IO - December 2012

Issue 2012-12
Eugene Astronomical Society

www.eugeneastro.org

Eugene Astronomical Society
Annual Club Dues $25
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PO Box 7264
Springfield, OR 97475
www.eugeneastro.org
EAS is a proud member of:
The Astronomical League
The World's Largest Federation of Amateur Astronomers

Next Meeting: Thursday, December 20th
Swap Meet & Potluck Get-Together

Our December meeting will be a chance to visit and share a potluck dinner with fellow amateur astronomers, plus swap extra gear for new and exciting equipment from somebody else's stash. Bring some food to share and any astronomy gear you'd like to sell, trade, or give away.

We will have on hand some of the gear that was donated to the club this year, including mirrors, lenses, blanks, telescope parts, and possibly even entire telescopes. Come check out the bargains and visit with your fellow amateur astronomers in a relaxed evening before Christmas.

We also encourage people to bring any new gear or projects they would like to show the rest of the club. The meeting is at 7:00 on December 20th at EWEB's Training Room, 500 E. 4th in Eugene.

Next First Quarter Friday: December 21st

Our November 16th star party had one telescope (thanks, Bill!) and two customers due to iffy weather. Here's hoping for better luck in December. Our next First Quarter Friday will be December 21st, with a backup date of Saturday, December 22nd if the 21st is cloudy. The 21st is the night the Mayan calendar rolls over to a new *baktun*, so expect some silly questions.

First Quarter Fridays are laid-back opportunities to do some observing and promote astronomy at the same time. Mark your calendar and bring your scope to the College Hill Reservoir (24th and Lawrence in Eugene) and share the view with whoever shows up. Here's the schedule thru 2013:

January 18 (52% lit)	February 15 (34% lit)	March 15 (19% lit)
April 19 (66% lit)	May 17 (50% lit)	June 14 (35% lit)
July 12 (21% lit)	August 16 (80% lit)	September 13 (67% lit)
October 11 (53% lit)	November 8 (38% lit)	December 6 (24% lit)

Dues Are *Way* Past Due!

EAS membership runs from October 1 through September 31, so it's past time to renew if you haven't already. Dues are still just $25/year, and include membership in the Astronomical League as well as the EAS. (That's where your *Reflector* magazine comes from, and where our observing awards come from.) Your dues also help us pay our liability insurance and to keep our telescope lending program going. We had over 50 members last year, and it would be great to see all of us renew for another year.

If you haven't renewed already, please send your $25 dues to the Eugene Astronomcal Society, P.O. Box 7264, Springfield, OR 97475. Make checks payable to Eugene Astronomical Society.

November Meeting Report
Webcam Imaging

At our November 21st meeting, Jeff Phillips showed us some of the amazing photos he has taken through very modest telescopes using simple webcams and simple digital cameras. He discussed how he takes the images by recording digital movies and then using software to take apart the movies frame-by-frame and stack the best frames into a single master image that he then sharpens and adjusts for optimum contrast and color. Jeff demonstrated the process with a movie he shot of Jupiter, and the results were spectacular. What started out as a fuzzy image that bounced around the frame due to atmospheric turbulence wound up producing a sharp image in which not only the bands and red spot were visible, but many festoons in the wake of the red spot and several other storms.

Jeff uses a basic lapop computer and the free Registax program to process the images. His camera is an old Canon Powershot, and his webcam is a Celestron NexImage of similar vintage. The telescopes he uses are equally modest, ranging from a 70mm dimestore refractor to a 5-inch Maksutov to an 8-inch SCT at the largest. His images prove that you don't need to spend a lot of money on equipment to take some excellent astrophotos.

Jeff with his computer, webcam, and camera

Jeff's success should inspire many of us to try webcamming and image stacking.

Our next meeting will be on Thursday, December 20th, at 7:00 PM at EWEB's Training Room. This is the second room in the semicircular building to the north of the fountain at EWEB's main campus on the east end of 4th Avenue.

A montage of the Moon and planets that Jeff has shot with basic equipment

Here's our meeting schedule thru the end of 2013. We meet on the 4th Thursday of each month except November, but we're not in the same room every time.

December 20 (Training Room)
January 24 (Training Room)
February 28 (Training Room)
March 28 (Training Room)
April 25 (Training Room)
May 23 (Community Room)
June 27 (Community Room)
July 25 (Community Room)
August 22 (Community Room)
September 26 (Training Room)
October 24 (Training Room)
November 21 (Training Room)
December 26 (Community Room)

The Joy of Meniscus Mirrors

by Mel Bartels

It's simply wonderful when ideas come together to create something new: a folding mount, super wide angle view with more aperture, short stubby scope and lightweight meniscus mirror.

