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August 2010

Solar Saturday

By Carl Bracken

Back in midwinter at a regular Thursday meeting of the Cedar Amateur Astronomers I volunteered to give a daytime presentation in July. When the ice and snow are flying, volunteering to present on a warm summer afternoon is relatively easy. The commitment also gave me a chance to develop our second formal daytime solar oriented talk.

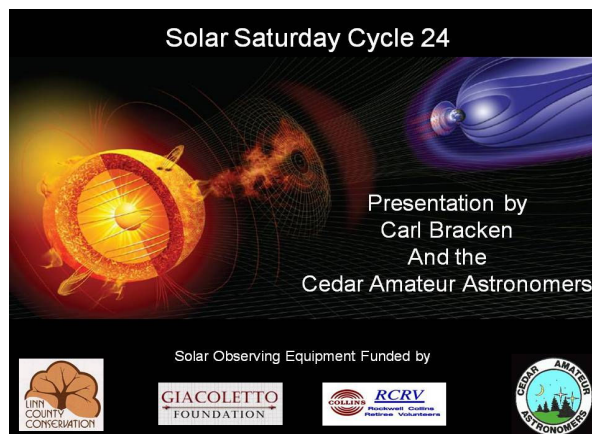
As the seasons changed and summer finally arrived it became obvious I must stop procrastinating. It was time to step up to the task of assembling something that would be informative and perhaps just a bit entertaining. Luckily for me NASA launched the Solar Dynamics Observatory in February, AND the recently renovated Big Bear Solar observatory in Southern California was once again on line. Both resources combined with the fine solar observing equipment that the CAA owns and operates at Palisades-Dows Observatory would make for an interesting and entertaining presentation.

The July 17th, Solar Saturday Cycle 24 presentation was attended by 66 visitors despite the day's heat and humidity. We began by establishing some historical context. Introductions to German astronomer Samuel Schwabe 1789 - 1875 and Swiss born astronomer Rudolf Wolf 1816 - 1893 were required. Mr. Schwabe created early regular records of sunspot counts and noted the regular pattern of highs and lows in the appearance of the spots. Mr. Wolf on the other hand, started with this data set and developed a model which he applied to historical records going back to Galileo's observations of sunspots. The result of this established sunspot Cycle Number 1 between 1755 and 1766 right after the Maunder Minimum (http://en.wikipedia.org/wiki/Maunder_Minimum). The most recent Cycle 24 officially began in January 2008.

Now that we had some context of the cycles most everyone in attendance seemed familiar with the 11 year period. But less well known was the variability of the cycles over the long haul. At this point I presented the most up to date information I could: at this stage Cycle 24 is showing signs of a weak overall period of activity. Perhaps it is because so many of us purchased highly tuned and specialized and pricey solar observing equipment in the last few years, or maybe the internal magnetic dynamo is for some unknown reason weakening a bit. Regardless of what your thoughts are on the causes, the weakness of Cycle 24 has definitely caused some experts in the solar physics world to update their previous outlook that it would be historically significant. If anything the early signs are that it will be the opposite.

Cycle 24's limited solar activity sets up an interesting natural experiment that we will all participate in. If the solar activity remains relatively low for an extended period what impact might it have on global climate? My point in the talk was not to debate global warming in one way or another but to note that if the current observational trend continues through this cycle and beyond then it will probably have some sort of impact on our climate. I pointed out that the past winter in Northern Europe set many records for cold and snow.

The talk then turned to an explanation of the numerous ground-based solar observing activities being
(Continued on next page)



The Community Planning Process
Fifteen in 15

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Touring the Skies

By Jim Bonser, jbonser@usa.net

I always look forward to August stargazing. The days are often hot and muggy, but the temperature drops quickly after sunset and comfortable short sleeved shirt viewing is often possible. August also puts the three constellations high overhead that contain my favorite telescopic targets. There is a lot to see this month, so let's get our tour underway!

