3 miles of each other. Both Vostok 3 and Vostok 4 returned safely to Earth on Aug. 15.  
**Aug 12, 1960** - Echo 1 Launch  
**Aug 12, 1962** - Vostok 4 Launch  
**Aug 13, 1596** - Discovery of Mira, Omicron Ceti by David Fabricius  
**Aug 17, 1966** - Launch of Pioneer 7 spacecraft  
**Aug 17, 1970** - Venera 7 Launch (USSR Venus Lander)  
**Aug 17, 1877** - Asaph Hall's Discovery Of Phobos (Mars Moon)  
**Aug 18, 1985** - Susei Launch (Japan Comet Mission)  
**Aug 19, 1646** - John Flamsteed was born  
**Aug 19, 1960** - Sputnik 5 Launch (Carried Two Dogs: Belka & Strelka)  
**Aug 20, 1960** - The Soviet spacecraft Korabl Sputnik 2 was launched carrying the dogs Strelka and Belka and 40 mice. This was the first mission ending with the successful recovery of a satellite. The spacecraft completed one orbit and returned safely to Earth.  
**Aug 20, 1975** - The U. S. spacecraft Viking 1 was launched on the first U. S. lander mission to the planet Mars. The Lander portion landed on the surface July 20, 1976. The Lander performed various scientific experiments and sent back images of the Martian surface while the Orbiter sent back images from orbit. The Lander functioned for 6-1/2 years.  
**Aug 20, 1977** - The U. S. spacecraft Voyager 2 was launched on what became a grand tour of the outer solar system. Voyager 2 encountered the planet Jupiter on May 5, 1979, Saturn on Nov. 12, 1980, Uranus on Jan. 24, 1986, and Neptune on Aug. 24, 1989.  
**Aug 20, 1997** - Voyager 2 Launch  
**Aug 21, 1965** - Gemini 5 Launch  
**Aug 24, 1966** - Launch of Soviet spacecraft Luna 11  
**Aug 25, 1981** - Voyager 2 spacecraft flyby of Saturn  
**Aug 25, 1865** - Shergotty Meteorite Fall (Mars Meteorite)  
**Aug 27, 1962** - The U. S. spacecraft Mariner 2 launched on a fly-by mission to the planet Venus. It passed within 22,000 miles of the planet on Dec. 14. Contact with Mariner 2 was lost on Jan. 1, 1963.  
**Aug 30, 1983** - Richard Truly, Daniel Brandenstein, William Thornton, Guion Bluford, and Dale Gardner were launched in the Space Shuttle *Challenger* (STS-8). Bluford became the first African American in space. The crew returned safely to Earth on Sept. 5.  
**Aug 30, 1991** - Yohkoh Launch

### ***PUBLICATION INFORMATION***

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