

# Sky WAA tch



## Looking Far Ahead

These peculiar galaxies, ARP 273, lie far beyond the Milky Way, at a distance of over 300 million light-years. Their distorted appearance is due to gravitational tides as the pair engage in a close encounter. This image is both beautiful and instructive since it provides a window on our possible future. Some 3 to 5 billion years in the future our Milky Way could well collide with the Andromeda Galaxy with tidal forces also likely to distort our own galaxy. A computer simulation can be found at the [Hayden Planetarium](#) site.

Credit: NASA, ESA, and the Hubble Heritage Team (STScI / AURA).

# Events for May 2011

## WAA Lectures

### "Teeter and his Telescopes"

**Friday May 6<sup>th</sup>, 7:30pm**

**Miller Lecture Hall, Pace University  
Pleasantville, NY**

Our speaker will be renowned telescope maker Rob Teeter; his talk will be entitled "Teeter and his Telescopes: 9 Years, 72 Scopes and a Thousand Stories." Listen as Rob recounts his most interesting telescope making adventures, capped off by the infamous story of "Mr. Know-it-all and his 0.71 Ratio". Free and open to the public. [Directions](#) and [Map](#).

## Starway to Heaven

**Saturday May 7<sup>th</sup>, 8:30pm**

**Meadow Picnic Area, Ward Pound  
Ridge Reservation, Cross River**

This is our scheduled Starway to Heaven observing date for May, weather permitting. Free and open to the public. The scheduled rain/cloud date is May 28<sup>th</sup>. Participants and guests should read our [General Observing Guidelines](#) and [Directions](#).

## WAA Club Picnic

**Saturday June 18<sup>th</sup>, 2PM**

**Trailside Museum, Ward Pound Ridge**

The event is for WAA members and their guests only. Club members are encouraged to bring side-dishes, salads and desserts. Tell guard at gatehouse you are going to WAA Picnic. Rain-date: June 25<sup>th</sup>. [Directions](#).

## Renewing Members. . .

George Angelastro - Harrison

Karen Seiter - Larchmont

Paul Alimena - Rye

Everett Dickson - White Plains

Tyler Cohen - Yorktown Heights

**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/>.

**WANTED Co-editor:** Individual to help edit the WAA newsletter. Initial responsibilities to be proof-reading, but eventually seeking someone to co-edit newsletter. Knowledge of Apple Pages would be helpful. Contact: [Newsletter](#).



## Yuri's Earth

On April 12th, 1961, Soviet cosmonaut Yuri Alexseyevich Gagarin became the first human in space. His remotely controlled Vostok 1 spacecraft lofted him to an altitude of 200 miles and carried him once around planet Earth. Commenting on the first view from space he reported, "The sky is very dark; the Earth is bluish. Everything is seen very clearly". His view could have resembled this image taken in 2003 from the International Space Station.

Credit: ISS Expedition 7 Crew, EOL, NASA.

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

## Three Books about the History of Astronomy

by Larry Faltz

You are certainly familiar with the general arc of astronomical knowledge: The Greeks figured out the basics, even coming up with a heliocentric view of the solar system, but their vision was lost with the ascendancy of Ptolemy and his epicycles, returning the earth erroneously to a central place in the universe. It took until the 1500s for Copernicus to reintroduce the heliocentric theory, the defense of which caused Galileo to boldly, but somewhat unsuccessfully, take on the Catholic Church. But the spirit of science marched on, with Kepler's ellipses and finally Newton's gravity. Within that great arc lies the intellectual history of the human race, or at least the part of it that belongs to Western Civilization.

It's a story frequently told, because more than any other science, astronomy holds on to its history. We name our space probes for our forbearers. The craters on the moon honor astronomers, physicists and mathematicians. We venerate our greatest intellectual ancestor by attaching his name to a telescope design. If you've collected astronomy books over the years, you certainly have several that tell this story in more or less detail. I must have at least a dozen. As it happens, I recently read three (a re-read of one of them) that take divergent approaches to the subject.