The first object I would like to draw your attention to is that amazing cluster in the constellation Hercules. Now-a-days, most amateur astronomers refer to it as M13. But a more descriptive and I think, romantic name is 'The Great Cluster in Hercules'. Listen to how Robert Burnham Jr. describes it in his book, 'Burnham's Celestial Handbook': "M13 Great Globular Star Cluster in Hercules, the finest cluster of its type in the north half of the sky and one of the most spectacular telescopic objects in the heavens." He is absolutely correct! M13 is one of my favorites and in August it is nearly overhead which means there is less atmosphere to look through which would blur the thousands of tiny points that make up this cluster. Most estimates place over a million suns in M13 which blazes in space with a total luminosity more than 300 thousand times brighter than our sun. M13 is easily seen with the unaided eye if the moon is not up and you are in a dark location away from electric lights. Practically any binoculars will show it well; especially 10X50 or greater. I'm afraid I don't have space to describe how to find Hercules in the column this month, but check out Sky and Telescope or Astronomy magazine at the library or bookstore, and use the chart in the center (my idea of a heavenly centerfold) or go to their web pages for a printable chart to help you.

The second object is in the next constellation to the east – Lyra. This object lies between the two stars at the end of the harp. This is M57, The Ring Nebula. The Ring Nebula is one of a class of objects called Planetary Nebula, because many of them look a little like the planets Neptune or Uranus in a smaller telescope, but they are not planets at all. They are stars at the end of their life cycle and M57 is one of my favorites because it is bright and very distinctive. I have heard it described as a 'Cheerio in the sky' or a tiny smoke ring. I think I like it so much because it is so unlike other objects and very much unexpected. The Ring Nebula is not visible to the unaided eye and I can only barely distinguish it in my 16X80 binoculars. A 5" or larger scope is really needed to see it clearly, and the bigger, the better! Definitely worth going to a star party this month and asking someone to point their scope at it for you!

My third favorite August object is actually a double star in the next constellation to the east of Lyra – Cygnus, the Swan. According to mythology, Cygnus is the swan that Zeus turned himself into in order to seduce Leda, the wife of the King of Sparta. The star that marks the head of the swan is the famous double called Albireo. It is a beautiful pair and I have no trouble gazing at them for minutes at a time. The dimmer of the two, known as Albireo-b is a class b dwarf star and is a very distinctive blue color. The brighter star which is known as Albireo-a is a Red giant star and looks a soft yellow or Topaz next to the light sapphire-blue Albireo-b.



Jim captured this image of Messier 5 on 07/11/2010. It is a composite stack of 10 images each with a 240 second exposure. The images were taken at prime focus using his AT102ED APO refractor using ISO 800.

There are several planets to enjoy this month. Bright Venus is impossible to miss in the west at dusk. As the sky darkens, Mars will appear a few degrees to the left of Venus and golden Saturn appears a little farther left (south) of Mars, but also a little higher. Watch on the nights of August 11, 12 and 13 as the moon joins these three bright planets. Please check out the star charts online at one of the magazines I mentioned to help you identify these planets and watch them dance around each other all month. Jupiter is still best seen in the morning before sunrise when it is high in the sky. By the end of August it will begin to rise in the late evening, as it prepares to dominate the skies of October.

Finally, I want to mention the Perseid Meteor shower. This month on the night of August 12, the Perseid meteor shower will peak. The best thing is the moon will not be in the sky to washout the fainter meteors. Many Perseids are quite bright and are always fun to watch. Just setup your lawn chair facing the east and scan the east and northeast sky as well as the sky overhead. Perseids will appear to come from a point in the north east sky near the constellation Perseus (**Per**-see-us), hence the name: Perseids. (**Per**-see-ids). The Perseid Meteor Shower is one of nature's best 'fireworks' shows! Be sure to dress with a thick sweatshirt, cap and blue jeans to keep the mosquitoes away and let me know how many you see! Clear Skies!

The Sun Can Still Remind Us Who's Boss

By Dr. Tony Phillips

Grab your cell phone and take a good long look. It's indispensable, right? It tells time, surfs the web, keeps track of your appointments and, by the way, also makes phone calls. Modern people can hardly live without one.

One good solar flare could knock it all out.

"In the 21st century, we're increasingly dependent on technology," points out Tom Bogdan, director of NOAA's Space Weather Prediction Center in Boulder, Colorado. "This makes solar activity an important part of our daily lives."

Indeed, bad space weather can knock out power systems, telecommunications, financial and emergency services—basically, anything that needs electronics to work. That's why NOAA is building a new fleet of "space weather stations," the GOES-R satellites.

