

# Rupes Recta - Lunar Straight Wall Imaged by Paul Owen



This single shot image of the Straight Wall was captured by Paul on March 6 using a Canon T3i through a Skywatcher Equinox 120 mm refractor with a TeleVue 2X Powermate.

The Straight Wall, officially called Rupes Recta, is an escarpment in southeastern Mare Nubium. This ancient lunar fault is 110 kilometres long and 240 - 300 metres high. Although it appears to be a sheer cliff, it is actually 2 - 3 kilometres wide. Below it in this photo is the 17-kilometre wide crater Birt, with crater Birt A on its rim.

Rupes Recta is seen best within a day or two after first quarter. Around third quarter it can appear as a thin white line. With good seeing the feature resembles a sword, with Rupes Recta as the blade and the nearly buried rim of a ghost crater forming the hilt. En garde!

#### **EVENT HORIZON** Astronomy in New Brunswick

#### SRAC/RASC Centre du NB Centre

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LP Abatement: Dwayne Branch Education-Outreach: Curt Nason Star Party-Events: Adrien Bordage Newsletter Editor: Curt Nason Website: Emile Cormier Equipment: Chris Weadick Library: Ted Dunphy Fundy Upgrade: Emma MacPhee NB Astronomy Clubs Réunion / Meetings

**SRAC/RASC Centre du NB Centre** When: September 9, 2017 13:00 Where: Rockwood Park, Saint John

When: October 21 (Annual Meeting) Where: Moncton High School http://www.nb.rasc.ca/

#### William Brydone-Jack Astronomy Club (Fredericton) When: Second Tuesday of the month Where: Fredericton, UNB Campus 2 Bailey Drive Boom 203

2 Bailey Drive, Room 203 www.frederictonastronomy.ca

#### Saint John Astronomy Club

When: First Saturday of the month Where: Rockwood Park Interpretation Centre. www.sjastronomy.ca

#### **Astronomy - Astronomie Moncton**

When: First Quarter Moon weekend Where: Moncton HS Observatory www.astronomymoncton.org

## FACEBOOK

https://www.facebook.com/RASC.NB

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# **Star Parties 2017**

Kouchibouguac National Park June 2 - 4

COW Mactaquac Provincial Park July 29

Mount Carleton Provincial Park August 11 - 13

> Fundy National Park September 15 - 17

Kouchibouguac Fall Star Gaze September 22 - 24

#### Harmonices Kepler Museum by June MacDonald

I was fortunate to take a river cruise in Europe this fall to see some European Christmas Markets. What I didn't expect to see was anything of an astronomical nature. What a lovely surprise and bonus to a wonderful trip.

We travelled via the Danube River and docked at Regensburg, Germany. I found out (although I can't remember how, now) that there was a museum devoted to Johannes Kepler in Regensburg and asked our cruise manager if it would be possible to visit it during our stopover. The "we" in this adventure were Mandy Bregg, Phillip Webb, his wife Linda and I. We were thrilled to death at the opportunity, especially when we were told the museum curator would kindly make an exception for us and open the museum on the weekday (normally open only on weekends).

We found our way to a down-at-heel section of town, where we parked ourselves in front of a very old, nondescript white timbered building which had a small sign with the following inscribed (in German): "Residential House of Keplers & Leiner families in the years 1626-1628". He had lived here for a short time due to unrest during the Counter Reformation. So, we possessed ourselves in patience and waited and waited...and waited – wondering if the curator had been snatched by aliens. Finally a man approached the door and when I asked about the building, we were told it was the wrong one! This was probably the building in which Kepler lived for a brief time in the mid-17<sup>th</sup> century.



Phil, June and Mandy

June is tickled to have Kepler tousle her hair

The museum itself was just a short walk around the corner. We soon arrived with sheepish expressions at the museum, which had a large, hard-tomiss sign in front proclaiming the name of Kepler. The building was very old and consisted of three stories, the top two levels holding all the artifacts connected with Kepler. The entrance fee was only 3 Euros (approximately \$4 Canadian), which we paid to the very pleasant, German-speaking only, curator. There was a lot of smiling, nodding and thank-yous all around.