When I travel, I'm often drawn to used bookstores or library sales. You never know what inexpensive treasures will pique your interest. I tend to look for books on subjects that don't go stale: biographies, music theory, exploration and history. Last summer, the library in Vail, Colorado was winnowing its collection and put some "obsolete" books on sale for \$1 each. I picked up a number of tomes, including Wernher von Braun's lavishly illustrated 1975 book *History of Rocketry and Space Travel*. Germane to our subject this month, another was Isaac Asimov's *Eyes on the Universe*, also from 1975. Three summers ago, in a wonderful used bookstore in Cooperstown, NY just a block from the hallowed Baseball Hall of Fame, I came upon a copy of Willy Ley's *Watchers of the Skies*, from 1963. And back in the 1970's in Chapel Hill, NC, I picked up Arthur Koestler's *The Sleepwalkers*, written in 1959.

Asimov (1920-1992), who by trade was a professor of biochemistry at Boston University, was one of the

most prolific writers of all time. In addition to a substantial amount of fiction, in particular the *Foundation* trilogy and the many *I, Robot* stories, Asimov turned out over 300 books on all fields of science and history, and even wrote a guide to the Bible. Ever in search of progress and simplification, he invented a new calendar, with four seasons, labeled A through D, of 13 weeks each, the days simply numbered (Christmas would be D86). This straightforward way of thinking is fairly characteristic of his writing, and while some of his fiction is evocative, his non-fiction writing is direct to a fault. *Eyes on the Universe*, while informative and complete, reads like a gigantic Wikipedia entry. Useful, clear, instructive, but not very charming.

Asimov gives us one chapter on the pre-telescopic history of astronomy and then starts his subject in earnest with Galileo. The progress of astronomical discovery is set in the context of the technological development of the telescope. All of the great discoveries are here, along with plenty of science. The book is useful and informative. But it's not *fun*.

Ley's *Watchers of the Sky* has much more evocative and elegant writing. It comes from the pen of another professor-scientist who also wrote science fiction. Ley (1906-1969) was a German rocket engineer and one of the 20<sup>th</sup> century's leading proponents of space flight. He left Germany in 1935, eventually emigrating to the US where he became a faculty member at Fairleigh Dickinson University. In the US he continued his advocacy and wrote a number of influential books, particularly *Conquest of the Moon* (with Wernher von Braun and Fred Whipple, 1953) and *Rockets, Missiles, and Space Travel* (1957), both of which had a profound impact on the US space program and stoked the public's appetite for cosmic exploration. Sadly, he died just a month before the Apollo 11 landing.

Ley's book is a far more satisfying read than Asimov's. The writing is more attractive and personal and the writer's enthusiasm for his subject seems to come from a deeper place. The theme is the history of astronomical thought and the science of astronomy; telescope technology plays a much smaller part. First, Ley gives us a more substantial discussion than



Asimov of the pre-Copernican era, starting with the Babylonians, then the Greeks, Romans, Ptolemy, Arab and Christian astronomers, and then he presents a detailed discussion of Copernicus, Galileo, the remarkable period between Galileo and Newton, and then 18<sup>th</sup> century astronomy, ending with Herschel's discovery of Uranus.

Then he switches gears and gives us a detailed history of the discoveries, and the science behind them (up to 1963, of course), for each of the solar system bodies, one chapter to each body (including one for the asteroid belt), then a couple of chapters on the universe outside the solar system. Ley even provides us with interesting speculative chapters on life in the universe and the search for extraterrestrial civilizations. Some useful appendices include a chronological list of "great astronomers" (the first being Pythagoras) up until the mid-20<sup>th</sup> century, a list of the first 100 asteroids to be discovered, a description of stellar classes and even a note on "astronomical fantasies" such as the "Symmes hole", the idea that the earth is hollow, with entrances at the poles.

The personalities of many of the protagonists come through vividly in Ley's book. If you can find a copy of *Watchers of the Skies*, I think you'll enjoy reading it. It may lack some of the science we know today, but the history is impeccable and the writer's charm and enthusiasm are palpable.