"GOES-R will bring our existing fleet of weather satellites into the 21st century," says Bogdan. "They're designed to monitor not only Earth weather, but space weather as well."

NOAA's existing fleet of Geostationary Operational Environmental Satellites (GOES) already includes some space weather capabilities: solar ultraviolet and X-ray telescopes, a magnetometer and energetic particle sensors. GOES-R will improve upon these instruments and add important new sensors to the mix.

One of Bogdan's favorites is a particle detector named "MPS-Low," which specializes in sensing low-energy (30 eV – 30 keV) particles from the sun.

Who cares about *low-energy* particles? It turns out they can be as troublesome as their high-energy counterparts. Protons and other atomic nuclei accelerated to the highest energies by solar flares can penetrate a satellite's exterior surface, causing all kinds of problems when they reach internal electronics. Low-energy particles, particularly electrons, can't penetrate so deeply. Instead, they do their damage on the outside.

As Bogdan explains, "Low-energy particles can build up on the surfaces of spacecraft, creating a mist of charge. As voltages increase, sparks and arcs can zap electronics—or emit radio pulses that can be misinterpreted by onboard computers as a command."

The Galaxy 15 communications satellite stopped working during a solar wind storm in April 2010, and many researchers believe low-energy particles are to blame. GOES-R will be able to monitor this population of particles and alert operators when it's time to shut down sensitive systems.

"This is something new GOES-R will do for us," says Bogdan.

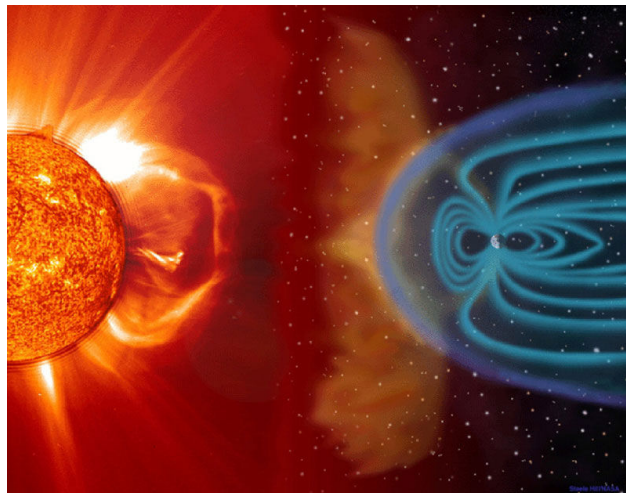
The GOES-R magnetometer is also a step ahead. It will sample our planet's magnetic field four times faster than its predecessors, sensing vibrations that previous GOES satellites might have missed. Among other things, this will help forecasters anticipate the buildup of geomagnetic storms.

And then there are the pictures. GOES-R will beam back striking images of the sun at X-ray and extreme UV wavelengths. These are parts of the electromagnetic spectrum where solar flares and other eruptions make themselves known with bright flashes of high-energy radiation. GOES-R will pinpoint the flashes and identify their sources, allowing forecasters to quickly assess whether or not Earth is in the "line of fire."

They might also be able to answer the question, *Is my cell phone about to stop working?*

The first GOES-R satellite is scheduled for launch in 2015. Check www.goes-r.gov for updates. Space weather comes down to Earth in the clear and fun explanation for young people on Scijinks, <http://scijinks.gov/space-weather-and-us>.

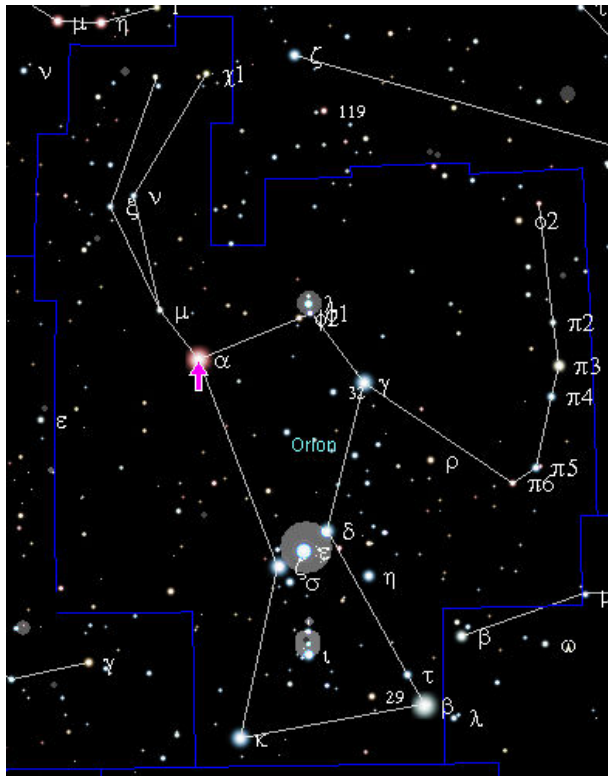
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