Unifying these ideas is the meniscus mirror, a thin curved constant-thickness piece of glass. It's not as if meniscus glass hasn't been seen before. We amateurs first saw meniscus correctors in Lawrence Braymer's 1954 Questar telescope. Today in the professional realm, there are seven major telescopes with meniscus shaped primaries of 8 meters.

I've been exploring meniscus mirrors for several years, having received a 13 inch f/3.0 blank from Richard Schwartz in 2000 which I completed in 2008 after hearing from a French amateur that f/3.0 works with a coma corrector. I built the 13 inch ZipDob primarily for the compact folding design and to test meniscus mirror technology.

13" meniscus mirror. Sagitta is 0.27"

Astronomy is like life. The more you open your eyes the more surprises you'll see. The most profound surprises are the silent ones that unexpectedly tap your shoulder. The panoramic composition of multiple deep sky objects backed by considerable aperture leaves visual memories that I can never forget. I call the experience Wide Angle Large Aperture observing, WALA!

The folding Zip Dob

Wherever I thought the ZipDob design was going, WALA changed my focus that first night (oh, sorry for the pun). Meniscus mirrors could be the answer for soaring glass prices, another problem telescope makers now face. A 24 inch Supramax blank goes for $3300, a far cry from the $350 I paid for my 24 inch blank from Corning in 1980. A 24 inch plate glass blank goes for $90. The conundrum (maybe a blessing — we'll see) is that the glass is 3/4 inch thick. Glass this thin cools quickly and is incredibly lightweight, but the diameter to thickness ratio may just be too extreme in the larger sizes.

The enabling technology for meniscus mirrors is the computer controlled kiln. The current torch bearer for kiln technology in the amateur telescope making world is David Davis. Slumping also obviates the need for rough grinding — quite the chore in larger sizes. Lucky us — we get to start right in on fine grinding.

More than I am making mirrors, I am conducting an experiment to map the trade-off curve where the increasing difficulty of mounting these ultra-thin mirrors is plotted against size. What aperture is the largest reasonable size we amateurs can hope to make? I know that a 13 inch mirror works. Several amateurs

are working on 16 inch to 25 inch meniscus blanks. Currently, I have 10.5 inch and 25 inch slumped blanks in hand. Working with David Davis, we hope to have 30 inch and 42 inch blanks soon. David is busy grinding a 60 inch, so he has the enviable pleasure of covering the extreme aperture end of the spectrum.

Since the glass is so thin, slumping in the kiln has two simple goals: produce a well annealed blank with no strain that is as accurately curved as possible. This will result in the minimal amount of glass removed.

Olivier Guyon, Univ of Az, who works at the Subaru 8 meter telescope in Hawaii, received a MacArthur genius award ($500,000) in part because of his slumping and mirror blank technologies. He favors repository materials to slump the mirror against; see http://www.naoj.org/staff/guyon/07telescopebuilding.web/content.html

David has been working with sand molds. To make the impression in the sand that the glass will sag into I need a precision convex plaster mold. To make that I need a concave plaster grinding tool to shape the mold and a wooden convex form to start the process. It took about two hours of grinding the plaster tool and mold against each other with 60-90 silicon carbide grit to form the precision mold for the 30 inch. It took three hours and a whole lot of mess with Jerry Oltion's help to grind the 42 inch mold. Jerry shares his account of that below.

A 42-Inch Mirror Takes Shape

by Jerry Oltion

After the success of his 13-inch f/3 meniscus mirror, Mel Bartels has decided to test the boundaries of what's possible with thin meniscus mirrors. Toward that end, he is currently working on two mirrors simultaneously: a 30-inch and a 42-inch, both f/3.

These mirrors will start out as 3/4-inch plate glass that is slumped in a kiln to the approximate curvature required, then polished and parabolized using more conventional mirror-making techniques. That requires a slumping mold.

42-inch wooden form, face-on

Making a slumping mold is an involved process. Mel started with a series of plywood rings that he sanded into a curve that approximated the target contour of the mirror. He then cast a layer of plaster over that curve. On a small mirror that would probably be good enough, but for a large meniscus mirror, Mel wanted the deviation from true to be no more than 1/16 of an inch. Anything greater would require grinding away too much glass, making for a huge job and leaving the finished product too thin to be

The rough mold's sagitta is about one inch

useful. So he poured another plaster mold inside the first one, then used the two plaster molds like a conventional mirror and tool, grinding them back and forth over one another until he achieved a spherical curve of the right depth (sagitta).

