NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

MARCH 2016

PRESIDENT'S NOTES

JUPITER, SATURN AND MARS, OH MY*

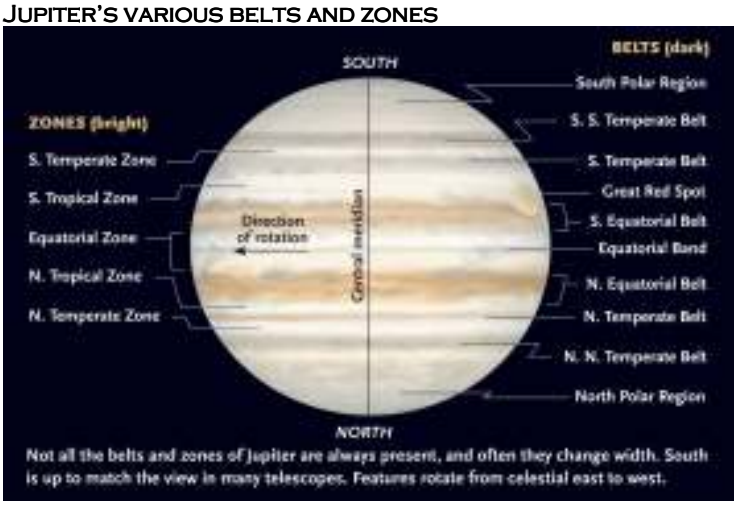
It has been forever since we've been able to gaze upon the likes of these solar system neighbors. Every time at an outreach event someone asks, "Can you show me Jupiter or Mars, or is Saturn up?" Well finally, the drought is about to be over. Jupiter is up as Sol sets, and Mars and Saturn are ready for viewing just a few hours later. In no time, we will be able to look at them all and still get to bed at a reasonable time (geologically speaking).

Jupiter was the Roman sky god (still is if you're Roman). He was also their weather god, and lightning tossing, good-time god. The Romans usurped the god Zeus from the Greeks to remake him as theirs (Jupiter), which is kind of funny, as Zeus had earlier usurped his dad, the god Cronus (Kronos), to rewrite the world of the Greek gods. I won't go into the rest of the story, as any of the Greek/Roman god stories get pretty sordid, pretty quickly, if you ask me. Anyway, what goes around comes around, and now Jupiter, the planet, is coming around again to our early evening skies.

Even in binoculars or the smallest telescope, Jupiter offers a wondrous sight, with two dark bands across its disk, and usually accompanied by the four Galilean moons, Io, Europa, Ganymede, and Callisto. For those of you who try to keep current in our solar system moon totals, Jupiter is running first with 67 moons, just ahead of Saturn's 65 (not counting the particles making up the rings). Also of interest for those who still battle with the eight/nine planet situation, these four moons are some of the largest objects in the solar system, outside the Sun, and the eight planets. In terms of mass, each is larger than any known dwarf planet (read Pluto). By the way, Ganymede's diameter is even larger than planet Mercury.

Sadly, even with large telescopes, study of the Galilean moons normally comes down to orbital and albedo measurements. Although, some amateur imagers are taking images showing astonishing surface detail on the moons. And, what about the smaller moons? Well, even less can be determined with our usual amateur optics, but the real action is going on in the planet's upper atmosphere anyway.

JUPITER'S VARIOUS BELTS AND ZONES



Sky & Telescope Illustration

Jupiter's cloud cover is ever changing and not merely due to the planet's rapid rotation. Jupiter exhibits differential rotation. The darker bands rotate more rapidly at the equator than they do at the poles. This causes the shearing effect that curls and festoons the edges of the belts as they interact with the lighter colored zones. Alongside and within the belts cyclonic storms pop up on occasion. Giovanni Domenico Cassini, noted one such storm in 1665 and described it as a "permanent spot" contained in the south equatorial belt. That storm was observed (more or less continually) for 48 years. Then there was a gap of documented observation for over a hundred years. The present red spot was rediscovered in 1830 and had been followed ever since. There is no definitive proof that the "Great Red Spot" is the same storm but most trust that it is.

As a boy, I remember the spot as red as brick, but it has since dimmed, and for a while was known as the great void because of its paleness. More recently, the color has returned, but the overall size of the spot has contracted. Jupiter is a vibrant object that holds interest for a lifetime. I'm very glad that what came around has come around again, and hope this time around you take time to continue or begin your relationship with Jupiter.

**Perhaps a Judy Garland outtake from* The Wizard of OZ*?*

Welcome our New Members

YES Fair award winners Dennis Yusufoff and Camden Miller are our newest members. Their astronomy related projects at the fair earned them free family memberships for 2016.

