Rochester Skies

A publication of the Rochester Astronomy Club

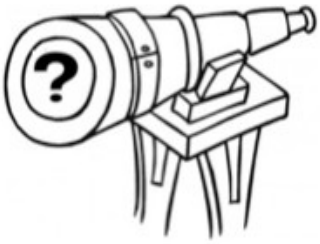
Quarterly Newsletter | **Rochester, Minnesota** | **Issue #24 1st Quarter 2016**

The President's Corner: Looking Ahead . . .

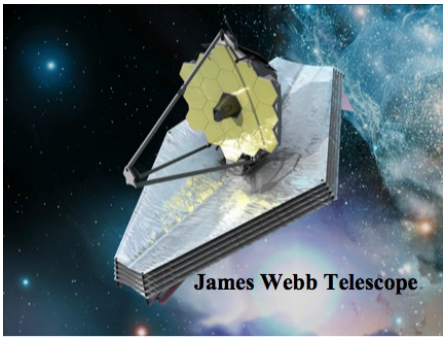
Randy Hemann

2016. We begin a new year. It seems like in each of the past few years, we have had no shortage of remarkable discoveries made in astronomy!

Kepler continues to seek out candidates trying to qualify as our twin planet (the so-called Earth 2.0), the Large Hadron Collider finally was injected with enough horsepower to find the elusive Higgs particle, New Horizons continues to wow us with more images and science from Pluto, and most recently the scientists at LIGO, the Large Interferometer Gravity-Wave Observatory) appear confident they have nailed down evidence of Einstein's space-time ripple.



So what's in store for us in the next year, the next 5 years, or the next 50 years? Well, Curiosity is still roving Mars. JUNO should arrive at Jupiter by next year, and the James Webb Telescope (JWT) will hopefully launch in 2018. NASA has a good idea what they want to look for with these missions, but the fun lies in what is often found that was not anticipated. I checked out an article[1] written 5 years ago about this very subject: What is in astronomy's future? That author predicted in 50 years we would possess a fundamental understanding of dark matter and dark energy. He predicted by then we will see distant planets, know their seasons and be aware of life forms. Lastly he forecasted that by mid-century we will have identified gravitational waves. Well, we appear to be way ahead of that prediction, so I hope we also get to the others in due time. But I am also interested in what we can predict as barriers to new discoveries; what will be unanticipated setbacks? What if there is a launch catastrophe with the JWT? How far would that put observatory


James Webb Telescope

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Highlights:

RAC Web Page:

http://www.rochesterskies.org

Most meetings are held at the Rochester Community College every second Tuesday of the month at 7:00 pm in the East Hall building, room EA121.

2nd Quarter Newsletter
Deadline Mid-June 2016

Please consider contributing to the RAC newsletter. Have a favorite astronomy topic? Want to share your astrophotography interest? Write about your astronomy experience. Any suggestions for the newsletter is, also, appreciated. Send your contributions to

rochesterskies@outlook.com

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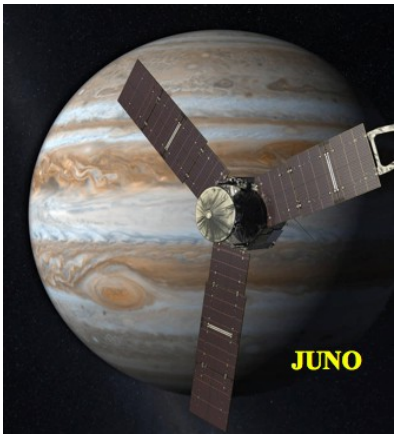
science back, or at least on hold? Last year there was mentioned concern regarding the absolute resolution that even the JWT may approach, that is, we may reach a limit to how sharp we can focus a distant object. "Quantum foam", the "jiggling" of photons traveling through the submicroscopic fabric of space may render images of distant worlds too fuzzy to interpret. These items and others may prove to be worries that hopefully the future simply solves or lays to rest.

Currently, there should be real concern about NASA's skinny budget that funds future missions, and we should always be concerned about our society's waning interest science and discovery. But that's where we come in.



Hopefully, the skies will cooperate better this year and we'll be able to be out more with the public. Whether it's getting out with your neighbors, family, and friends, or participating in our club events, let's keep the interest in astronomy high in our own neighborhoods, and the rest will fall into place.

[1]An eye to the future of astronomy … a cosmic pick 'n' mix. Bryan Gaensler. The Conversation. 6.5.2011.

