SkyWAAtch

The Monthly Publication of the Westchester Amateur Astronomers June 2007

M81

The June skies offer another opportunity for viewing one of the nearest spiral galaxies—M81 in Ursa Major. At a distance of 4.5 light yrs, M81 shines at a magnitude of 6.9. Under the most pristine conditions talented observers have made visual sightings of the galaxy, making it a candidate for the most distant object viewable to the naked eye.

The above photo shows what the eye cannot. It's an ultra-violet image taken from the Earth orbiting Galex telescope. The image graphically highlights the blue star-forming regions in the galaxy's spiral arms, and the older stars at its core. For more details go to APOD at:

http://antwrp.gsfc.nasa.gov/apod/ap070515.html

Events for June 2007

➢ Monthly Meetings

"After Galaxies Collide: A Supermassive Black Hole in a Billion Year Old Merger"
Friday June 8, 8:00PM
Hudson River Museum, Yonkers
Charles Liu, Professor of Astrophysics at the College of Staten Island and associate at the Hayden Planetarium, will speak on galactic collisions and black holes. He works primarily on observational galaxy evolution. He is a contributing editor to *Natural History* and co-author of *One Universe: At Home In The Cosmos.*

➢ "Starway to Heaven"

Saturday, June, 16, 8:30-11:00PM
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River
This is our scheduled observing date for June, weather permitting. Free and open to the public. The scheduled rain /cloud date is June 23rd.

Club Bits

New Members…

Betty Migler, Croton-on-Hudson, NY

Renewing Members…

Gustav Forssell, Whitestone, NY
Margaret Frisch, Mahopac, NY
Glen & Patricia Lalli, White Plains, NY
Richard McGuinness, Port Jervis, NY
John Paladini, Mahopac, NY
Jack Ullman, Bronx, NY
Bruce Zeller, Bethel, CT

Call: **1-877-456-5778** (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at: http://www.westchesterastronomers.org/.

16th Annual WAA Bar-B-Que

June 16, 2pm to 7pm
Trailside Museum,
Ward Pound Ridge Reservation.

This event is for WAA members and their guests only. Club members are encouraged to bring side dishes, salads, dips and desserts. Let us know what you are bringing. Also tell us if you will attend (along with the number of guests) so we can purchase the right amount of hamburgers and hot dogs. R.S.V.P: Charlie Gibson at:

waa-president@westchesterastronomers.org
or 1-877-456-5778.

Tell the guard at the front gate that you are going to the "WAA Bar-b-que".

"Starway to Heaven" will begin at 8:30pm, after the bar-b-que.

"Rain/cloud date is Saturday, June 23.

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Meetings: Andrus Planetarium, Hudson River Museum of Westchester, 511 Warburton Ave., Yonkers. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is $25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Charlie Gibson; Senior Vice President: Pat Mahon; Secretary: Barbara Moroch; Treasurer: Michael Virsinger; Vice President Membership: Karen Seiter; Vice President Programs: John James; Vice President Field Events: David Butler; Newsletter: Tom Boustead; Webmaster: Robert Davidson.

Articles

The Ions of Dawn

By Patrick L. Barry

This summer, NASA will launch a probe bound for two unexplored worlds in our solar system's asteroid belt—giant asteroids Ceres and Vesta. The probe, called Dawn, will orbit first one body and then the other in a never-before-attempted maneuver.

It has never been attempted, in part, because this mission would be virtually impossible with conventional propulsion. "Even if we were just going to go to Vesta, we would need one of the largest rockets that the U.S. has to carry all that propellant," says Marc Rayman, Project System Engineer for Dawn at JPL. Traveling to both worlds in one mission would require an even bigger rocket.

This is a trip that calls for the unconventional. "We're using ion propulsion," says Rayman.

The ion engines for the Dawn spacecraft proved themselves aboard an earlier, experimental mission known as Deep Space 1 (DS1). Because ion propulsion is a relatively new technology that's very different from conventional rockets, it was a perfect candidate for DS1, a part of NASA's New Millennium Program, which flight-tests new technologies so that missions such as Dawn can use those technologies reliably.