On investigating the two upper levels, we found paintings, furnishings and busts of Kepler, as well as display cases with examples of items and instruments that Kepler would have used: planisphere, telescopes. various globes, sextants, compasses and diagrams. In some of the displays there were original books, "posters" and documents written by Kepler (in Latin & German) - what appeared to be one of his observing logs, several maps of the solar system and planetary motion, hand drawn and painted images of constellations, plus a book written by Tycho Brahe. Most of the instruments were not from Kepler's time, but later models of what he would have used in his research and observing. One of the rooms was set up with antique furniture as would have been in his time.

Johannes Kepler's life was an interesting, busy, very challenging one, with many successes and widespread recognition of his expertise, yet also full of sadness and trials. He was born in what was to be the future Germany in 1571 to a poor Lutheran family and, although very sickly from childhood, his intelligence won him a scholarship to university and afterward he began teaching mathematics. He became an outspoken supporter of the "Copernican Solar System" (a Sun-centred solar system) which led to his expulsion from the Lutheran church and a working relationship with Tycho Brahe. Kepler inherited Brahe's position as Court Astronomer and Imperial Mathematician to Rudolphe II, and continued his research of the solar system using Brahe's data as well as his own; about which he wrote several scientific which described Kepler's books "Three Laws" and established the forerunner of the "scientific method."

Books: *Mysterium Cosmographicum* (defending the Copernican System), Astronomia Nova (first two Kepler laws), *Harmonices Mundi* (Harmony of the World, Kepler's third law), and most influential: *Epitome Astronomiae* (heliocentric astronomy).



The Kepler Museum and Death House

Kepler developed logarithms to calculate past and future planetary positions. Using the logarithms, he also predicted transits of the Sun by Mercury and Venus, although he never lived to see them. He had many "firsts" connected to his research: described tidal effects of the Moon, formed the basis of integral calculus, was called "the father of modern optics," and many others. His work was a constant driving force in his life; ground-breaking, important and influential.

His personal life was a shambles. He continued to suffer chronic illness, lost his wife and two sons to disease,

was forced to relocate many times over his life, and was alienated by his church. Eventually he remarried and began another family, lost two more children, lived a life of poverty, and had to defend his mother from charges of witchcraft (successfully). All through this he continued with his observing and research, publishing many important scientific works, which earned him the title of "the father of modern astronomy."

In spite of his expulsion from the church, he was a religious man and saw his work as his "Christian duty to study and understand the works of God." He died in 1630 after a long arduous journey to Regensburg to collect several years of salary owed him by the Imperial government, where he became acutely ill and died. A plaque on the front of the museum claims "This is the death house of Johannes Kepler."

It was amazing to actually be in the very building where he lived for a short time (hoping none of the nasty germs had been preserved) and to see the original works for which he was so revered and has had such an impact on the development of astronomy.

#### Make Your Own Desiccant Cap by Mike "MikeGyver" Powell

Have you ever wanted to keep the moisture out of your optical tube while in storage? One option would be to buy a desiccant cap. They run about \$35.00 to \$55.00 US. Well, there is a simple and easy solution at a much lower cost. Many of the pill bottles or electronic items you purchase today



have small desiccant bags inside them. Keep the Bags

Search around your house for an old 35 mm film canister. Many people saved them for storage of small items. If you don't have one they can be purchased on E-Bay, by the lot at a very low cost, or check out your local Value Village. I have found bags full of them



Drill five 1/16" holes in the bottom of the film canister to allow air to flow in. Place the desiccant bags into the canister and place the cap back on. You now have a "Desiccant Cap" for your telescope



Place the Film Canister Desiccant Cap into the 1¼ eyepiece portion of your telescope and it will keep all moisture out from the inside of your optical tube during storage. Enjoy.



