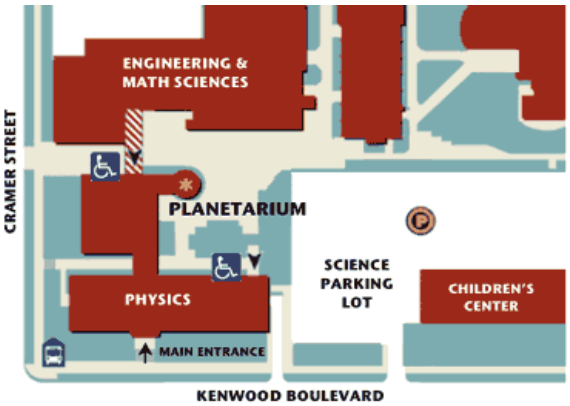
Focal Point

January, 2012

Inside this issue:

The January Membership Meeting

The upcoming General Membership Meeting of the MAS is going to be held on January 20th, at 8:00PM at the UW Milwaukee Physics Building, Room 151, which is located at 1900 E Kenwood Bld. Parking available in the Science Parking Lot. Gerry Samolyk will give a talk entitled: **Bright Star Photometry with a "Camera on a Stick"**.



Moon and International Space Station

Multiple images of the ISS have been combined into one composite image to show the progress of the station as it crossed the face of the moon in the early evening of January 4. The space station can be seen in the night sky with the naked eye and a pair of field binoculars may reveal some detail of the structural shape of the spacecraft.

Think you need a special telescope to take similar images? According to a recent NASA news release, amateur photographers can snap pictures of the space station from their own backyards. Sightings times and information from NASA's SkyWatch website can help you determine when the space station will be in view.

Equipment used was as follows: Nikon D3S, 600mm lens and 2x converter, Heavy Duty Bogen Tripod and a trigger cable to minimize camera shake. The camera settings were as follows: 1/1600 @ f/8, ISO 2500 on High Continuous Burst.

Photo credit: L. Harnett/NASA

Member's Stories

The Jupiter

As it was mentioned in the October issue of this Newsletter, the Jupiter is Big, Bright, and Beautiful. It still rules the evening sky as the brightest "star". Now it crosses the meridian soon after the sunset well placed for evening observation.

Here are two Jupiter images taken from the MAS Observatory last October using the 25" Z-scope with an attached Pentax DSLR camera. The prime-focus method was used. It involves using the telescope as a very long camera lens attached through a special adapter. A typical such adapter would have a barrel at the bottom like an eyepiece and a wider part at the top with a screw thread to attach the camera.

Image from 10/02/11 (above) is a stack of 156 exposures each 1/20 of a second.

Image from 10/22/11 (to the left) is a stack of 125 exposures each 1/20 of a second.

Raw images were aligned and stacked using RegiStack 5.1 and Photoshop Elements 2.0 software.

by Paul Borchardt

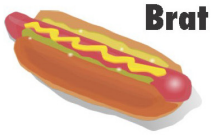
Save the Date

5th Annual
Swap 'N' Sell

Sponsored by Sheboygan Astronomical Society
Saturday, March 10, 2012
Aviation Heritage Center
Sheboygan Airport
N6191 Resource Drive, Sheboygan Falls, WI 53085
9:00 a.m. to 2:00 p.m.

WI Astronomy
(www.wiastro.com) will be providing $500 in door prizes

Brat Fry



Astronomy Presentations:

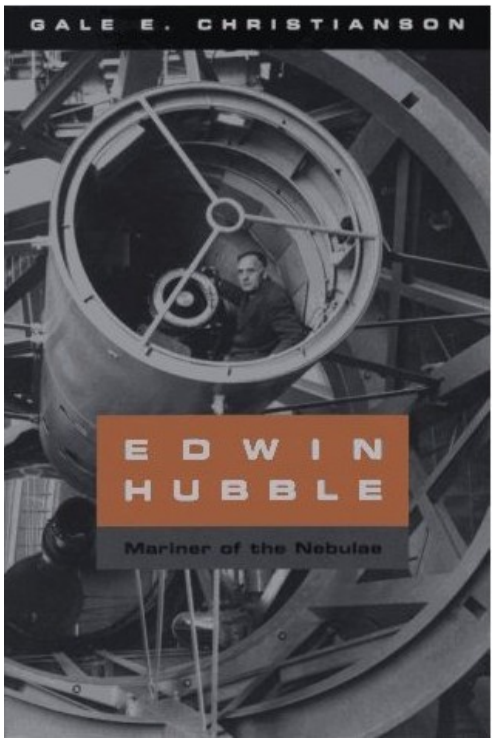
10:00 a.m. Jeff Setzer: Sir Patrick Moore: "Most Famous Amatuer Astronomer You've Barely Heard Of"
11:00 a.m. Michael Bakich fron Astronomy Magazine: A Big Announcement!
12:00 p.m. Randy Griffin: "Where in the Universe?"
1:00 p.m. Ty Westbrook: "The Leviathan of Parsons Town: Irish Astronomy in the Victorian Age."

Book Review

Gale Christianson: Edwin Hubble / Mariner of the Nebulae

I have long admired the work of Edwin Hubble, a leading figure in modern cosmological thought. This book covers a range of Edwin Hubble's life, and that of some of the other key players of modern cosmology.

Hubble's father moved the family to the Chicago area to pursue an insurance career in 1900. Hubble grew up in Wheaton, and had a strong interest in science. An uncle fired Edwin's interest, as many summer evenings were spent under the skies with a telescope. Hubble did very well in school, and was accepted at the University of Chicago. He wanted to study science, but his father assured him that law school was the correct choice.



In 1907, the University of Chicago was in the news due to the Michelson experiment, which very accurately measured the speed of light. This greatly fascinated Hubble. By 1910, Hubble was accepted into Oxford as a Rhodes scholar. He immersed himself in all things British. He pursued law, but had a greater interest in science.

By this time, interesting astronomical developments were occurring in the US. Slipher had measured red shifts to certain nebula, and found some to be receding from earth at 1000 miles per second. Hubble viewed a law career as less satisfying, and began to pursue his science dreams. By 1915, Hubble made his way to Yerkes. He dove into research there. Upon hearing that the new 100" telescope was nearing completion at Mt Wilson, however, he promptly made his way west to California.

After a brief stint in the service for World War I, he returned to Mt Wilson, just as the Curtis/Shapley debate was being scheduled. This debate covered the crucial cosmological question of the day: are the nebulae parts of the Milky Way (Shapley's view), or are they external, and possibly island universes in themselves (Curtis). The outcome of the debate was inconclusive, as there was no way to determine how far away the nebulae were.

Hubble decided to try to categorize the nebula, because no system existed yet. He tried to learn as much as possible about them. A great moment came in October of 1923. He had been taking plates of M31, looking for novae. He reasoned that novae have an average intrinsic brightness, and so it would be possible to estimate the distance to M31 by the study of novae. But he found something ever better. He found Cephied variables on his photographic plate. Because he had a great history of other plates taken of M31, he could compare them. So, as he was able to determine the variable's period and its apparent brightness, he could calculate the distance. They were much farther away than anyone suspected. Hubble thought M31 was about 1 million light years distant. He also found Cephieds in M33 and NGC 6822. Everyone then realized that the Curtis/Shapley debate was settled. The "island universes" (the term galaxy had not been invented yet), were indeed very far away. The universe was much larger than most astronomers thought. Hubble published these findings in 1931.

By this time, Hale was starting to suggest that a larger telescope was needed to resolve the cosmological issues of the day. The area of Mt Palomar was chosen, as Mt Wilson was suffering increasing light encroachment from nearby Los Angeles. Plans were made, but development ground to halt at the onset of World War II. Hubble served his country in various projects, some classified. He was happy to return to southern California, however, after the war.