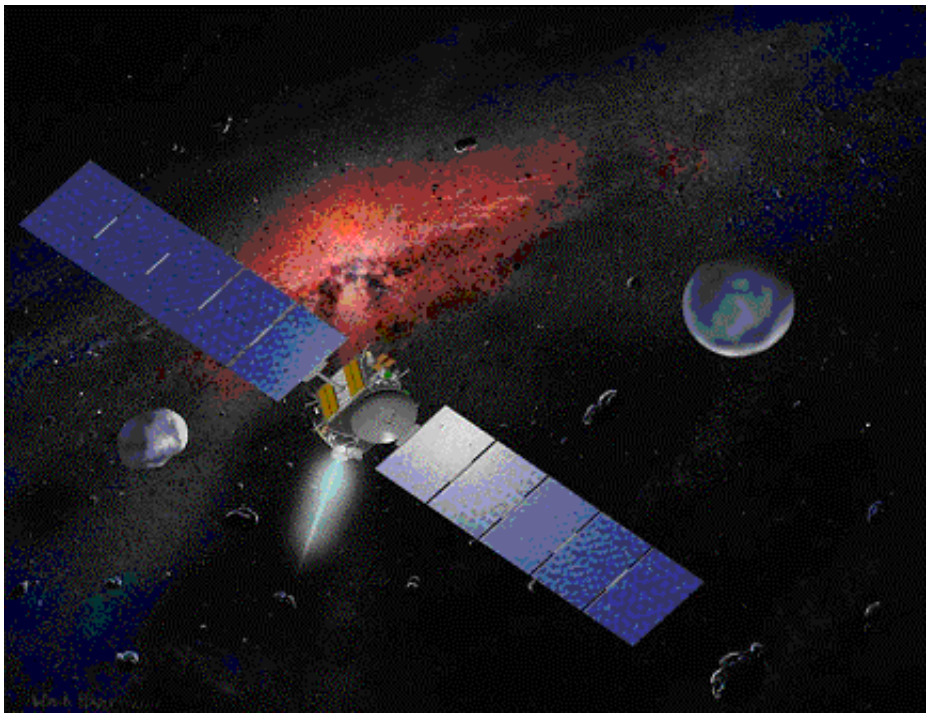
"The fact that those same engines are now making the Dawn mission possible shows that New Millennium accomplished what it set out to," Rayman says.

Ion engines work on a principle different from conventional rockets. A normal rocket engine burns a chemical fuel to produce thrust. An ion engine doesn't burn anything; a strong electric field in the engine propels charged atoms such as xenon to very high speed. The thrust produced is tiny—roughly equivalent to the weight of a piece of paper—but over time, it can generate as much speed as a conventional rocket while using only about 1/10 as much propellant.

And Dawn will need lots of propulsion. It must first climb into Vesta's orbit, which is tilted about 7 degrees from the plane of the solar system. After studying Vesta, it will have to escape its gravity and maneuver to insert itself in an orbit around Ceres—the first spacecraft to orbit two distant bodies. Dawn's up-close views of these worlds will help scientists understand the early solar system.

"They're remnants from the time the planets were being formed," Rayman says. "They have preserved a record of the conditions at the dawn of the solar system." Find out about other New Millennium Program validated technologies and how they are being used in science missions at: http://nmp/TECHNOLOGY/infusion.html.

The Jet Propulsion Laboratory, California Institute of Technology provided this article under a contract with NASA.



Artist's rendering of Dawn spacecraft, with asteroids. Largest are Vesta and Ceres. Credits: Dawn spacecraft—Orbital Sciences Corporation; background art—William K. Hartmann, courtesy UCLA.

This image may be downloaded from http://spaceplace.nasa.gov/news_images/dawn_vesta_ceres.jpg

Observing Reports and Photos

Three Star Viewing at Quaker Ridge Elementary

By Dave Butler

The sky was fairly cloudy only Venus, the Moon and Saturn could be seen. But over 200 students, parents and family would show up for the viewing, more than making up for the cloudy sky. Bob had the club's 20 inch and all 200 were going to see all objects on the Dob. The line stretched from one end of the parking lot to the other. The moons of Saturn were so much brighter on the Bob's Dob; Titan even seemed to have diameter. Yes I had to look too. It looks surreal is a typical comment when people look at Saturn. At least 10 club members had telescopes set up. I started with the 2/3rds full crescent of Venus. The crowd kept all of us very busy. One member, who at first though that he did need to set up yet another telescope, was soon overwhelmed with the number of viewers. The Moon at 250x always gets Wows, and more than a few commented about seeing a flag as they viewed the crater shadows.

Alan Alterman was the perfect host thanking every one who helped. "That was a wonderful evening! I estimate well over 200 kids and parents. I know with a clearer sky we would have seen more but the kids were thrilled by what you were able to show them. Many, many thanks!"