#### Kouchibouguac Spring Star Fest June 2 - 3

#### Friday June 2

- "What's Up" slideshow presentation in English at the outdoor theatre. From 8:30 pm to 9:30 pm
- Telescope and Binocular Night Sky Viewing near site 194. From 10 pm to midnight.

#### Saturday June 3

- Solar Observing and Telescope Clinic near site 194. Noon to 4 pm
- "What's Up" slideshow presentation in French at the outdoor theatre. From 8:30 pm to 9:30 pm
- Telescope and Binocular Night Sky Viewing near site 194. From 10 pm to midnight.

#### Sunday June 4

• Solar Observing near site 194. From 9 am to 11 am

#### Prague Astronomical Clock by June MacDonald

The Astronomical Clock in Praha is of medieval vintage, installed in 1410, making it the third oldest astronomical clock in the world and the oldest one still operating.

The Orloj is mounted on the southern wall of the Old Town Hall in the Old Town Square of Prague, Czech Republic. The clock mechanism itself is composed of three main components:

- the astronomical dial, representing the position of the Sun and Moon in the sky and displaying various astronomical details
- "The Walk of the Apostles," a clockwork hourly show of figures of the 12 Apostles and other moving sculptures, notably a figure of Death (a skeleton) striking the time.
- a calendar dial with medallions representing the months, among other things.

One could consider the Orloj to be a primitive planetarium, displaying the state of the Universe.

The clock was made by clockmaker Mikulas of Kadan and Jan Sindel, the latter a professor of math and astronomy at Charles University, the oldest and largest university in the Czech Republic. The dial was added in 1490 and the clock façade was decorated with gothic sculptures. In 1629 or 1659 wooden statues were added, and the Apostles were added after a major repair in 1787-1791. A gold rooster was added in 1865-1866, along with some major repairs. Partly destroyed by the Germans in 1945, it was repaired in 1948, and was last renovated in 2005. There is a net placed over the statues to keep the pigeons away.



Local legend says the city will suffer if the clock is neglected and its good operation is placed in jeopardy. A ghost mounted on the clock is supposed to nod his head in confirmation. Also, according to legend, the only hope was represented by a boy born on New Year's night. Much of the original machinery is still intact.

The astronomical dial, or large dial, is a form of a mechanical astrolabe, a device used in medieval astronomy. It shows how the medieval world saw the Universe, representing Earth and the local view of the sky. A blue circle directly in the centre is the Earth and the upper blue is the portion of the sky above the horizon. The reddish-brown and black areas indicate the portion of the sky below the horizon. During the day, the Sun sits over the blue part of the background and at night it sits over the black. At dawn and dusk, the mechanical Sun is positioned over the reddish-brown part of the background. The background represents the standing Earth & Sky, and surrounding it are four main moving components:

- Zodiacal ring
- an outer rotating ring
- a small golden star representing the Sun
- a silver icon representing the Moon.

It tells time in Old Bohemian (Italian or Central European) time, Medieval or Babylonian time, and sidereal time - all simultaneously. It shows the phases of the Moon, sunrise, sunset, the Sun's position in the sky and the zodiac.

#### **Description of the Clock**

- The very centre where all the arms meet – place of the observer
- Innermost gold ring circle on the face of the clock – Tropic of Capricorn
- Next gold ring circle equator
- Dark blue circular area astronomical night
- Aurora area (mustard yellow) daybreak (or dawn in Latin)
- Crepusculum (mustard yellow area) – twilight
- Ortus (rising in Latin, pale blue area) – sunrise (east)
- Occasus (pale blue area) sunset (west)
- Sun icon mean solar ecliptic
- Moon icon mean revolutions of the Moon
- Tiny star at end of one arm, near outer part of zodiacal ring, shows sidereal time – position of vernal equinox
- Curved triangular area above ortus

