SkyWAAtch

The Constellation Orion

M42

Orion Nebula

Rick Bria provided these pictures of the constellation Orion and M42 (the Orion Nebula). Notes Rick: Orion is a symbol of winter. It is seen rising in the East in fall, is high in the south in winter, and sets in the west in spring.

The three stars in a row form Orion's belt, and if the line from the belt stars is extended down it can be used to find Sirius, the brightest star on our northern sky. If the belt stars are followed up, they will lead you to the star Aldebaran.

The Orion Nebula (cataloged as M42) is a huge gas cloud below the belt (labeled 42). Gas clouds like M42 are where stars form. The gas collapses from gravity until the forming star is hot and massive enough to begin the fusion process. The Orion Nebula is 1400 light years away and 50 light years in diameter. It is thought that many thousands of stars will eventually form from the Orion nebula.

Orion image Technical Details: Canon T1i Camera with 28mm lens at f/4. Two stack - 240 second exposure at ISO-800 (8 minute exposure equivalent). No calibration – Processed in Photoshop.

Events for March 2011

WAA Lectures

"The Latest on Mars' Atmosphere; Can it Support Life?"
Friday March 4th, 7:30pm
Miller Lecture Hall, Pace University
Pleasantville, NY

Br. Robert Novak Ph.D., Professor of Physics and Chair of the Physics Department at Iona College, will speak on the prospects for life on Mars. He holds advanced degrees in physics from Stevens Institute of Technology and Columbia University. For the past fourteen years he has been collaborating with NASA's Astrobiology Institute as part of a team that has detected organic chemicals, water vapor, and carbon monoxide in comets and in the atmosphere of Mars. Free and open to the public. Snow date March 11th.

Upcoming Lectures

On April 1st, Dr. Michael Inglis, professor of astrophysics at Suffolk County Community College, and author of *Astrophysics is Easy* and *Astronomy of the Milk Way,* will speak on 50 Years of Astronomy, highlighting such topics as the origin of black holes, the search and discovery of other solar systems, and the ultimate fate of the universe. Free and open to the public.

Starway to Heaven

Saturday March 12th, 6:30-9:00PM
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for March, weather permitting. Free and open to the public. The scheduled rain/cloud date is March 26th. Participants and quests should read our General Observing Guidelines.

New Members. . .

Jonathan Gold - Ossining
Mary Ann Cesarski - Peekskill

Renewing Members. . .

William Sawicki - Bronx
Tom & Lisa Cohn - Bedford
Warren Lindholm - Cortlandt Manor
Rick Bria - Greenwich, CT

Members Classified

As a service to members, the WAA newsletter will publish advertisements for equipment sales and other astronomy-related purposes. Ads will only be accepted from WAA members and must relate to amateur astronomy. Please keep to 100 words, include contact info and provide by the 20th of the month for inclusion in the next issue. The newsletter is subject to space limits; so ads may be held to subsequent issues. The WAA may refuse an ad at its sole discretion. In particular, price information will not be accepted. Members and parties use this classified service at their own risk. The Westchester Amateur Astronomers (WAA) and its officers accept no responsibility for the contents of any ad or for any related transaction.

Send classified ad requests to:
waa-newsletter@westchesterastronomers.org

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/.

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. 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: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.

Articles and Photos

Cosmic Assassin

by Larry Faltz

History records many of the names of assassins who changed the course of human events: Marcus Junius Brutus, Charlotte Corday, John Wilkes Booth, Gavrilo Princip, Lee Harvey Oswald. But there's never been one who assassinated an entire planet. Now there is: Michael Brown.

OK, he didn't really kill the planet, he just kind of demoted it, or maybe even just insulted it. And actually he didn't really even do that, but he did supply the critical observations that led the International Astronomical Union to reclassify Pluto as a "dwarf planet" in 2006, leaving us with 8 non-adjective modified "planets" and destroying the value of the oft-taught mnemonic "My Very Educated Mother Just Sent Us Nine Pizzas". I never liked this mnemonic much. If Mom was so educated, she would have recognized the high fat and carbohydrate content of pizza and probably sent nine salads. Anyway, I knew the order of the planets long before I heard it, and as mnemonics go it lacks the spice that made many of the ones I had to learn in medical school so memorable.

