

# POLARIS



## Royal Astronomical Society of Canada London Centre Newsletter May 2017

---

### Observing the 2017 Solar Eclipse *Compiled By Norman McCall*

On August 21, 2017 people in North America will have the opportunity to see a partial or even a total solar eclipse in certain regions of the United States. However, as everyone has been told from birth that one can never look directly at the sun, what method does one use to observe a solar eclipse?

According to NASA and four other science and medical organizations, it is OK to look at a total solar eclipse with the naked eye — but **only** during **totality** when the face of the sun is **fully obscured by the moon**. Given this news, maybe we should consider how exactly to safely observe the eclipse both within the region of totality and in regions of partiality.

A total solar eclipse happens when the central disk of the sun is completely covered by the moon. Many people have probably seen a partial solar eclipse, in which the disk of the moon appears to take a bite out of the sun's disk, but never fully obscures it. But total solar eclipses are a much rarer sight.



*The path of the 2017 total solar eclipse—Credit: NASA*

On Aug. 21, 2017, a total solar eclipse will cross the continental U.S. from coast to coast. However, only those people in what's known as the "path of totality" will see a total solar eclipse. The path of totality is about 70 miles wide (112 kilometers), and extends from Oregon to South Carolina. Depending on where observers are located, the sun may be completely obscured by the moon for up to 2 minutes and 40 seconds. For those outside of totality, the partial eclipse will last 2 to 3 hours.

During this brief moment of totality - when the moon completely blocks the sun's bright face - day will turn into night, making visible the otherwise hidden solar corona (the sun's outer atmosphere). Bright stars and planets will

become visible as well. It is truly one of nature's most awesome sights.

In order to see this awesome natural sight, sky-watchers need to know how to view the eclipse safely. To inform the public on this topic, an information guide on safe viewing has been written and released by NASA, along with the American Astronomical Society (AAS), the American Academy of Ophthalmology, the American Academy of Optometry and the National Science Foundation. Links to these sites are listed at the end of this article.

### Viewing in regions of Partiality

The only safe way to look directly at the uneclipsed or partially eclipsed Sun is through special-purpose solar filters, such as "eclipse glasses" or hand-held solar viewers. Homemade filters or ordinary sunglasses, even very dark ones, are not safe for looking at the Sun. To ensure safety, verify the eclipse glasses are certified to ISO 12312-2 international standard for such products. Vendors include: Rainbow Symphony, American Paper Optics and Thousand Oaks Optical. NOTE: **homemade filters or ordinary sunglasses, even very dark ones, are not safe for looking at the sun.**

Generally, there is no need for sky-watchers to use a telescope during the eclipse, but a pair of binoculars (with solar filters) can be helpful during totality. But, as per the recommendations, **do not attempt to look at the disk of the sun through non-filtered binoculars, with solar-viewing glasses**. The concentrated solar rays will damage the filter and enter your eye(s), causing serious injury.

### Use of Eyeglasses

The recommended guidelines for using the eclipse eyeglasses are as follows:



(1) Always inspect your solar filter before use; if scratched or damaged, discard it. Read and follow any instructions printed on or packaged with the filter. **Always supervise children using solar filters.**

(2) Stand still and cover your eyes with your eclipse glasses or solar viewer before looking up at the bright Sun. After glancing at the Sun, turn away and remove your filter — **do not remove it while looking at the Sun.**

*(Continued on page 2)*

(3) **Do not** look at the uneclipsed or partially eclipsed Sun through an unfiltered camera, telescope, binoculars, or other optical device. Telescopes, cameras, binoculars and other optical devices need their own solar filters. **Solar-viewing glasses are not a substitute for a proper (and full) solar filter on magnification devices.**

For example, never view the disk of the sun through a telescope, binoculars or camera without a proper (primary side) solar filter. Solar-viewing glasses are not powerful enough to protect your eyes from *magnified* sunlight. Even if you are wearing solar-viewing glasses, viewing the disk of the sun through a magnification device will result in serious eye damage if the device is not equipped with a proper solar filter, according to the viewing safety sheet.