SeeingDarkness in a New Light

Larry Mascotti

The Twilight Zone-Solar Eclipse Memories

The past August in-depth presentation by Jerome Taubel on preparations for the 2017 eclipse was excellent and brought to mind memories of back of the neck hair razing chills from past totalities that I have witnessed. My experiences with Nature includes growing up underneath Milky Way arched skies, planting footprints along the beaches of the oceans that hug our shores, hearing the roar of the plunging waters over the Niagara Falls, being adrift in the middle of Lake Superior at night and the total darkness it availed, seeing the land underneath me from Pike's Peak, walking and gawking underneath the serene canopy of the mighty Sequoia Forest and witnessing the green flash and many other marvelous sunsets (natural bias to these vs. sunrises). The only natural life experience that sits above the moments of being within the umbra on my personal list of being struck with awe is the birth of my two daughters.

A total solar eclipse is a must ***see!*** And see is the operative word. This is one of your only chances as a modern homo sapient to be in real contact with your primal roots. It happens too fast to be burdened by gadgets. Others will be willing to supply celluloid memories. Let the shadow roll over and engulf you in its grand deep darkness. Feel the chill on your skin as the temperature is depressed. Taste and smell the shift in wind. Hear the hush as the daily routine shuts down. Experience sights unseen through your eyes. *Be present in the moments*. Let others fiddle with the technological distractions. Watch as daylight becomes dusk. Blue shades of sky convert to dark water blue hues and advance to the absence of the familiar day blends. The ever present stars introduce themselves as the moon rendezvous with its awaited syzygy with Sol. The soul is aroused by this predicted "end of days" calamity as your eyes stare at the flaying corona and your heart

misses a beat as prominences spray their powerful jets of ions like an announcing gasp that says I, Sol, exist!

…And as a minute flee like seconds, the moon in her wisdom retreats and gives you back your breath…

I remember the excitement of watching the Twins win the Series in my living room. It was a great experience! But I wonder what would it have been like to have been

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Total Solar Eclipse of 21 August 2017

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an eye witness from one of the seats in the Thunderdome?? When Nature brings a total solar eclipse close to your neighborhood do not watch it from your couch. Be present!

"Zeus, the father of the Olympic Gods, turned mid- day into night, hiding the light of the dazzling Sun, and sore fear came upon men." [Archilochus (6 April (30 March) 648 B.C. at Thasos]

"Never have I beheld any spectacle which so plainly manifested the majesty of the Creator or so forcibly taught the lesson of humility to man."

[James Fenimore Cooper…1806 Solar Eclipse]

Pondering Pluto. Wow, what a surprise!!! That's the beauty of discovery. I expected a cratered covered ancient iceberg. Rather the god of the underworld (the ruler of dead) shows a rather young rejuvenated surface (I suspect some gravitational tidal action). The stunning images of winter's desolation orb are a crowning achievement for our species. As I gaze upon an artist map from my childhood, rendering imaginative visions of our neighbors in space, I am breathless knowing that the solar system has now been first hand fully inventoried. Celebrate that a robotic emissary from our imperfect pale blue distant dot awoke on the coldest of mornings and has shown us again the brightness of a new dawn. WE have the capacity to be so very good when we are awake to the best of our humanity…when we go boldly into the night… as you go forward, work to make this our planet of choice not chance.

RAC

Part 2: Randy Hemann Remembers His Astronomy Past

Randy's history in becoming an amateur astronomer continues from the last issue of Rochester Skies (3rd Quarter 2015).

It was a rather cold but clear evening early December when, after chores and supper were finished, I thought I'd take my telescope out behind our house where I found shade from our farm light to investigate what this new star was all about. It was very cold and my fingers were numb handling the aluminum parts while standing in the snow. I had two cheaply made eyepieces. One was noted only to be "low power" and the other was "high power", but I knew the latter must have been 200x magnification, because that's what the label on telescope box said! When I looked at my new star with the low power eyepiece, I didn't see much except that the star looked a little bit distorted. So I thought, well maybe I'll just take a quick look through that high power eyepiece (rarely used because it was so difficult to keep anything stable in its small field of view, particularly with the rickety mount). After a few attempts I was confident I had the new star in view but it remained really oddly shaped. I fumbled with the stiff plastic focuser for a bit, and then suddenly, through one of those transient portals of atmospheric stillness, I saw Saturn as clear and as sharp as ever! I couldn't believe what I saw! As far as I was concerned, I just discovered the planet! That moment, at 12 years of

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Randy Hemann Remembers from previous page

age, I recall actually feeling my mind exploding with disbelief and awe. Remember, it was only six years prior to this that my distorted view of space had me believing I could almost "touch" the stars! Although I was only able to persuade one of my siblings to come out that night, knee deep in the snow and cold to prove what I saw, that first impression was personally spectacular to me.