Mel was able to grind the 30-inch mold on his own, but the 42-inch required an extra pair of hands to help move it around. So I recently spent an afternoon at Mel's house, playing with plaster, making a huge mess, and having a grand time in the process. By the end of the afternoon we had removed several pounds of plaster from the two disks and ground them from a badly astigmatic shape to a decent sphere. Since plaster is so easy to remove, every minute spent refining the plaster curve saves hours of time grinding the mirror, so we were careful to get it as spherical as possible.

Jerry and Mel grinding the 42-inch slumping tool

What's next? Slumping the glass in the kiln, then grinding and polishing it to the right shape. Mel will do the 30-inch first, then apply what he learns with that to the 42-inch. See below for the next exciting chapter...

A Visit to the Scopewerks

by Jerry Oltion

On Saturday, November 24th, Mel Bartels, Tom Conlin, and I made a pilgrimage to Toledo, Oregon and David Davis's shop, which he calls the Toledo Scopewerks. Telescope maker Howard Banich also made the pilgrimage from Portland. Our mission: to prepare the kiln for slumping Mel's 30" mirror blank.

We arrived to find David underneath his grinding machine, inspecting a pin that had sheared off due to the immense inertia of the 60" mirror he's grinding. That's not a typo: David has slumped a 60-inch glass tabletop into a curve and is busy grinding it into shape to make one of the largest amateur-ground mirrors ever attempted.

Mel Bartels, David Davis (under grinding machine), and Howard Banich. That's a 60-inch mirror on the grinder.

But that was just the beginning. We found treasures everywhere we turned: An 18-inch mirror blank on a foamed glass backing that was light enough to float on water, a stack of 24-inch glass disks ready for slumping into a couple dozen lightweight two-foot mirrors, a pie plate turned into a mirror — we were tripping over stuff that most shops would have on display as their prize product.

David asked for help in moving the 60" mirror off the grinding machine so he could replace the sheared pin. We all eyed one another warily; then Tom stepped forward and he and David lifted the mirror and set it against the other 60" leaning against the wall. The what?!! That's right, the other one. As long as he had the mold in the kiln, David figured he might as

well slump two. In case something happened to one, you know. Like Tom's hands slipping. (No pressure!)

Nobody sneezed. Nobody dropped anything. The mirror safely stowed, we set to examining the grinding machine. The sheared pin caused trouble removing the shaft, but no problem: David sawed the coupling in half and the turntable lifted right off, exposing the helicopter bearing that supports the weight of the spinning mirror. Well of course you would use a helicopter bearing to grind mirrors. Doesn't everybody?

Mel tuning the surface of the sand inside the kiln

f/3 curve down into the sand, leaving a shallow (5/8") depression into which the glass plate could slump. Problem was, the sand wouldn't conform smoothly to the mold. We tried rotating the mold, pushing it back and forth, rocking it, and brushing the sand around, to no avail. The outer inch or so refused to behave, leaving a depression that would

The sand mold ready for slumping

Tom Conlin and David Davis moving 60" mirror

We could have spent all day just admiring the grinding machine, but the kiln in the next room lured us back to our primary mission. It's a massive fire-brick construction, big enough to hold a 60" mirror. David had laid a bed of sand inside a 30" ring in preparation for Mel's mirror, so we set right to work tuning it up. The first order of business was to press the plaster mold that Mel had ground to the correct

Mel, David, and Tom placing the mold into the sand

give Mel's mirror the mother of all turned edges if we didn't fix it. Finally we resorted to pounding on the back of the mold with our hands, and that compressed the sand enough to conform to the mold.

From there, it was a matter of carefully lowering the glass into the kiln, letting the metal ring support its weight over the sand. David used suction cups and stamina to lower the 30" diameter, 3/4" thick plate into position.

Then with little ceremony he closed the kiln lid and programmed the heat cycle into the controller, giving it a long, slow rise in temperature that would bring the glass just to its melting point, then hold while it slumped into the mold, then slowly lower the temperature and hold again to anneal the glass before cooling back to room temperature.

While the kiln buzzed with the first few watts of heat, we posed for a group photo with the mold. In two days time, we would find out whether it worked.

30" blank on sand mold, ready to slump

Howard Banich, David Davis, Tom Conlin, Mel Bartels, and Jerry Oltion standing behind kiln with Mel's 30" f/3 mold.