### Pinhole Projection

An alternative method for safe viewing of the partially eclipsed Sun is pinhole projection. For example, cross the outstretched, slightly open fingers of one hand over the outstretched, slightly open fingers of the other. With your back to the Sun, look at your hands' shadow on the ground. The little spaces between your fingers will project a grid of small images on the ground, showing the Sun as a crescent during the partial phases of the eclipse.

### Safety during Totality

Now that you have some general information about how to view the sun safely, here are NASA and the AAS's recommendations for how to safely view the total solar eclipse with the naked eye. Again, these tips come from NASA's safety information sheet.

(1) Viewers who are looking at the eclipse with solar-viewing glasses will be able to see when the sun's face is completely obscured by the moon (because, once again, the only light that can penetrate these solar-viewing glasses is the light from the sun's disk). Viewers will be able to observe the moon creep slowly over the sun's disk and eventually covers the sun entirely.

(2) In the moments before totality, viewers looking through their solar-viewing glasses will see a crescent of light from the sun growing thinner and thinner as the moon progresses over its face. In the last few seconds just before the disk of the sun is entirely covered by the moon, the crescent will break up into a series of small dots of light that look like beads on a string (typically there are about three to eight such dots, according to Fienberg). These are called Baily's beads (after Francis Baily, the British astronomer who discovered them). Once the last bead disappears, the face of the sun has been covered by the moon, and totality has begun.

**Remember,** only if you are within the path of totality, remove your solar filter only when the moon completely covers the sun's bright face and it suddenly get quite dark. You then will experience the brilliance of totality! **As soon as the bright Sun begins to reappear,** immediately replace your solar viewer to glance at the remaining partial phases.

As a further precaution, in order to anticipate when the disk of the sun will reappear, viewers should first be aware of about how long the total eclipse should last where they are standing — the total eclipse will last, at most, about 2 minutes and 40 seconds. The nearer that viewers are to the edge of the path of totality, the shorter the total eclipse will be. Viewers who want to observe the total solar eclipse with the naked eye should try to move closer to the center of the path, so there is ample time to observe the eclipse safely.

### Conclusion

Whether you stay in Canada and experience the solar eclipse as a partiality or if you are fortunate enough to travel to experience totality, it will be an astronomical event you will certainly remember for a lifetime!

### Reference Links

NASA's Eclipse website:

<https://eclipse2017.nasa.gov/safety>

<https://eclipse2017.nasa.gov/safety>

The Universe in the Classroom:

<http://astrosociety.org/edu/publications/tnl/05/stars2.html>

SPACE.COM Article: Solar Eclipses: An Observer's Guide (Infomatic):