In spite of Earth's protective magnetosphere, solar storms can wreak havoc with Earth satellites and other expensive electronics on the ground.

Beetle...Betle...Beteljoo...BETELGEUSE!

By Tom, Tom's Astronomy Blog, <http://tomsastroblog.com/>



The constellation Orion - image courtesy of Zwergelstern, released to PD

would even be perfectly visible during the day. We would see it increase in brightness over a two-week period, hold intensity for about two or three months, then rapidly dim. What would be left? It could be a neutron star remnant, a white dwarf, or even a pulsar. We don't have to worry about a gamma ray burst from Betelgeuse; its rotational axis is positioned so that the burst won't be headed our way. Not that worrying about it would do any good, you know. If we were looking down the barrel, Betelgeuse is close enough to fry us to a cinder.

Long an object of speculation and study, Betelgeuse has been receiving even more attention with the advent of the new "super telescopes" like Gemini. It's fair to say that at any moment, someone... somewhere... is looking at Betelgeuse.

Many people think it would be really cool to watch Betelgeuse supernova. Maybe. If I sound grouchy here it's because although I would like to see a supernova that close (and we should be perfectly safe at this distance), I don't want to lose Betelgeuse. Sure, we wouldn't really lose Betelgeuse... SOMETHING will still be there... but it won't be that big, beautiful red star I'm used to seeing.

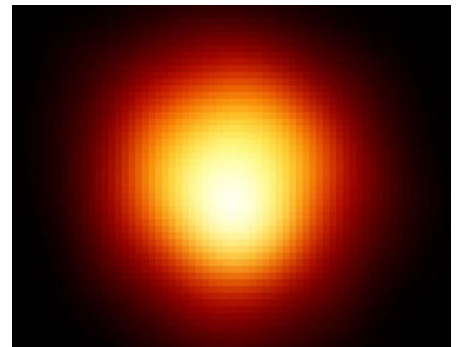
Keep looking up, Alejandro.

As far as stars go, it's one of the largest, the most luminous, brightest, most massive, and one of the best supernova candidates on the list. Betelgeuse is huge. If it were in our sun's place, it would extend out beyond the orbit of Mars, possibly beyond that of Jupiter. It is the ninth brightest star in the night sky, and the second brightest (behind Rigel) in the constellation Orion.

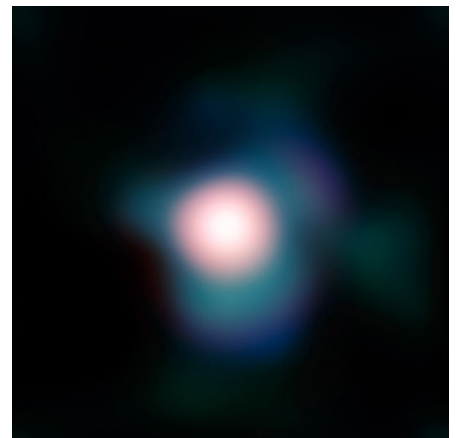
The origin of the name "Betelgeuse" is an interesting read in itself, if you happen to be interested in etymology (which I am). There are also many and varied pronunciations floating around, and "beetle juice" is perfectly acceptable. I was taught to pronounce it "BET el juz". You can avoid the whole issue and just call it "alpha ori/orionis", if that grabs you.

Betelgeuse is a semi-regular variable star, and is believed to be about 8.5 million years old. While that makes it an infant compared to our sun (actually, it makes it a fetus), Betelgeuse is old for its type. Scientists believe it will supernova any time in the next 1,000 years; in fact, it could go tonight. Betelgeuse has been doing some strange things lately, things which many astronomers believe to be a pre-ambule to supernova.