Coda: When David opened the kiln two days later, he found that the weight of the glass, perhaps combined with the expansion of the metal ring due to the heat, had pressed down the outer portion of the sand, leaving the glass with less curve than desired. It came out about f/3.75; still plenty fast, but not fast enough for Mel. To a fast mirror maker, if it ain't f/3 or less, it's just a hubcap.

So where do we go from here? The Scopewerks gang are busy emailing ideas back and forth, trying to decide the next step. Glue the sand into place with a sodium silicate (water glass) wash? Forego the metal ring and support the glass on a central fire brick, letting it slump onto a convex mold instead? Make the entire mold out of fire brick? Stay tuned for the next exciting chapter as Mel, David, and the Toledo Scopewerks push the boundaries of large meniscus mirror making.

Alan Gillespie's Panorama of Eagle's Ridge

On the night of September 15th, Alan Gillespie shot multiple exposures of the sky above Eagle's Ridge, our observing site on the flank of Mt. June. He stitched them together to make this beautiful panorama showing the Milky Way arching up from the left (north) and dropping down in the center (south). To the right of the lone tree, Eugene's skyglow looks a little like sunset in the northwest.

The individual shots were all taken on a camera tripod with no tracking. Using short exposures and a wide field, no star trails are evident even under high magnification. Well done, Alan!

Milky Way and Eugene skyglow over Eagle's Ridge. Photo © 2012 by Alan Gillespie.

An Observing Site NW of Junction City

Dusty Dodd and Doug Demorest have found another observing site. This one is to the northwest of town, and might make an easier drive for some of us and an interesting change of pace for the rest. It's about 21 mi. from Junction City, near the small towns of Alpine and Glennbrook. Here's how to find it:

From Junction City take 99W to Monroe. Go through Monroe, then just outside of town turn left onto Alpine Cut-off Road which will join with Alpine Road. Continue through Alpine until you come to a Y. Take the left fork toward Alsea Falls. You will also go through the small town of Glenbrook and onward to Nichols Rd, which is graveled. Follow that for a mile to BLM Rd 14-6-34 (there will be a Y in the road and you will want to take the right fork). Continue past BLM Rd 15-6-9 which is on the right and will be gated. You will see a large logged off unit on the right side.

Continue on up the hill and you will come to another Y. Bear to the right. From here the road will be pretty rough because they rocked it with # 3 rock and the road has a bit of an incline to it. From Nichols Rd to the incline is approximately 3.5 mi. You will note in the pictures that there is still a bit of an incline even at the parking area (this is a spur road but affords the best view). If you continue on the better maintained road there is a more telescope-friendly turn out that will accommodate more cars but less of the horizon is available.

The coordinates are: 44º16'42"N, 123º26'19"W.

The signpost that marks the turnoff at Nichols Rd.

The road up to the site

Parking and setup area

The view to the southeast with Eugene in the distance

Space Shuttle Endeavor Makes Emergency Landing in Residential Neighborhood

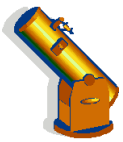
On Saturday, October 13, the Space Shuttle Endeavor came loose from its 747 cargo transport right over densely populated Los Angeles. Fortunately the last remaining astronaut on board was able to bring it under control and land it safely on a residential street, where witnesses report...

Okay, not really. But it really did roll down residential streets in Los Angeles en route to the California Science Center in Exposition Park. It was a tight fit at times, but it made its final trip with only a few tree branches slapping the wings. Here's a link to a time lapse video of its last 12 miles. It's a pretty amazing job of maneuvering, and a neat finale to a space vehicle that served us well for many years.

http://www.youtube.com/watch?v=JdqZyACCYZc&feature=youtube_gdata_player

Thank You Castle Storage

For the last five years, Castle Storage has generously provided EAS a place to store its telescopes and equipment. EAS would like to thank Castle Storage for their generosity and support for our group. Please give them a call if you need a storage space, and tell your friends. They are great people and offer secure and quality storage units.



Observing in December


Last Q


New


1st Q


Full

December 6	December 13	December 19	December 28
Mercury Rise: 5:45 AM	Mercury Rise: 6:05 AM	Mercury Rise: 6:27 AM	Mercury Rise: 7:00 AM
Venus Rise: 5:13 AM	Venus Rise: 5:31 AM	Venus Rise: 5:46 AM	Venus Rise: 6:07 AM
Mars Set: 6:37 PM	Mars Set: 6:37 PM	Mars Set: 6:37 PM	Mars Set: 6:38 PM
Jupiter Set: 7:19 AM	Jupiter Set: 6:47 AM	Jupiter Set: 6:20 AM	Jupiter Set: 5:39 AM
Saturn Rise: 4:15 AM	Saturn Rise: 3:51 AM	Saturn Rise: 3:31 AM	Saturn Rise: 2:59 AM
Uranus Set: 1:36 AM	Uranus Set: 1:08 AM	Uranus Set: 12:45 AM	Uranus Set: 12:10 AM
Neptune Set: 10:34 PM	Neptune Set: 10:08 PM	Neptune Set: 9:45 PM	Neptune Set: 9:10 PM
Pluto Set: 6:25 PM	Pluto Set: 5:59 PM	Pluto Set: 5:36 PM	Pluto Set: 5:02 PM