Eventually the cheap mount gave way and I didn't have any means to repair it so the telescope was set aside, packed up and stored away. Then high school, college, and medical school flew by, followed by a residency in Family Medicine, getting married, having 3 kids and boom! You're 35 years old with plenty of debt and things other than astronomy to do! (I will insert a disclaimer right here to my family that those years just didn't really happen with a boom; it was a very enriching, wonderful time of my life!). Anyway, it was a few years later when I was introduced to an astronomy club meeting by a senior Internal Medicine colleague of mine. I found that those meetings rekindled my wonderment in astronomy, and reminded me how I felt in my youth. At that time this same colleague was trying to find more room in his house and was looking for a buyer of his Criterion RV-6 reflector. I thought how cool is this – to own a classic 6-inch reflector with its entire eyepiece collection for 100 bucks! It was a great deal, and I found dabbling in visual amateur astronomy to be quite fun. It was amazing how much more I could see in a 6-inch telescope as compared what I recalled seeing in my 3-inch StarMaster. I began to read more books about amateur astronomy and the cosmos in general. They were fascinating and I wanted to learn and *see* more. I guess deep down I didn't want to be fooled again by rocks hitting stars! But I had to figure out how much telescope I would need to see what I wanted to see. After a few years of learning and saving, I purchased an 18-inch Obsession Dobsonian. It was then I could harness enough photons to see for myself the faint

Horse Head Nebula

18-inch Obsession Dobsonian

wisps of the Horse Head nebula and spirals of the Whirlpool galaxy. Those faint celestial sights were not rumors or pictures anymore. They were real! It was also very rewarding to have others who have never looked in a telescope see these distant worlds for the first time. And it was fun having people look through the eyepiece describing the subtleties of gas banding they're noticing on the ringed planet that, ahem, *I* discovered years ago.

(Randy's history in becoming an amateur astronomer concludes in the next issue of Rochester Skies.)

NCRAL 2016 Meeting

Friday, April 29 (all day) to Saturday, April 30 (all day) in Normal, Illinois.

Hosted by the Twin City Amateur Astronomers

Meeting at the Heartland Community College (HCC)

For more information select NCRAL2016

A Personal Journey into Astrophotography

Mike Carlin

A few short years ago, I joined the Rochester Astronomy Club in hopes that my curiosity of the cosmos could be cured. However my curiosity quickly developed into a bit of an obsession. Eventually, I decided to embark on the journey of astrophotography. After a few meetings, I discovered my desires and began to understand that some investments were in order: most importantly, a telescope.

After obtaining a new telescope, I proudly joined the club at Eagle Bluff for an official outing. This was perhaps my first real attempt to view anything with my starter telescope. However, I was quick to learn that astronomy was a little more difficult than I first believed. In addition, I learned that my new Celestron 114EQ telescope was very much a true starter telescope. While I couldn't see as much as my more advanced colleagues, I developed an appreciation for the science of astronomy with "Dora the Explorer," and our adventures continued.

After a year or so with "Dora," I was able to invest in new equipment, including a Canon 70D DSLR and a Celestron 8SE Schmitt-Cassegrain telescope. With new equipment in hand, at last I was able to attempt my first foray into astrophotography. In mid-November, I was finally able to put all the pieces together. With clear skies at Eagle Bluff, laptop fully charged, and some tips from other members, I was ready to go. But then the batteries in the telescope started to fade along with my hopes of obtaining a respectable image of the night sky. However, I was able to obtain a semi-decent image of the Orion Nebula (M42). Taking almost 2 years just to get to this point, I was genuinely ecstatic with the result.

So, what did I learn? The two big takeaways: always have fully charged batteries to help with tracking, and practice image focusing.

Celestron 114EQ...A.K.A. "Dora the Explorer"

A few weeks later Christmas came, and so did a Power Tank to power the telescope for longer periods of time. On January 1st, I set the telescope up on my deck and pointed it again to M42. This time, with a little more experience and better batteries, I was able to take several beautiful photos. In a way it felt like blending art and science. Discovering the camera's many settings, understanding how to use the telescope, and coordinating the ballet of everything on the laptop, I was able to take the photo you see on the next page.

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My first image of M42.