At the March Meeting

The March meeting will be held at 7PM on Friday, March 18 in the community room of the Student Union Building at Cochise College, Sierra Vista Campus.

Our speaker is Max Moe an Einstein Postdoctoral Fellow at the University of Arizona. Max grew up as an amateur astronomer under the dark skies outside Fort Collins, Colorado. While he has observed and sketched the Herschel 400 deep-sky objects, Max especially enjoys hunting down planetary nebulae in the summer sky. As an undergraduate at the University of Colorado, Max researched quasar outflows and the binary star interactions that shape planetary nebulae. He pursued his graduate studies at Harvard University, where he conducted both observational and theoretical research on eclipsing binaries, Type Ia supernovae, X-ray binaries, and peculiar transients. This past July, Max defended his Ph.D. thesis in astrophysics at Harvard University, entitled "How I Learned to Stop Worrying and Love Eclipsing Binaries." In his free time, Max enjoys biking, reading horrible science fiction, and hiking with his wife and five-month-old son.

His talk is titled: "The Cosmic Tango of Binary Stars." Most of the brightest stars in the night sky are members of binary star systems. The stellar components in binaries can interact with each other and produce a plethora of astrophysical phenomena, including novae, X-ray binaries, millisecond pulsars, Type Ia supernovae, gamma-ray bursts, mergers of compact stellar remnants, and sources of gravitational waves. Despite their ubiquity, the formation and evolution of binary stars remain poorly understood. For example, Type Ia supernovae have produced most of the iron in the universe, and they have been utilized as standard candles to measure the acceleration of the universe, dark energy, and the cosmological constant. Although we have observational evidence that Type Ia supernovae derive from accreting and exploding white dwarfs, the donor binary companions to the white dwarfs are still not known. In his talk, Max will share recent advances in binary star formation and evolution as well as highlight important questions that hopefully future missions can answer.

He will conclude with a discussion of binary star evolution toward binary black holes, their in spiral via gravitational wave radiation, and their detection by the Advanced Laser Interferometer Gravitational-Wave Observatory (LIGO).

Call to Arms- Dark Sky Warriors

HB 2507 (EMCs) is a bill that would double the area in the state permitting digital billboards. It passed the Arizona House recently and has moved into committee in the Senate. It is currently being considered by the Senate Commerce and Workplace Development Committee and is expected to come before the whole Senate very soon.

Current Arizona law on electronic message centers (EMCs, also known as 'digital billboards') was set in 2012 after an initial bill backed by the outdoor advertising industry to permit EMCs statewide was vetoed by Governor Jan Brewer. HB 2507 would unravel the 2012 compromise by extending the reach of EMCs in western Arizona, doubling the territory in which they would be permitted under A.R.S. §28-7902(E).

We need all dark sky advocates to contact their representatives to voice their opposition to this bill. You'll find several discussions with details about the bill and some talking points to help you craft your communications on HACLIST. **Please see Bob Gent, Rick Burke, David Roemer or Ted Forte at the meeting for more information about the bill and the many reasons citizens should oppose it. (It's not just about the impact on astronomy).**

Sierra Vista sky glow as seen from Palominas

HAC Swap Meet April 2

Mark your calendars, check your closets, and dust off those old eyepieces – HAC will hold an Astro Gear Swap Meet at the Patterson Observatory on Saturday, April 2nd starting at 1PM. We will advertise this event and it will be open to the public. Members are invited to bring items for sale or swap. You are also encouraged to bring your scope if you need any help with it. So bring items to swap, cash, and your checkbook – there will be toys to buy!

Space Place Article
March 2016
The Closest New Stars to Earth

By Ethan Siegel

When you think about the new stars forming in the Milky Way, you probably think of the giant star-forming regions like the Orion Nebula, containing thousands of new stars with light so bright it's visible to the naked eye. At over 400 parsecs (1,300 light years) distant, it's one of the most spectacular sights in the night sky, and the vast majority of the light from galaxies originates from nebulae like this one. But, its great luminosity and relative proximity makes it easy to overlook the fact that there are a slew of much closer star-forming regions than the Orion Nebula; they're just much, much fainter.

If you get a collapsing molecular cloud many hundreds of thousands (or more) times the mass of our sun, you'll get a nebula like Orion. But, if your cloud is only a few thousand times the sun's mass, it's going to be much fainter. In most instances, the clumps of matter within will grow slowly, the neutral matter will block more light than it reflects or emits, and only a tiny fraction of the stars that form—the most massive, brightest ones—will be visible at all. Between just 400 and 500 light years away are the closest such regions to Earth: the molecular clouds in the constellations of Chamaeleon and Corona Australis. Along with the Lupus molecular clouds (about 600 light years distant), these dark, light-blocking patches are virtually unknown to most sky watchers in the northern hemisphere, as they're all southern hemisphere objects.