   Planetary Hours Border



- Curved line on upper border of Planetary Hours Border – Planetary Time
- Light blue areas daytime
- Smaller innermost circle with gold symbols on blue – zodiac characters, represent the stars in the sky
- Small gold ring divided by tiny lines around zodiac ring – represents the ecliptic
- Roman numerals central European time; gold Roman numerals at

the outer edge of blue circle are the timescale of a normal 24 hour day in Central European time

- Curved gold lines dividing the blue part of the dial into 12 parts are marks for unequal hours. These hours are defined as 1/12 of the time between sunrise and sunset and they vary during the year.
- Outermost ring (blue band with unusual markings) – these are ancient Schwabacher numerals that



indicate ancient Czech time

- Tip of Sun arm is present day time; the ancient marker on this ring looking like a warped R is the end and start of the ancient day. The outer blue band moves back and forth to coincide with time of sunset.
- Outermost gold ring represents the Tropic of Cancer
- The golden Sun moves around the zodiac circle showing its position on the ecliptic
- The Moon is in half black and half silver, showing lunar phase. A 57tooth gear inside the sphere has a screw thread attached to a weight; this movement is powered only by gravity. This part of mechanism was made in the mid-17th century and produces a much smaller deviation than the original.)

On either side of the astronomical dial are two figures, representing "bad" characters (remember this was originally designed in medieval times). On the left is a Miser clutching his money bag and shaking a stick. Next to him, Vanity" is looking in a mirror. On the right of the dial the skeleton – Death – rings a bell and beckons to the Turk next to him, who represents the invading Muslim hordes and shakes his head at Death.



The Calendar dial or small dial has a stationary background with a rotating outer margin. In the centre is the Prague coat of arms. There are three rings of paintings around the coat of arms (painted by Josef Maines in 1865): a simple decorative ring, then pictures of zodiacal images, and lastly people in the fields at their various works to mark the seasons. Around this is the outer moving ring with the names of the saints and their feast day, as well as every month and day of the year with the current date at the top, indicated by the gold arrow.

On either side of the smaller calendar dial are two figures of four good characters: on the left, a philosopher and an angel; on the right, an astronomer and a chronicler. None of these move.

Every hour on the hour, the upper blue doors open and the Walk of the Apostles proceeds. A few of the "bad" figures around the astronomical dial move and the whole performance ends with the golden rooster near the top crowing and moving its wings, the ringing of a huge bell at the top of the tower, the clock chiming the hour, and a trumpeter sounding a horn. A legend says at the first cock-crow in the morning, the ghosts and devils flee Prague.

Finding additional information to corroborate what I had from the trip was a challenge. There is a lot of confusing info and it needed careful doublechecking to make sure I had facts as accurate as possible. This was so cool and I'm very glad to have seen it.

#### **RASC NB Education & Outreach Update for 2017**

Year	Events	People	Star Finders English	Star Finders French	Moon Guides English	Moon Guides French	Get Started in Astronomy	Volunteer Hours
2012	75	4658	2188	229	1852	137		
2013	102	4119	1602	8	1513	120		
2014	104	4843	1716	241	1378	199		
2015	114	7262	2106	244	2568	156	819	
2016	219	9498	1984	115	2290	87	514	988
2017	109	3582	1071	30	1239	0	199	730

Types of Outreach Events													
Year	Presenta- tion	Night Observing	Day Ob- serving	Youth Group	School Talks	Exhibi- tion	Observ./ Planet'm						
2012	12	24	2	12	17	8	0						
2013	24	24	3	12	32	7	0						
2014	23	21	20	17	12	8	3						
2015	22	33	23	7	15	13	1						
2016	31	55	39	19	54	11	10						
2017	27	29	3	14	31	4	1						



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## **Puzzle 'n Pics**



### Can you solve this puzzle created by Ted Dunphy?

The first correct answer emailed to editor@nb.rasc.ca wins a prize from the Editor.

Answer to the previous puzzle, won by Emma MacPhee: (DWARF CHICKEN) = PLUTO POULT



Photo by Rick Murray, a student in an astronomy course taught by Emma MacPhee



Lunar Alps and Apennines by Paul Owen (see Page 1)