All times: Pacific Standard Time (Nov 4, 2012-March 10, 2013) = UT -8 hours or U.S. Pacific Daylight Time (March 11-November 3, 2012) = UT -7 hours.

Date	Moonrise	Moonset	Sunrise	Sunset	Twilight Begin	Twilight End
12/1/2012	19:33	09:43	07:28	16:35	05:45	18:19
12/2/2012	20:32	10:19	07:29	16:35	05:46	18:18
12/3/2012	21:34	10:51	07:30	16:35	05:46	18:18
12/4/2012	22:36	11:21	07:31	16:35	05:47	18:18
12/5/2012	23:41	11:48	07:32	16:34	05:48	18:18
12/6/2012		12:16	07:33	16:34	05:49	18:18
12/7/2012	00:47	12:44	07:34	16:34	05:50	18:18
12/8/2012	01:57	13:15	07:35	16:34	05:51	18:18
12/9/2012	03:08	13:49	07:36	16:34	05:52	18:18
12/10/2012	04:23	14:30	07:37	16:34	05:52	18:19
12/11/2012	05:37	15:19	07:38	16:34	05:53	18:19
12/12/2012	06:48	16:18	07:39	16:34	05:54	18:19
12/13/2012	07:53	17:25	07:39	16:35	05:55	18:19
12/14/2012	08:48	18:37	07:40	16:35	05:55	18:19
12/15/2012	09:33	19:51	07:41	16:35	05:56	18:20
12/16/2012	10:12	21:04	07:42	16:35	05:57	18:20
12/17/2012	10:44	22:14	07:42	16:36	05:57	18:20
12/18/2012	11:13	23:20	07:43	16:36	05:58	18:21
12/19/2012	11:40		07:43	16:36	05:58	18:21
12/20/2012	12:07	00:25	07:44	16:37	05:59	18:22
12/21/2012	12:34	01:27	07:44	16:37	05:59	18:22
12/22/2012	13:04	02:28	07:45	16:38	06:00	18:23
12/23/2012	13:36	03:28	07:45	16:38	06:00	18:23
12/24/2012	14:12	04:26	07:46	16:39	06:01	18:24
12/25/2012	14:53	05:21	07:46	16:40	06:01	18:25
12/26/2012	15:39	06:13	07:46	16:40	06:02	18:25
12/27/2012	16:31	07:01	07:47	16:41	06:02	18:26
12/28/2012	17:26	07:43	07:47	16:42	06:02	18:27
12/29/2012	18:25	08:21	07:47	16:43	06:02	18:27
12/30/2012	19:27	08:55	07:47	16:44	06:03	18:28
12/31/2012	20:29	09:25	07:48	16:45	06:03	18:29

All times are for Eugene, Oregon, Latitude 44º 3' Longitude 123º 06' for listed date

Items of Interest This Month

1st two weeks: Mercury visible to lower left of Venus before sunrise

All month: Jupiter at its best

12/5 Ganymede and Callisto run circles around Jupiter (sort of). Plus Ganymede shadow transit 6:37 – 8:44 pm

12/7 Io shadow transit 9:17 – 11:28 pm

12/8 Vesta at opposition (brightest)

12/11 Moon near Venus before sunrise

12/12 – 12/15 Good nights to watch asteroid Toutatis (movement visible in real time)

12/13 Peak of the Geminid meteor shower

12/13 Europa shadow transit 5:03 – 7:28 pm

12/17 Ceres at opposition (brightest)

12/20 Io shadow transit 7:40 – 10:04

12/21 First Quarter Friday Star Party

12/21 Winter begins. Mayan calendar ends. The world doesn't.

12/25 Moon very close to Jupiter (photographers, take note!)

For Current Occultation Information

Visit Derek C. Breit's web site: http://www.poyntsource.com/New/Regions/EAS.htm

Go to Regional Events and click on the Eugene, Oregon section. This will take you to a current list of Lunar & asteroid events for the Eugene area.