In visible light, these clouds appear predominantly as dark patches, obscuring and reddening the light of background stars. In the infrared, though, the gas glows brilliantly as it forms new stars inside. Combined near-infrared and visible light observations, such as those taken by the Hubble Space Telescope, can reveal the structure of the clouds as well as the young stars inside. In the Chameleon cloud, for example, there are between 200 and 300 new stars, I and II clouds), approximately 50 T-Tauri stars and just a couple of massive, B-class stars. There's a third dark, molecular cloud (Chamaeleon III) that has not yet formed any stars at all.

While the majority of new stars form in large molecular clouds, the closest new stars form in much smaller, more abundant ones. As we reach out to the most distant quasars and galaxies in the universe, remember that there are still star-forming mysteries to be solved right here in our own backyard.

Image credit: NASA and ESA Hubble Space Telescope. Acknowledgements: Kevin Luhman (Pennsylvania State University), and Judy Schmidt, of the Chamaeleon cloud and a newly-forming star within it—HH 909A—emitting narrow streams of gas from its poles.

Pictures from HAC Members

Rosetta Nebula– By Rick Burke

Thor's Helmet – by David Roemer

M81 and M82 from RISS-Remote - by Craig Anderson

WantAds

FOR SALE: StellaCam

I have a StellaCam II video camera with video to computer adapter to view on a computer monitor. $150.00.

Contact Bob Kepple at 520-366-0490, or Astrocards@aol.com.

FOR SALE: Meade Starfinder 8" Reflector Telescope

Will Sell at a very reasonable price. Included are a Telrad Finder, Filters, and additional Lenses.

Contact Mr. Jim Moses at (520) 803-0913 or by email jjmoses2@gmail.com

FOR SALE: Celestron Celestar 8 inch S/C Deluxe - $1200.

Will also sell pieces individually

Contact Rhonda and Terry Taylor at (520) 366-2378 or by email at twrl2@yahoo.com. Or, see Craigslist at http://sierravista.craigslist.org/bar/4523742100.html

FOR SALE: Older Optical Guidance Systems 12.5" f/9 Ritchey-Chretian telescope.

Very good Paul Jones ceramic optics, Robofocus secondary focuser, will include Takahashi collimating telescope. Some of the images through the scope are at Mshadephotography.com.

Contact Mike J. Shade at mshade@q.com

FOR SALE: 8" Celestron Nex Star

Good condition with all original accessories.

Contact Mae Childs at maechilds2014@aol.com

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Our sponsors have been keeping us supplied in door prizes for some years. If you have not contacted them lately, please consider this. They have a lot of great astronomical products that we all need.

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David Roemer with Visitors at Kartchner Solar Party

HAC March/April Calendar of Events

SU	MO	TU	WE	TH	FR	SA
13 Daylight Savings Time Begins	**14**	**15** **1:03 PM** Joyce Clark Middle School Pie in Sky	**16** Village Meadow Elementary	**17**	**18** HAC Meeting Student Union M. Moe	**19**
20 Vernal Equinox 12:30 AM	**21** Jupiter 2° North of Moon	**22**	**23** **8:01 AM**	**24**	**25** Saturn Stationary	**26**
27 	**28** Mars 4° south of moon	**29** Saturn 3° South of moon	**30** Cub Scouts at Patterson 6:30p	**31** **11:17 AM**	**1 April**	**2** **1PM Patterson Observatory** 
2	**4**	**5**	**6** Journalist FAM Tour 7:30PM Patterson	**7** **7:24 AM**	**8** **Coronado Star Party 7:30PM**	**9** Member Star Party
10	**11**	**12**	**13** **11:59 PM**	**14** Patterson Public Night 7:30PM	**15** HAC Meeting Library Commons S. Morrison	**16**
17	**18**	**19**	**20**	**21** Earth Day Vet park SV 10 AM Lyrid Meteors	**22** **1:24 AM** Lyrid Meteors	**23** Passover Begins Lyrid Meteors
24	**25**	**26** Juno Opposition	**27**	**28** Valley Union H.S. Elfrida 7PM	**29** **11:29 PM** Math and Science Expo 8AM Patterson	**30** Passover ends
May 1 May Day	**2**	**3**	**4** Eta Aquariid Meteors	**5** Eta Aquariid Meteors	**6** **3:30PM** Eta Aquariid Meteors	

TRANSIT OF MERCURY MAY 9TH!

All event times MST. Join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email to: haclist-subscribe@yahoogroups.com