Finally, we come to a wholly different approach to the subject in Arthur Koestler's *The Sleepwalkers*. Koestler (1905-1983) was a Hungarian-born intellectual and writer who was a committed Communist until he fell out with the party and wrote his powerful novel *Darkness at Noon* (1940). Eventually settling in England, he wrote on a wide variety of subjects but in his later years became interested in science. *The Sleepwalkers* is subtitled "A History of Man's Changing Vision of the Universe" and its real subject is the "psychological process of discovery" and how the development of

scientific thought interfaces with culture and history, both influencing it and, to a larger degree, being influenced by it. The first part of the book is a detailed philosophical exploration of cosmology and its place in human thought and society before Copernicus. For Koestler, the intertwining threads of religion and science arose from the Pythagorean School's "mysteries", a consequence of the development of mathematics in the human mind. He spends a good deal of time on Plato, Aristotle, Ptolemy and St. Augustine (all of whom receive his scorn for being intellectual weaklings). He details the retreat from scientific progress that followed the fall of Hellenistic society. This section is a vigorous, almost college-level analysis of the major philosophical ideas that shaped Western civilization. Koestler ends this part with an expression of contempt and dismay for the state of the world at the beginning of the Renaissance. He quotes Whitehead: "In the year 1500, Europe knew less than Archimedes who died in the year 212 BC."

But then Koestler shifts gears, and we get vivid, detailed, incredibly researched portraits of the three men who solved the problems and achieved "the most important turning point in man's history": Copernicus, Kepler and Galileo. What interests Koestler is how their personalities and the events in their lives shaped their ability to overcome 1,500 years of intellectual stasis. The struggle to do so was difficult, and the protagonists were not always aware of where they were going (hence the title). Koestler's scholarship is extraordinary. He reads and analyzes the source material, including Copernicus' nearly incomprehensible *De Revolutionibus Orbium Coelestium*. He quotes widely from original letters, contemporary manuscripts and classic treatises. This is a work of towering intellectual accomplishment, truly one of the most profound works of scientific history ever published. *The Sleepwalkers* is still in print after more than 50 years, and it deserves to be. If you are willing to be very serious about your approach to understanding the philosophy of science, read this book.

## **Cosmic Recount** **by Dr. Tony Phillips**

News flash: The Census Bureau has found a way to save time and money. Just count the biggest people. For every NBA star like Shaquille O'Neal or Yao Ming, there are about a million ordinary citizens far below the rim. So count the Shaqs, multiply by a million, and the census is done. Could the Bureau really get away with a scheme like that? Not likely.

Yet this is just what astronomers have been doing for decades.

Astronomers are census-takers, too. They often have to estimate the number and type of stars in a distant galaxy. The problem is, when you look into the distant reaches of the cosmos, the only stars you can

see are the biggest and brightest. There's no alternative. To figure out the total population, you count the supermassive Shaqs and multiply by some correction factor to estimate the number of little guys.

The correction factor astronomers use comes from a function called the "IMF"—short for "initial mass function." The initial mass function tells us the relative number of stars of different masses. For example, for every 20-solar-mass giant born in an interstellar cloud, there ought to be about 100 ordinary sun-like stars. This kind of ratio allows astronomers to conduct a census of all stars even when they can see only the behemoths.

Now for the real news flash: The initial mass function astronomers have been using for years might be wrong.

NASA's Galaxy Evolution Explorer, an ultraviolet space telescope dedicated to the study of galaxies, has found proof that small stars are more numerous than previously believed.

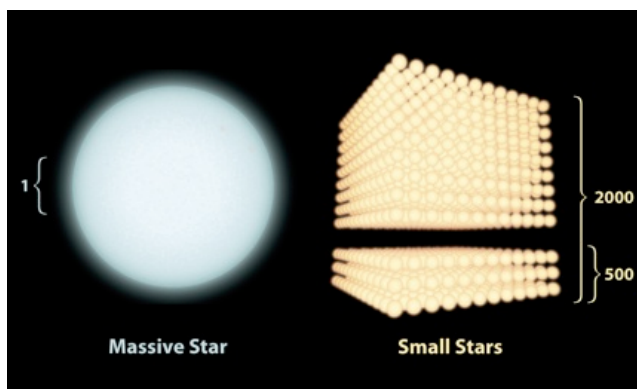
"Some of the standard assumptions that we've had—that the brightest stars tell you about the whole population—don't seem to work, at least not in a constant way," says Gerhardt R. Meurer who led the study as a research scientist at Johns Hopkins University, Baltimore, Md. (Meurer is now at the University of Western Australia.)