Mike Brown

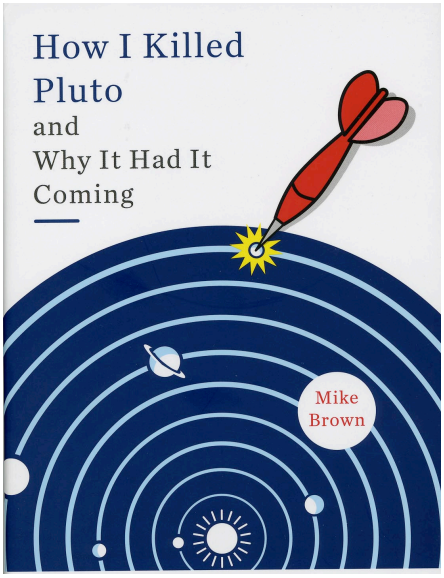
Brown didn't set out to destroy Pluto. He was on the quest for a 10th planet, and when he found a possible candidate he realized that as a scientist with integrity he needed to be sure he knew just what it was he was looking at. And so it became a problem of classification, which in turn means, for planetary science, what the rules are by which we group different orbiting objects so we can talk about them rationally, in order to gain insight into where they come from and how the entire solar system works.

The whole idea of classification is at the root of science. The first great classifier was Aristotle, who took on the project of trying to put nearly the entire natural world into order. He did so based on some arbitrary notions of what caused things to be related, and it took the better part of 2,000 years to correct his enthusiastic mishmash of the animal and plant kingdoms (although it contained many truths as well). For astronomy, the basic problem was a little easier: we only had to deal with the fixed stars and the seven regular wanderers (the 5 visible planets, the sun and the moon), but again, arbitrary notions of what they were and where they were resulted in Ptolemy's *Almagest* being thought definitive for almost 1,500 years.

Brown, the Richard and Barbara Rosenberg Professor of Planetary Astronomy at the California Institute of Technology in Pasadena, tells his story in the new book *How I Killed Pluto and Why It Had It Coming*. In a breezy and often charming personal statement, Brown describes his youthful interest in astronomy in the rocket town of Huntsville, Alabama, his college, graduate school and post-graduate experiences, and the details of his research program, which became interspersed with romance, marriage and fatherhood. And finally he reports on the climactic brouhaha at the 2006 IAU meeting in Vienna, which he didn't attend in person but observed over the Internet and interacted with via email. Along the way, he describes, in non-technical language, how he used the venerable 48-inch Schmidt telescope at Mt. Palomar (and its archaic glass photographic plates, which permitted wide-field observations) and computer programs of his own design to search for and eventually find possible candidates for the 10th planet. When he comes upon one serious candidate, his wife reminds him that it's the ticket to scientific fame and success but he is intellectually honest enough to avoid that temptation, even taking so much time to verify his results that he

nearly gets scooped by a Spanish astronomer (who it appears may have cheated).

The book is just a little less technical in its description of planetary science than I might have wanted, but it's at a good level for the average reader. Ever the objective observer, Brown spends almost as much time analyzing his newborn daughter's feeding schedule as he does describing orbital elements of the new Kuiper belt objects that he discovers: Quaoar (his first major discovery, in 2002), Sedna (2003), Haumea (2004), Makemake (2005) and Eris (2005). It's Eris that he thinks is bigger than Pluto, based on data from the HST, and thus the best candidate for the 10th planet (new data released in late 2010 suggests it is actually a tad smaller). He realizes that the characteristics of all of these bodies and many more discovered in the Kuiper belt (which extends from 20 AU to 55 AU) make it clear that Pluto resembles them more than it does the other, "traditional" planets, and that not even a larger Eris makes it a "planet".



Brown describes with some horror the alternative formulations and potentially silly definitions that were being considered at the IAU meeting and you get the sense that he isn't all that happy with the definitions that were finally agreed upon. For one thing, if there are "planets", then isn't a "dwarf planet" still a planet, the way a "sweet potato" is still a potato? (For $16.95 you can buy a T-shirt that says "Dwarf people are people, therefore dwarf planets are planets" if you're inclined to express your opinion that way.) In fact, the IAU definitions get really complicated: there are Planets (the big 8), Dwarf Planets (which includes Pluto, Eris, Haumea, and Makemake but also the former asteroid Ceres) and Small Solar System Bodies, which are made up of asteroids, trojans, centaurs, trans-Neptunian objects (everything in the Kuiper belt except those previously named) and comets. Now, you should also be aware that there are sub-classifications, including the "resonant objects", made up of wonderfully named "twotinos" (Kuiper belt objects locked in 1:2 orbital resonance with Neptune), the more wonderfully named "plutinos" (objects in 2:3 resonance, of which Pluto is the largest) and the most wonderfully named "cubewanos" (classical Kuiper belt objects) which move in near-circular orbits unperturbed by Neptune, of which Quaoar and Makemake are examples. So you see, some Dwarf Planets and SSSB's are also cubewanos but others aren't. I'm sure the Editor of *SkyWAAtch* doesn't want to give me space to start ragging on *that* level of definitional complexity!