International Space Station Schedule over Rochester

Tu 3/29, 8:47 pm	< 1 min	11° S to 14° SSE	Sa 4/2, 10:08 pm	< 1 min	19° NW to 23° NNW
W 3/30, 7:57 pm	< 1 min	10° SE to 10° ESE	Su 4/3, 9:16 pm	3 min	28° NW to 17° NE
W 3/30, 9:30 pm	2 min	10° SW to 14° SW	M 4/4, 8:24 pm	3 min	41° NW to 12° NE
Th 3/31, 8:38 pm	5 min	10° SSW to 18° ENE	M 4/4, 10:00 pm	1 min	18° NNW to 21° N
Th 3/31, 10:15 pm	< 1 min	12° W to 17° W	Tu 4/5, 9:08 pm	3 min	21° NW to 11° NE
F 4/1, 9:22 pm	4 min	10° WSW to 32° NNE	Tu 4/5, 10:44 pm	< 1 min	15° NW to 15° NW
Sa 4/2, 8:29 pm	6 min	10° WSW to 10° ENE	W 4/6, 8:15 pm	3 min	26° NW to 11° NE

The Transit of Mercury
9 May 2016

The last Mercury transit was 8 November 2008 and the next Mercury transit won't be until 11 November 2019 and we'll only see a partial transit at best. Unfortunately, the next Mercury transit we will see in Rochester after 2019 won't happen until 2049. However, this year we are treated with the rare event of seeing the entire transit. The data below represents the editor's location in Rochester and the timing, in Daylight Savings Time, of the transit based on the given longitude/latitude.

Latitude 43° 58.1' North

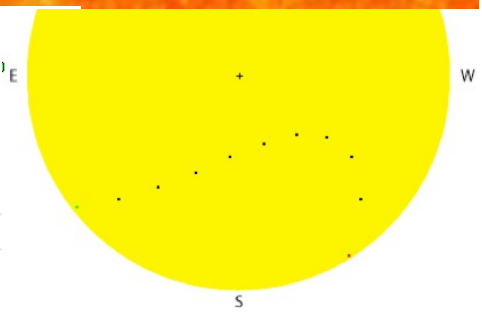
Longitude 92° 29' West

Predicted Transit Circumstances

(for above coordinates with ΔT=68.3s)

Event	Date	Time	Alt	Azi	P	V
External ingress :	2016/05/09	06:13:26	+3.0 °	68.4 °	83.6 °	09.2
Internal ingress :	2016/05/09	06:16:39	+3.5 °	68.9 °	83.9 °	09.2
Maximum transit :	2016/05/09	09:58:04	+42.6 °	108.5 °	153.9 °	06.9
Internal egress :	2016/05/09	13:38:27	+62.8 °	196.9 °	224.0 °	04.5
External egress :	2016/05/09	13:41:38	+62.6 °	198.5 °	224.2 °	04.5
	2016/05/09	09:57:32	+42.5 °	108.4 °	153.6 °	06.9

Sunrise : 05:49 Sunset : 20:23



Movement of Mercury across the solar disc.
(topocentric coordinates)

Personal Journey into Astrophotography from previous page

This time I learned that I'm doing something right, I've got a detailed photo, which was the goal I had in mind at the onset and as I learn more, refining the science and developing artistic technique, I know it will only get better.So what are my final thoughts on this? Photography is still a new field to me, and there is a lot to learn. But adding in the complexity of imaging extremely faint and tiny objects in the sky brings an exciting new element to the already exhilarating equation. Learning techniques such as image stacking, using color filters, and a large list of other things I have yet to find out will make for a fulfilling lifelong hobby.

Orion Nebula (M42)

Rochester's Community Education

Paul Larson is the Planetarium Director for the Mayo High School Planetarium. All classes are located in Mayo High School in Room 1-226.

Journey to the Center of the Milky Way

Embark on a Journey to the Centre of the Milky Way and travel faster than light, from the driest place on Earth right to the center of our own galaxy, where a black hole is consuming anything that strays into its path.

#8356.241	Thu	Mar 31	7:30-8:30	$6.00

From Earth To The Universe

The night sky, both beautiful and mysterious, has been the subject of campfire stories, ancient myths and awe for as long as there have been people.

#6006.351	Tue	Apr 12	6:00-7:30	$4.00

Dark-The Movie

This is a full dome movie that explores the nature of Dark Matter.

#8344.241	Thu	Apr 14	6:30-7:30	$6.00

Two Pieces of Glass

This large screen formatted program follows two students as they interact with a female astronomer at a local star party.

#8354.241	Thu	Apr 21	6:30-7:30	$6.00

Big Picture of the Universe

Theoretical Cosmologist Michael Turning will be speaking live from the Adler Planetarium in Chicago, IL, and telecast simultaneously on the dome at Mayo High School.