When Betelgeuse does supernova, it will become the brightest object in the night sky – easily outshining the Moon. It



NASA/JPL/ESA - Hubble - This 1999 image was the first direct image of the surface of a star other than the Sun



Betelgeuse, image by ESO's Very Large Telescope

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A Question of Identity



Question: When is a supernova not a supernova?

Answer: Now that's an interesting story...

It all started on Christmas night 2005, when astronomers using the Katzman Automatic Imaging Telescope (KAIT) in California discovered an apparent supernova not far from the center of the elliptical galaxy NGC 2274. There was nothing there on an image they had taken two weeks prior. Twelve hours later, Astronomers at the National Astronomical Observatory of China confirmed the 18th magnitude object was real. It was named SN2005md and the discovery was announced in CBET #332 on December 26.

A spectrogram taken on December 28 showed it to be most probably a "young Type-II supernova". This was announced in an IAU Circular (8650) on the 29th of December. Subsequent KAIT images showed that SN2005md faded rather quickly and it was fainter than magnitude 19.8 by January 2006.

Normally that would be the end of the story, but this time it wasn't.

KAIT Telescope

First, it is generally accepted that the progenitors of core-collapse supernovae are massive young stars. These massive young stars are almost always found in spiral or irregular galaxies dominated by young stellar populations.

NGC 2274 is a strangely shaped early irregular galaxy (an E-type galaxy), so SN2005md was unusual. In fact, it was only one of 22 examples found in an extensive literature search of all early irregular galaxies containing core-collapse supernovae in history.

A paper published in 2008 by Hakobyan et al. (2008, A&A, 488, 523) examined all these cases and found that 19 of the galaxies had been misclassified, and were actually spiral (17), irregular (1) or ring (1) galaxies. Of the 3 remaining galaxies with early type classification, one (NGC 2768) is a suspected merger remnant, another (NGC 4589) is definitely a merger, and the third (our NGC 2274) is in close interaction with another galaxy. This seemed to explain the contradiction of core-collapse stars residing in old non-star-forming irregular galaxies, since some amount of young stellar population in these interacting galaxies is expected.

Well then, all was right in the Universe once more...or was it.

In February 2008, while Hakobyan and company were putting the final touches to their paper for submission, an electronic telegram (CBET 1265) was issued announcing that either a new supernova in NGC 2274, very close to the position of SN2005md has erupted at magnitude 18.5, or that SN2005md itself had suddenly re-brightened!

The difference between the previously reported position of SN2005md and the "new" object was on 0.1 arc seconds in R.A. and 0.4 arc seconds in declination, but at the distance of NGC 2274 (estimated to be 70 mega parsecs) that could mean they were unrelated objects 120 parsecs apart. Measuring the exact positions of anything that faint close to a galaxy is tricky business and the likelihood they were the same object seemed greater than the probability they were two SN in the same galaxy that close together.

The fact that the previously reported spectrum only showed a featureless blue continuum, with no obvious broad supernova features, and that the object faded so quickly added to the suspicion that SN2005md wasn't a supernova at all.

The telegram went on to explain if the new object was indeed a re-brightening of 2005md, possible explanations were that it was the super-outbursts of a luminous blue variable (LBV), or multiple flares of the LBV as part of an extended eruption. Other possible explanations included a Galactic variable star or a background AGN/blazar.

Needless to say, SN2005md was a mystery. Further observations were encouraged.

Flash forward to July 2010. Astronomers Telegram (ATEL) #2750 finally sorts it all out for us. A fully reduced spectrum taken with the LRISp on the Keck I 10 meter telescope on December 31, 2005 shows that the object originally classified as a young Type IIb supernova is in fact a galactic cataclysmic variable. That's right, it's in our own Milky Way galaxy. NGC 2274 just happens to lie in the background very close to its position on the sky. The CVs spectrum shows features typical of a dwarf nova in outburst. The Balmer emission lines were the clincher. They have an average redshift of about 300km/second, which is far to little to be part of a galaxy estimated to be receding from us at 5000+km/second.