Brown's published contribution to the Pluto story should take some heat off of Neil deGrasse Tyson, Director of the Hayden Planetarium, who didn't include Pluto in the display of the solar system that hangs from the ceiling of the Rose Center for Earth and Space, which opened in 2000. Tyson wrote an informative and well-illustrated book, *The Pluto Files* (2009), which makes a nice complement to Brown's book. His comment on the dust jacket of *How I Killed Pluto* is typically clever Tyson: "Finally, I have someone to whom I can forward the hate mail I get from schoolchildren."

We should not fret over Pluto's expulsion from the small fraternity of (real) planets. As Dava Sobel notes in *The Planets* (2005), "The campaign to drop Pluto from the planet registry, although widely perceived as a shameful demotion, in fact salutes the greater diversity of an expanded Solar System". And that's the whole point, because science has to march on, and that means classifications are going to get changed. But, *cubewanos*?

You'll enjoy Brown's book. In addition to its story of discovery and controversy, it's a chance to see what kind of lives astronomers live. By the way, for a nicely written general book on the solar system, I recommend Richard Cornfield's *Lives of the Planets* (2007).

Larry Faltz is Senior Vice President of WAA and Chief Medical Officer at Phelps Memorial Hospital Center. The opinions in this article are solely those of the author.

Thank Goodness the Sun is Single

by Trudy E. Bell

It's a good thing the Sun is single. According to new research, Sun-like stars in close double-star systems "can be okay for a few billion years—but then they go bad," says Jeremy Drake of the Harvard-Smithsonian Astrophysical Observatory in Cambridge, Mass. How bad? According to data from NASA's Spitzer Space Telescope, close binary stars can destroy their planets along with any life. Drake and four colleagues reported the results in the September 10, 2010, issue of The Astrophysical Journal Letters.

Our Sun, about 864,000 miles across, rotates on its axis once in 24.5 days. "Three billion years ago, roughly when bacteria evolved on Earth, the Sun rotated in only 5 days," explains Drake. Its rotation rate has been gradually slowing because the solar wind gets tangled up in the solar magnetic field, and acts as a brake.

But some sun-like stars occur in close pairs only a few million miles apart. That's only about five times the diameter of each star—so close the stars are gravitationally distorted. They are actually elongated toward each other. They also interact tidally, keeping just one face toward the other, as the Moon does toward Earth.

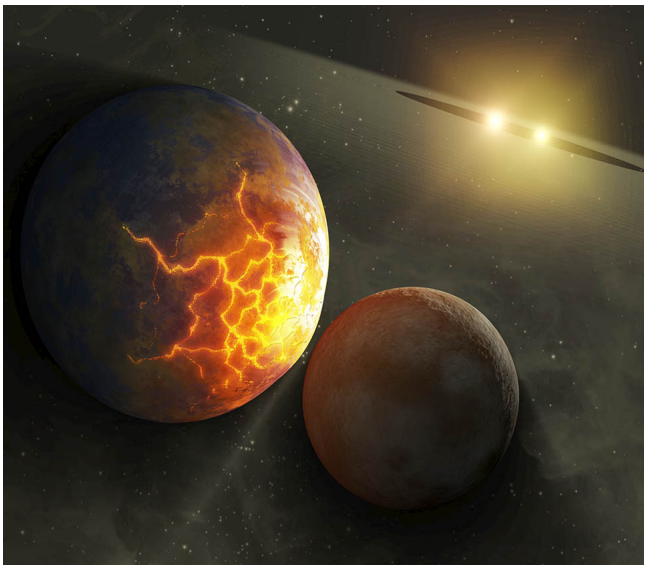
Such a close binary is "a built-in time bomb," Drake declares. The continuous loss of mass from the two stars via solar wind carries away some of the double-star system's angular momentum, causing the two stars to spiral inward toward each other, orbiting faster and faster as the distance shrinks. When each star's rotation period on its axis is the same as its orbital period around the other, the pair effectively rotates as a single body in just 3 or 4 days.

Then, watch out! Such fast spinning intensifies the magnetic dynamo inside each star. The stars "generate bigger, stronger 'star spots' 5 to 10 percent the size of the star—so big they can be detected from Earth," Drake says. "The stars also interact magnetically very violently, shooting out monster flares."