#8341.241	Thu	May 05	7:00-8:30	$6.00

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Sky Events

all times in Central Daylight Savings

Mar	20	09	Venus at Aphelion
	20	14:05	Regulus 2.5°N of Moon
	21	22:57	Jupiter 2.1°N of Moon
	22	07:59	Moon at Ascending Node
	23	06:47	Pen. Lunar Eclipse; mag=0.775
	23	07:01	FULL MOON
	23	15	Mercury at Superior Conjunction
	24	20:50	Spica 5.1°S of Moon
	25	09:16	Moon at Apogee: 406,125 km
	28	13:45	Mars 4.2°S of Moon
	29	09:58	Saturn 3.5°S of Moon
	31	09:17	LAST QUARTER MOON
Apr	05	12	Mercury at Perihelion
	05	12:27	Moon at Descending Node
	06	03:30	Venus 0.7°S of Moon: Occn.
	07	06:24	NEW MOON
	07	12:36	Moon at Perigee: 357,164 km
	08	05:35	Mercury 5.2°N of Moon
	09	16	Uranus in Conjunction with Sun
	10	17:05	Aldebaran 0.4°S of Moon
	13	22:59	FIRST QUARTER MOON
	16	19:46	Regulus 2.5°N of Moon
	17	23:42	Jupiter 2.2°N of Moon
	18	09	Mercury at Greatest Elong: 19.9°E
	18	13:04	Moon at Ascending Node
	21	02:59	Spica 5.1°S of Moon
	21	11:05	Moon at Apogee: 406,352 km
	21	00:24	FULL MOON
	21	00	Lyrid Meteor Shower
	24	23:13	Mars 4.9°S of Moon
	25	14:28	Saturn 3.3°S of Moon
	27	08:51	Mars 4.8°N of Antares
	28	03:14	Mercury 3.0°S of Pleiades
	29	22:29	LAST QUARTER MOON
May	02	20:27	Moon at Descending Node
	04	14	Eta-Aquarid Meteor Shower
	05	23:14	Moon at Perigee: 357,828 km
	06	14:30	NEW MOON
	08	03:21	Aldebaran 0.5°S of Moon
	09	10	Mercury at Inferior Conjunction
	09	06:13	**Mercury Transit**
	13	12:02	FIRST QUARTER MOON
	14	02:06	Regulus 2.3°N of Moon
	15	04:30	Jupiter 2.0°N of Moon
	15	15:39	Moon at Ascending Node
	18	09:07	Spica 5.1°S of Moon
	18	17:06	Moon at Apogee: 405,934 km
	21	16:15	FULL MOON
	22	06	Mars at Opposition
	22	16:59	Saturn 3.2°S of Moon
	29	07:12	LAST QUARTER MOON
	29	23:45	Moon at Descending Node

Rochester's Community Education from previous page

Space Exploration

Are we alone? Is the life on planet Earth all there is in the universe? If we were to consider life elsewhere in the universe, what would it need to survive?

#8353.241	Thu	May 19	6:30-7:30	$6.00

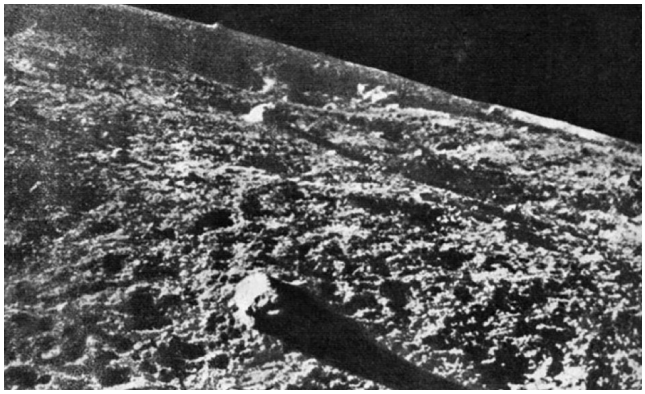
Lucy's Cradle

The Birth of Wonder. We wonder why we've found life only on Earth and when our ancestors first became aware of the universe. To understand why some worlds bear life, we will visit the barren worlds in our solar system. To discover when life becomes intelligent, we will journey to the grasslands of East Africa over three million years ago.

#6007.351	Tue	May 24	6:00-7:30	$4.00

Register at
www.rochesterce.org/register
or call 507.328.4000

50 Years Ago (1966)



The first image from the surface of the Moon via Luna 9, Feb. 3-4, 1966. (Credit: Roscosmos)

Surveyor 1's shadow against the lunar surface. (NASA)

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