(Continued on next page)

A Question of Identity (Cont'd)

This also explains the re-brightening in 2008, since CVs are prone to outburst over and over on various timescales from weeks to years. It also resolves the conundrum of having a core-collapse supernova in an E-type galaxy with few signs of active star formation.

And once again, order has been restored to the Universe.

The only mystery that remains is why it took them so long to figure this out. The spectrum that resolved this issue was obtained New Years Eve, 2005!

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Upcoming Public Night Programs at Palisades-Dows Observatory

All the events below are at Palisades-Dows Observatory at 1365 Ivanhoe Rd., located just south of the Cedar River, a short drive SW of Mt. Vernon, IA. The observatory is just 2 miles west on Ivanhoe Rd. from IA Highway 1.

*August 7, 2010
at 8:30 p.m.*



Are We Alone? Searching for Life in the Universe

Presenter: Professor Robert Mutel, The University of Iowa

Are we alone? In this lecture, Dr. Mutel will discuss the scientific foundations of this question as well as the technology behind current and planned searches for extraterrestrial life in the solar system and on extra-solar planets. He will also briefly summarize the history of life's evolution on Earth, and the likelihood that such conditions may exist elsewhere in the universe. Finally, Dr. Mutel will speculate about the possible cultural consequences of a detection. Weather permitting, observing through CAA telescopes will follow.

*September 11, 2010
at 8:00 p.m.*



Iowa's Astronomical Rocket Program

Presenter: Asst. Professor Randall McEntaffer, The University of Iowa

The University of Iowa has a long tradition of suborbital rocket flights. Recently, Dr. Randall McEntaffer has joined the Department of Physics and Astronomy and continues this tradition in the area of astronomy. His talk will concentrate on NASA's suborbital rocket program, the results from recent astronomical flights, and plans for upcoming missions. Weather permitting, observing through CAA telescopes will follow.

*October 9, 2010
at 7:30 p.m.*



Astronomy in the Hawkeye State

Presenters: Doug Slauson and Brent Studer

Many people are familiar with the name of James Van Allen, but Iowa's astronomical heritage goes back long before the pioneering space physicist helped usher in the Space Age. Tonight, Brent and Doug will talk about astronomical events in Iowa's history, provide a brief history of astronomy at The University of Iowa and around the state, and describe upcoming events that will be of interest to tonight's audience and their descendants. Weather permitting, observing through CAA telescopes—including the 24-inch Boller & Chivens formerly owned by The University of Iowa—will follow the presentation.

CAA Monthly Meeting Agenda – August 5, 2010

- Program: None
- Section reports
- August refreshments: Drinks - John Leeson, food - Greg Frohner
- Other post reports
- Old Business
 - Posts that need filling ASAP:
 - Scout coordinator
 - Librarian
 - Observatory committee member
 - Outreach committee
 - Publicity coordinator
 - Volunteer coordinator
- New Business
 - Potluck and swap meet at the member night at EIOLC, Friday August 6, at 7pm

This month CAA's meeting will be held at the St. Luke's Hospital Resource Center in the Formal Lounge, at 7pm.



The dates for the 2010 Iowa Star Party have been announced **Thursday - Sunday, September 2-5, 2010.**

This star party is being sponsored jointly by the Ames Area Amateur Astronomers (<http://www.amesastronomers.org/>) and Whiterock Conservancy (<http://www.whiterockconservancy.org/>). Meals will be provided and accommodations ranging from tent camping to full B&B will be available. Advanced registration is required. If you have any questions contact Trent Milam (712-684-2964 ext 112, rsort@whiterockconservancy.org).

Astrofest 2010

The Chicago Astronomical Society invites you to attend our annual star party, Astrofest, which will be held September 10-11, 2010 at Vana's near Kankakee, Illinois. Registration forms and related information are available at http://www.chicagoastro.org/index_files/Page345.htm

The theme for this year's event is "The Link Between Astronomy and Particle Physics." In addition to our usual line-up of astronomers, Astrofest 2010 will include presentations by scientists involved in research with such contemporary topics as dark matter and dark energy. Our star party will be held on Vana's 20+ acre field, with plenty of room for camping and telescopes; each attendee will be invited to use our 14-inch observatory telescope. Other activities include: astrophotography contest; telescope contest; door prize raffle.