Meurer says that the discrepancy could be as high as a factor of four. In other words, the total mass of small stars in some galaxies could be four times greater than astronomers thought. Take that, Shaq!

The study relied on data from Galaxy Evolution Explorer to sense UV radiation from the smaller stars in distant galaxies, and data from telescopes at the Cerro Tololo Inter-American Observatory to sense the "H-alpha" (red light) signature of larger stars. Results apply mainly to galaxies where stars are newly forming, cautions Meurer.

"I think this is one of the more important results to come out of the Galaxy Evolution Explorer mission," he says. Indeed, astronomers might never count stars the same way again.

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



*Astronomers have recently found that some galaxies have as many as 2000 small stars for every 1 massive star. They used to think all galaxies had only about 500 small stars for every 1 massive star*

## Classified

**For Sale:** Star Master Deluxe Oak 42" StarStep Observing Chair. Like new, excellent condition and finish. Free personal delivery at a mutually agreeable site within Westchester. Contact: Tom Crayns by email at [artic\\_ulated@msn.com](mailto:artic_ulated@msn.com) for further details.

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: [Newsletter](#).



### ***Jupiter and Europa***

Rick Bria took this image of Jupiter and its moon Europa last October at the Mary Aloysia Hardey Observatory. Jupiter's Great Red Spot is not visible in this picture because it is on the other side of the planet. But a rare large white oval can be seen in the north equatorial belt and many swirling gas clouds are visible elsewhere on the planet. Jupiter's moon Europa can be seen to the right.

Notes Rick: I delayed processing and sending this image out in hopes that a new version of the image processing software (Registax 6) would soon be completed. I finally gave up on waiting and processed the picture. Naturally, Registax 6 was released only two days later. At first glance, Registax 6 has improved in the area of sharpening images and suppressing noise. I will probably reprocess this image, and perhaps others, with this new software. The amazing thing is that Registax 6 is FREE. It was created by people that are interested in imaging planets, the Moon and Sun at high power. Image Technical details: 16" LX200 telescope @ f/10 4000mm fl. Canon T1i Camera. 5X video mode in EOS Movie Record software (free). Processed in K3CCDTools, Registax 6(free), PhotoshopCS5 (not even close to being free). Stability 7-10 and Transparency 7-10.



### **◀Owl Nebula**

Courtesy of Larry Faltz, this photo is M97, the Owl Nebula (NGC 3587) in Ursa Major, taken on 4/9/11 at Ward Pound with an 8" Celestron CPC800 SCT working in alt-az at about f/4 with focal reducers. The camera is the MallinCam Color Hyper Plus video camera fitted with an IDAS P2 light pollution filter. Images were captured with DeepSky Imaging. Six 56-second frames were stacked with Deep Sky Stacker and processed just a little with Photoshop. This planetary nebula is about 9.9 magnitude and 3.3 arc-minutes in diameter and is 2,600 light-years distant. The central star, clearly visible on the image, is magnitude 16.0.



### **Iridium Satellite**

Rick Bria provided this image of the Mary Aloysia Hardey Observatory Dome. In the background is a bright flare. This flare is not from a meteor or a plane; it's from an Iridium Satellite. Iridium satellites are used by the United States government and have bright dish antennas that reflect sunlight. At times they can be seen in daylight.

Image Detail--Location: Convent of the Sacred Heart; Canon T1i Camera, 15mm lens at f/4.5; 25 second exposure.



### **◀ Needle Galaxy**

Larry Faltz provided this image of NGC 4565 in Coma Berenices. Discovered by William Herschel, the Needle is one of the finer edge-on galaxies available to amateur viewers. It lies about 30 million light years distant.

This was one of several images captured by Larry on his netbook. Notes Larry: Remember, these are video screen shots from a sensor that is 700x500, with a little mild post-processing (stacking a few images, unsharp mask, mild contrast/brightness/color correction). I used a Meade 3.3 and Mallincam MFR-3 focal reducers in-line after the diagonal, giving about f/4.