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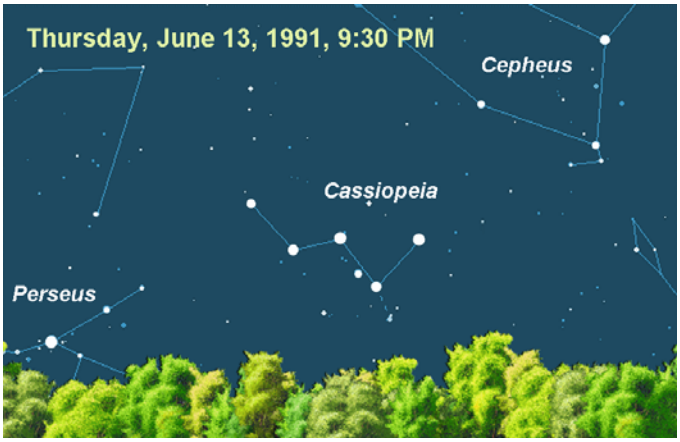


▼ VESTA

Here is an image of Vesta from a sequence of 15 exposures by Rick Bria and Ted Schimenti of the Round hill Observatory. All images were taken unattended, by the automation program ACP.

Vesta Facts... Although it is 100 million miles away, this is the closest Vesta has been to Earth in 18 years. Discovered by Heinrich Olbers 200 years ago, Vesta is the second-largest asteroid at 325 miles in diameter. In May and early June it is brighter than magnitude 6, and easy to see in binoculars in the constellation Ophiuchus.

◀ WAA: Sweet Sixteen

We have an anniversary coming up in June—sixteen years since the WAA was founded. (Actually, we've been around since 1983, just under different names.) The first meeting of the reorganized club took place on Thursday, June 13, 1991, with Joe Rao presenting his "The Great Eclipse of 1991" lecture. After the meeting, while driving home on Route 100, Bob Davidson and Tom Segur spotted the constellation Cassiopeia in its familiar "W" orientation just above the treetops. It only took a split second for both of them to bring their cars to a halt on the deserted road and realize what they were looking at: The perfect logo for the new Westchester Amateur Astronomers.

Constellation Corner:

By Matt Ganis

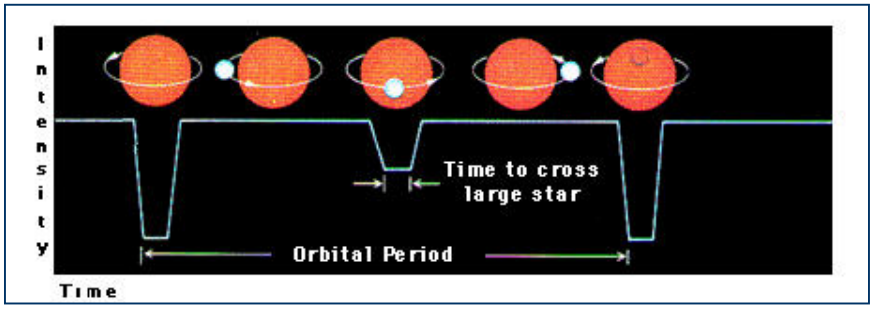
In almost every column I write for the WAA I mention the magnitudes of various stars and planets in our sky. The brightness of a visible star is called its apparent magnitude. Unless you have superhuman vision, most objects in the sky have an apparent magnitude between -1.0 and +6.0 and typically don't change over time (unless we're talking about a planet that changes its geometrical configuration with the Earth and Sun or moves further away from us in it's orbit).

Binary star systems can often be confused with variable stars since they too tend to change slightly in brightness. The reason for this is that both objects seem to vary their output of light; however the mechanics between these two phenomenon are not related. A binary star is a system where two stars are locked in each others' gravitational pull and are destined to go through the universe spinning around each other. A variable star, on the other hand, is a star that, for one reason or another, changes its luminosity in either a predictable pattern or at random. Estimates are that at least 60% of stars are members of a binary systems. These common systems can form in one of two ways. Binary stars are born in the same way as all other stars—that is condensing from a nebula. The only difference is where they form: In the parent nebula, the two future binary stars form closely to one another. After they are "born" (initiation of hydrogen fusion), their solar winds blow away all of the surrounding nebular material, and because of their proximity, the two stars cannot escape each other's gravitational pull. They are therefore locked together. (Note that this can also be applicable to more than two stars; for example, our closest neighbor, Proxima Centauri, is part of a triple star system).

The other way for a binary system to form is if a free star happens to fall into another star's gravitational pull, and become locked in orbit because it does not have enough energy to escape. (This is the same way some planets got their moons: an asteroid is captured by a planet's gravitational pull). A binary star system works very simply. The system consists of a two (or more) stars caught in orbit about each other. If you watch the brightness of the system over time, you'll notice a periodic change in its apparent magnitude. The time of orbit can last anywhere from less than half an hour to millions of years, depending on how close the stars get. As one star passes in front of the other, the brightness as observed from the Earth changes (diminishes). When the two stars are "next" to each other, we receive the light output of both stars (increasing the overall brightness).