We hope to see you at Astrofest 2010. If there are any questions, please contact Jim Cuca at jamescuca@comcast.net.

CAA Meeting Minutes July 1, 2010

By Corely Washburn, Secretary

7:02 pm Call meeting to order

There were no corrections to the minutes of the previous meeting.

We watched Basil's DVD, "Understanding the Universe, Our Sun The Nearest Star". Thank you Basil.

Section Reports

Equipment: Report Given

Computer: Report Given

Meteor and Aurora: No Report Given

Imaging: Report Given

Deep Sky: No Report

Solar, Lunar, and Planetary: Carl set up the solar scope for display. Jupiter is missing a band

Stellar: Report Given

Break for refreshments, thank you Richard Masek for providing those. Refreshment volunteer for August John Leeson bringing beverages, Greg Frohner bring food.

Treasurer's Report: Carl Bracken

Committee Reports

Observatory: No Report Given. John Leeson appointed to observatory committee as additional committee member.

ALCOR: New roster submitted. Club is 129 members strong.

EIOLC: Report Given

Librarian: Position open. We had a donation to the library from Tom Birr of several items.

Program Chairman: No Report

Old Business: None

New Business:

Club Patches: Motion made to order two hundred 3 inch patches and resell to members for \$2 each. Motion Seconded. Motion Carried. Motion was made to go with the actual original club logo using four point star not five point. Motion Seconded. Motion Carried. Motion was made to order fifty 10 inch patches to be resold to members for \$20 each. Motion Seconded. Motion Carried. Doug Slauson agreed to proceed with this project.

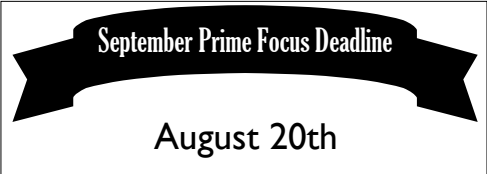
Adjourned 9:40pm

In Attendance: Tom Birr, Jim Bonser, Deb Bonser, Carl Bracken, Steve Brunner, John Centala, Wendell Clifton, Gary Couch, Keith Erickson, Greg Frohner, Lloyd Holecek, Vern Jackson, John Leeson, Richard Masek, Doug Slauson, Basil Tilley, Forest Tomes, Corely Washburn, Nathan Welch.

Funds	6/1/2010	6/30/2010	net gain(loss)
Robotic Telescope	\$ 310.48	\$ 310.48	\$ -
Internet Connectivity	\$ 1,164.07	\$ 1,047.36	\$ (116.71)
Jim Rutten Memorial	\$ 652.70	\$ 652.70	\$ -
Keith Sippy Memorial	\$ 744.00	\$ 769.00	\$ 25.00
Equatorial Mount	\$ 535.24	\$ 535.24	\$ -
Endowment	\$ 6,184.99	\$ 6,184.99	\$ -
General	\$ 640.97	\$ 487.47	\$ (153.50)
E.I.O.L.C Facility	\$ 1,906.52	\$ 1,781.33	\$ (125.19)
RCRV	\$ 1,558.38	\$ 1,423.12	\$ (135.26)
Lady Astronomers	\$ 250.00	\$ 250.00	\$ -
AEGON Transportation Fund	\$ 4,958.00	\$ 4,958.00	\$ -
		\$	\$ -
Totals	\$ 18,905.35	\$ 18,399.69	\$ (505.66)

Calendar of Events

- 5th — CAA Monthly Meeting.
- 6th — CAA Members Night
- 7th — Public Program at Palisades-Dows Observatory starting at 8:30p.m.
 Professor Robert Mutel, The University of Iowa
 Presents: *Are We Alone? The Search for Life in the Universe*



August 2010

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 Mars 1.9° South of Saturn.	2	3	4 Moon 0.6° South of Pleiades (M45).	5 CAA Monthly Meeting.	6 Members Night at Palisades-Dows.	7 Public Night at Palisades-Dows.
8	9	10	11	12 Mercury 2° North of Moon.	13 Perseid meteors peak.	14
15	16	17 Antares 1.9° South of Moon.	18	19	20 Venus greatest elongation East (46°). Neptune at opposition.	21
22 Venus 2° South of Mars.	23	24	25	26	27	28
29	30	31				

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