# Almanac

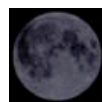
**For May 2011 by Bob Kelly**

Wait until my wife finds out that we should move to the Southern Hemisphere for the month of May! Almost everything interesting this month is easier to see 'down under'. Planets playing in the bright morning twilight sky, Saturn, even a meteor shower, will be higher in the sky and that much easier to see as you go further south. But, fear not, fellow habitants of the northern regions! While hockey and basketball teams pretend it's still winter and baseball players struggle to stay warm, even as our dark nights get shorter, we have fantastic Saturn and hundreds of interesting stars, galaxies and clusters to enjoy this month.

Saturn takes center stage this month, about half-way up in the southern sky during TV's Prime Time hours. The first magnitude star Spica keeps Saturn company, with Saturn the slightly brighter and steadier light. While Saturn is almost overhead in the Southern Hemisphere, it's still high enough here that any telescope will show the sublime ring, tipped  $7\frac{1}{2}$  degrees toward us. While you are using high power to get a better view of Saturn, watch for the tightly spaced double star Gamma Virginis one degree to the upper right of Saturn. Saturn will continue to creep toward it, passing by at  $\frac{1}{4}$  degree away in June. How much magnification do you need to see the two stars separated?

Most of the rest of the brighter planets – Mercury, Mars and Jupiter - have been hanging out behind the Sun, from our point of view. From their point of view, it's the Earth and Saturn hiding behind the sun! Venus, as if impatient with its shy siblings, is moving lower in the morning sky to see what the dawdling is all about. So, if you've been tracking Venus during its long morning appearance that began back in November, now you can follow Venus down into the bright planets' hideout. The prospect of having four bright planets that you can see in one view with your binoculars is too exciting to miss. For most of May, Mercury, Venus, Mars and Jupiter will be within 10 degrees of each other – a small enough area to cover with your fist held at arm's length!

These intriguing pairings will last all month, but they will happen less than ten degrees above the horizon. You'll need binoculars and a clear eastern horizon. Look about one-half hour before sunrise. The sky will still be bright, but it's a balancing act between looking late enough to give the planets enough time



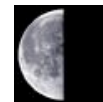
May 3



May 10



May 17



May 24

to get above the horizon and looking early enough before the rising sun blots them out. For day-to-day details on the alignments, see the great diagrams at Sky and Telescope or the on-line Abrams Sky Calendar. The tightest formations will be from the 12<sup>th</sup> through the 16<sup>th</sup>, when Venus gets in among the other planets. Jupiter uses this as an excuse to take off up into the darker sky; making Jupiter easier to see for the rest of the year.

The Moon has a nice photo-op with the Hyades and Pleiades clusters on the evening of the 4<sup>th</sup>, low in the west-northwest right after it gets dark out. Then the Moon joins the morning planet party seven degrees above Jupiter on the 29<sup>th</sup> and to the left of Jupiter. On the 30<sup>th</sup> the Moon will be above Mercury, Venus and Mars. The Moon is only two percent illuminated ten degrees above the horizon with Venus and Mars to its right and Mercury down near the horizon on the 31<sup>st</sup>. The easy way to tell Spica from Saturn: The Moon will be to the right of Saturn on the 13<sup>th</sup> and to the right of Spica (and below Saturn) on the 14<sup>th</sup>.

Notice that in May the Milky Way is not too obvious this month, hugging the horizon. The advantage of this is that the dust clouds in the plane of our galaxy that block our view to the island universes outside our home universe are out of the way. This makes May a great month for hoping from our familiar star patterns to distant faint galaxies. There are plenty of hints on how to hop to a galaxy in various astronomy magazines or a good book like *Turn Left at Orion*. Use low power to find these tiny smudges of light, then add more power to turn these faint fuzzes into distinctive domains of millions of stars.

Our meteor shower for May is crumbs from Comet Halley. The Eta Aquarid meteors are not a big shower, and its radiant is better placed for the areas south of ours.

The International Space Station has some wonderful overflights in the evening skies through May 6<sup>th</sup> and in the morning starting May 26<sup>th</sup>. If the Shuttle Endeavour launches on April 29, as planned, there could be some good views of the pair as Endeavour soars over us for the days she travels to and from her last mission to the ISS.

Bob has a blog at <http://bkellysky.wordpress.com/>.