The war had changed his views on many things; both he and Dr. Oppenheimer grew concerned that nuclear warfare could easily end life on earth. They both began to see the limits of what military power could accomplish.

By 1948, two important telescopes came online. The 200'' was completed, and the 48'' Schmidt was started in its survey work. It captured wide-angle sections of sky in unprecedented detail. These survey images were very helpful starting points for research. More research could be done later with the 200.

In 1948, Hubble had a heart attack. After a brief period of rest, he was anxious to get back to ''the mountain'' to continue his work. Humason and Sandage were assigned to help him, mostly in physically obtaining images. They could then discuss results, and plan their research projects. An ambitious project was stated to obtain spectra of many of the newly discovered galaxies as possible. It was well known that the spectra would show the speed of the galaxies. The spectral lines show the presence of specific chemicals, and would be shifted to the blue side if the galaxy was approaching, and to the red side, if the galaxy was receding. Hubble's team soon realized that all but a handful of galaxies were receding. Further, the closer, brighter galaxies were receding, but the distant, fainter ones were receding much faster. A linear relationship was established between a galaxy's distance and recession speed. The greater the distance a galaxy was from earth, the faster it was receding. Hubble's law is one of the cornerstones of modern cosmology. We live in an expanding universe. Space itself is expanding.

Einstein had great respect for Hubble's work. When Einstein developed his theories, the universe was thought to be static. Einstein's own equations showed the universe could not be static. But, Einstein created a ''cosmological constant'' to make relativity fit the imagined view of the universe. Einstein later called this the greatest blunder of his life. The static universe concept from an earlier era was discarded.

Thus, the two key contributions of Hubble are that the universe is much larger than just the Milky Way, and that the universe is expanding; the more distant a galaxy is, the faster it is receding from us.

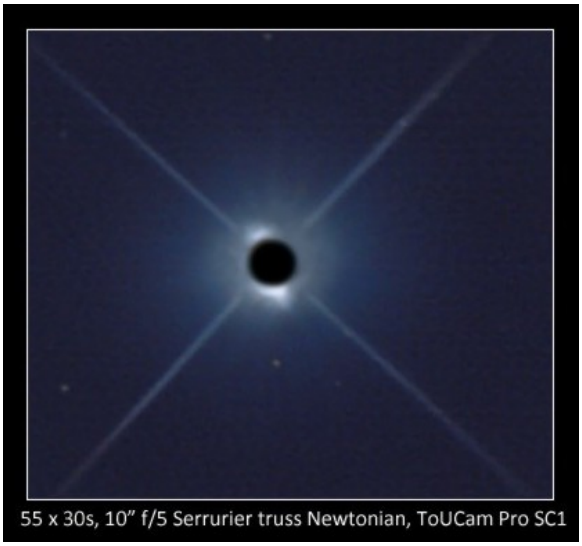
In our day, of course, we honored Hubble by naming the Space Telescope after him. It reaches out billions of light years, and reaches 28th magnitude. The research done with this telescope will drive the discoveries of the future, just as the 100'' of Mt Wilson, and the 200'' of Mt Palomar, had done earlier. I suspect Hubble would be very proud of this.

Tom Schmidtkunz

In the Astronomical News

Amateur astronomer glimpses an alien solar system

This is truly astonishing: an "amateur" astronomer in New Zealand, Rolf Olsen, has for the first time actually been able to get a direct photograph of the disk of swirling material forming a planet around a nearby star!
First, the picture:



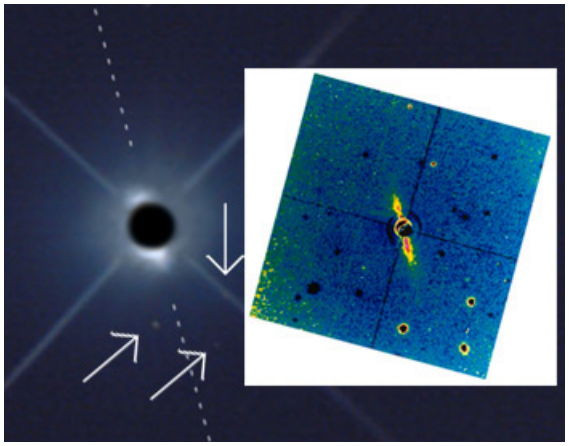
This is a picture of Beta Pictoris (or just β Pic), a young star just over 60 light years away. The light from the star itself has been subtracted away, and the two big crosshair streaks of light are diffraction spikes caused by light inside the telescope. But the fuzz you see above and below the star *is* real, part of the disk of material forming planets right before our eyes! The disk wasn't discovered until the 1980s because the star is so bright its light swamps the much fainter material around it. Than, an infrared images of β Pic revealed that it's surrounded by a flat dust disk almost exactly edge-on to us. We see that disk as a broad line crossing the star itself, like in the false-color image from the Las Campanas observatory. β Pic became a very popular object, and we now know that not only is that the disk actively forming planets, there is a planet orbiting the star inside that disk, and we've even seen it move!

Rolf first took a bunch of pictures of β Pic, and then took a second bunch of pictures of *another* star, Alpha Pictoris, which is very similar in brightness and color. He subtracted the image of the second star, removing the glare from β Pic itself. Adjusting for brightness is easy — that's just a bit of algebra — but color was critical. And it worked! I'll note that the method he used is very close to what astronomers use when working on a Hubble project to observe planet-forming disks! It's also used to see exoplanets themselves as they orbit their stars.

In the Las Campanas observatory picture below, you can see three stars near β Pic, and I saw three stars in Rolf's image that looked to be the same ones. I rotated the Las Campanas image and resized it; it's inset in the image here. Note the three stars; I marked those same stars in Rolf's image with arrows. Looks like he nailed it! Which is amazing.

I wouldn't have thought it was possible, especially with only a 10 inch telescope! β Pic is a bright star, so it's easy to spot from the southern hemisphere, but the disk is so faint and so overwhelmed by the star light I would've thought it couldn't be seen. But there you go: a bold experiment has paid off.

Telescopes and cameras are getting better all the time. I still think getting a direct picture of a planet orbiting another star is beyond the current capability of small 'scopes… but it is not only possible but relatively easy to detect them if they transit their host star, blocking its light a little bit.



Congratulations to Rolf Olsen for achieving this. You should look through his gallery of astrophotographs for a more detailed description of the whole process. I think it's a milestone in "amateur" astronomy, and it goes to show you that sometimes, the sky is *not* the limit.

by Bad Astronomy

Adopt a Telescope Program - Signup Sheet

	Adoptee	Scope	Location
1	Sue Timlin	18" F/4.5 Obsession	Wiesen Observatory
2	Neil Simmons	12.5" F/7.4 Buckstaff	B Dome
3	Russell Chabot	12.5" F/9 Armfield	A Dome
4	Dan Yanko	10" F/6 Newtonian	Albrecht Observatory
5	Tamas Kriska	25" F/15 Zemlock	Z Dome
6	Henry Gerner	12" LX 200	Tagney Observatory
7	Jeffrey Fillian	14" Z-Two scope	Ray Zit Observatory
8	Kevin & John McCarthy	10" LX 200	Jim Toeller Observatory

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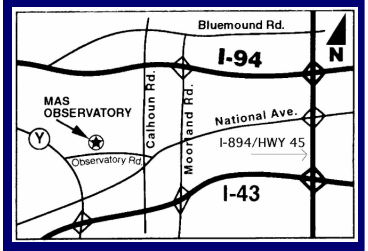
1/28	Brian Ganiere	414-961-8745
2/4	Henry Gerner	414-774-9194
2/11	Chris Hesseltine	414-482-4515
2/18	Scott Jamieson	262-896-0119



MAS Observatory

18850 Observatory Rd
New Berlin, WI
Phone: (414) 477-6220

www.milwaukeeastro.org