Variable stars tend to fall into two general categories: intrinsic variables, in which physical changes, such as pulsations or eruptions, are involved in the change of brightness, or extrinsic variables, in which the light output fluctuates due to an eclipses or stellar rotation.

Mira Variables are named after the star Mira in the constellation the Cetus, the Whale. These are old,



red giant stars nearing the end of their lives At this late stage in their evolution, they typically have grown unstable and are beginning to pulsate. Essentially the equilibrium that keeps a star in place (the mass pushing down and the heat pushing outward) is beginning to breakdown. This pulsation cycle can last from anywhere between a few hundred days to several years, and the star can vary between eight different magnitudes. Since they are so unstable, their cycles are not necessarily constant.

The Cepheid Variables are named after the first one to be discovered: Delta Cepheid. Cepheids have cycles that last a few days, and they vary by as much as two magnitudes. Unlike Mira variables, the Cepheid variable stars have extremely regular pulsation rates, and their cycles are directly linked to their absolute magnitude. Cepheids are important beyond the fact that are pulsating stars. Astronomers have found that there is a relation between the period of a Cepheid and its luminosity. By measuring a Cepheid's apparent brightness, we can determine the distance by noting a relationship between luminosity and brightness. They are true astronomical "yardsticks". So remember, when you're looking up at the stars at night, not all is as it seems to be. That single point of light may actually be a series of stars, spinning and rotating around one another, or it may be a beacon, telling just how far away it is—like a lighthouse on some distant shore.

Almanac

For June 2007 by Matt Ganis

June 8 | June 14 | June 22 | June 30

Can you believe it's May already? Wow, I cannot believe that half of the year has gone by already. It really does seem like just yesterday when I walked out of my garage and looked up into the sky and was greeted by a rising Orion (that's how I judge winter time is here). I am partial the fall/winter skies, but summer viewing has its pluses too.

The beginning of the month offers up an interesting "conjunction" (as I'll call it) of Saturn, Venus and Mercury. This is really more of a lining up of the planets, but given they're all in the same area of the sky I'll take some "literary liberty" and call it a conjunction. But have a look in the western skies at the start of the month (between June 1 and say the 15th) just around 9pm. You'll get a clear indication of where the ecliptic is when you trace an invisible line between the three planets. I love when this happens because it's an opportunity to visually show someone where this "imaginary" line called the ecliptic is in the sky.

Saturn is still quite bright in our evening skies, shining at about a -0.5 magnitude. It's headed for a very close conjunction with the other bright planet in our sky, Venus. Over the course of the month, you can watch the two planets approach each other. At the start of the month, the two planets are separated in the sky by about 23 degrees (with the constellation of Cancer right in the middle). But over the course of the month, Venus will be moving like a "bullet" across the sky, through Cancer to come within ½ degree of Saturn by the 30th of the month. The planets will meet in the constellation of Leo where it should make for a very pretty site in our western skies.

As I said earlier, Mercury will be visible in our western skies at the start of this month. Don't wait too long though. The little planet only shines at a magnitude of +1.5, and by the 15th of the month, it will sink back into the haze of the western sky. It should be an interesting object: it will look like a thin crescent in your telescope. Have a look; I don't think you'll be disappointed.

Meanwhile, in the Eastern skies, Jupiter is rising and located between the constellations Ophiuchus and Scorpius. The planet is blazing at -2.6 magnitude and can be found just to the northeast of the 1st magnitude star Antares. On June 5th the planet reaches opposition. Opposition occurs when a body farther from the Sun than Earth appears opposite the Sun in the sky. It's typically the best time to observe a planet.

The Summer Solstice occurs at 2:06pm on June 21st. This is the day the North Pole is nearest the Sun. Looking from Earth, the Sun reaches its highest point in the sky for the year. This means it takes the most amount of time to cross the sky, so it's the longest day of the year. A solstice occurs twice a year, whenever Earth's axis tilts the most toward or away from the Sun, causing the Sun to be farthest north or south at noon. The name is derived from Latin sol (sun) and sistere (to stand still), because at the solstice, the Sun stands still in declination, that is, it reaches a maximum or a minimum.

So enjoy the warm air viewing this month. While there aren't a huge variety of planets to observe, the ones we have are clearly ready to put on a show for us. Don't be late!