Worst of all, the decreasing distance between the two stars "changes the gravitational resonances of the planetary system," Drake continued, destabilizing the orbits of any planets circling the pair. Planets may so strongly perturbed they are sent into collision paths. As they repeatedly slam into each other, they shatter into red-hot asteroid-sized bodies, killing any life. In as short as a century, the repeated collisions pulverize the planets into a ring of warm dust.

The infrared glow from this pulverized debris is what Spitzer has seen in some self-destructing star systems. Drake and his colleagues now want to examine a much bigger sample of binaries to see just how bad double star systems really are. They're already sure of one thing: "We're glad the Sun is single!"

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the NASA.



Planetary collisions such as shown in this artist's rendering could be quite common in binary star systems where the stars are very close.

Almanac

For March 2011 by Bob Kelly

Does March come in like a lion? In our skies, it does, as Leo the lion rises into our evening skies from the eastern horizon. The bright winter constellations seem to move quickly westward, as if in fear of our fierce lion of the east. That jump westward is due to the rapid advancing of the time of sunset as we pass the vernal equinox on the 20th. So to see the stars in a dark sky, we look later and later in the evening. This effect seems more pronounced this year when daylight savings time starting on March 13th, making the time of sunrise and sunset 6:59am and 7:07pm, respectively.

Jupiter makes a regal exit from our evening skies this month. But on his way out, he performs a majestic final act by drawing our attention to the fleet and hard to spot planet Mercury. As Jupiter descends and Mercury ascends, -2.1 magnitude Jupiter passes fainter (-1.0) Mercury from the 13th through the 16th. In the telescope, Jupiter shows that its South Equatorial Belt is coming back, so the king of planets has his twin stripes again. The lighter colored cloud deck of ammonia ice that was covering the brown cloud layer is being dissipated by the reestablishment of sinking air at that latitude.

Mercury makes a fine showing this month, ranging almost 10 degrees above the western horizon 40 minutes after sunset at its greatest eastern elongation of 19 degrees on the 23rd. Since Mercury follows the Sun across the sky during an eastern elongation, intrepid observers can block the sun with a building to reduce the risk of dangerous sunlight getting into the telescope. This allows experienced observers to view Mercury with a telescope high in the daytime sky, well above the haze near the horizon. Can anyone make out some surface features on the (tiny) 7 arc-second-wide disc of gibbous Mercury? If you do see Mercury, say 'hi' to our nearest planetary neighbor! Mercury is the closest planet to Earth from March 14th through December 27th, when Mars becomes the closest planet to Earth. The distance from Earth to Venus is more than the distance from Earth to Mercury until January 7th, 2012, as Venus spends most of 2011 moving away from Earth in its slightly faster, inner orbit.


Mar 4


Mar 12


Mar 19


Mar 26

The Moon gets its share of photo ops this month. On the 1st and the 31st, it lines up with Venus in the morning sky. It shares the evening twilight with Jupiter on the 6th and 7th. And the first quarter moon is stuck high in the horns of Taurus the bull on the 12th. The sight of a star instantly winking out when the dark limb of the Moon passes in front of it is exciting and educational (showing the lack of a substantial atmosphere on the Moon). The Moon covers μ Geminorum (magnitude 2.9), a star at the foot of one of the Gemini twins, on the evening of the 13th. See http://www.lunar-occultations.com/iota/iotandx.htm for more details.

Saturn is a late evening object, at its largest as Earth comes to our closest approach to the ringed planet (800 million miles away!). Don't mistake a nearby 6th magnitude star for Saturn's largest moon, 8th magnitude Titan.

Venus is still in the pre-dawn sky, only about one fist-width or so above the horizon. With this morning star blazing at magnitude -4, can you find Neptune at magnitude +8 within one degree of Venus around the 27th? Using this way to find Neptune is like trying to pick out a candle while looking into a searchlight, but early in the pre-dawn darkness, on a clear morning, it may be seen.

Speaking of looking into a searchlight, Mars is still hiding in the glare of the Sun, but it is far enough from solar conjunction that scientists are listening again for signals from the Spirit rover, which hasn't been heard from since the beginning of the Martian winter last March. The Opportunity rover is trundling along toward the large crater called Endeavour. Opportunity has been on Mars for 2511 Martian days and has 16 ½ miles on its odometer.

Updates at my Heads UP! blog at http://bkellysky.wordpress.com/ .