<http://www.space.com/15613-solar-eclipses-observing-guide-infographic.html>

## **London Centre Executive**

### **President**

Rick Saunders  
prez@rasclondon.ca

### **Vice-President and Newsletter Editor**

Norman McCall  
vp@rasclondon.ca

### **Treasurer**

Bill Gardner  
treasurer@rasclondon.ca

### **Secretary**

Everett Clark  
secretary@rasclondon.ca

### **National Representative**

Mike Hanes  
nat\_rep@rasclondon.ca

### **Observer's Chair**

Dale Armstrong  
observing@rasclondon.ca

### **Honorary President and once National President**

Peter Jedicke  
pastpresident@rasclondon.ca

### **Past President**

### **Public Outreach Coordinator**

Dave McCarter  
outreach@rasclondon.ca

### **Higher Education Liaison and Librarian**

Robert Duff  
uni\_liaison@rasclondon.ca

### **ATM Chair**

Mike Hanes  
atm@rasclondon.ca

### **Observatory Committee Chair**

Pete Raine  
observatory@rasclondon.ca

### **Youth Programs/Women's Programs**

Heather MacIsaac  
youth@rasclondon.ca  
programs@rasclondon.ca

### **Councilor at Large**

John Rousom  
councilor2@rasclondon.ca

### **System Administrator**

Jeff Harrison  
admin@rasclondon.ca

## **Moon Phases**



Full Moon: May 25, 2017



Last Quarter: June 1, 2017

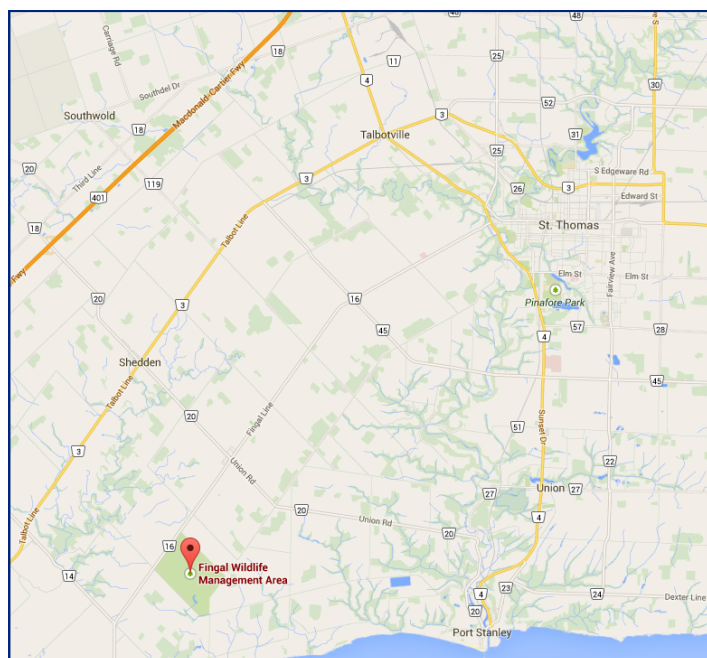


New Moon: June 9, 2017



First Quarter: June 17, 2017

## **Fingal Dark Sky Observing Site**



## Sky Events for Late May and June

Saturday, May 20 — Neptune 0.5° N of Moon  
 Monday, May 22 — Venus 2° N of Moon & Double shadow transit on Jupiter  
 Wednesday, May 24 — Mercury 1.6° N of Moon  
 May 26, 28 & 29 — Double shadow transit on Jupiter  
 Saturday, June 3—Venus greatest elongation W  
 Thursday June 15—Saturn at oppositions



Mercury: Visible in the morning sky early in the month.  
 Venus: Prominent in the dawn sky throughout the month.  
 Mars: Just 16° from the Sun, The tiny planet may just be seen in evening twilight.  
 Jupiter: In the evening sky throughout the month with multiple views of double shadow transits.  
 Saturn: Not far from the winter solstice point, low in the sky for observers in the Northern Hemisphere.  
 Uranus: In the morning sky in Pisces..  
 Neptune: Rises after midnight.



### R.A.S.C. London Centre Library — Books of the Month, May 2017

*By Robert Duff*

As always, these “Books of the Month” are available for loan to members, to be returned at the following monthly meeting. The books for May 2017 are as follows:

*Foundations of Astronomy*, by Michael A. Seeds. – 7<sup>th</sup> Edition, c2003  
*In Search of Time: Journeys Along a Curious Dimension*, by Dan Falk. c2008.  
*Universe on a T-shirt: the Quest for the Theory of Everything*, by Dan Falk. c2002.

For a complete listing of our RASC London Centre Library collection please click on the **Library** menu at the top of the RASC London Centre main web page: <http://www.rasclondon.ca/>

If there is a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at [rduff@sympatico.ca](mailto:rduff@sympatico.ca)

### Exploring the Stars Events & Cronyn

**Observatory Public Nights,  
 April 18<sup>th</sup>—May 6<sup>th</sup>, 2017**

*By Robert Duff*

#### Exploring the Stars, Chartwell Riverside Retirement Residence, April 18<sup>th</sup>, 2017

*By Robert Duff*

Graduate student Kendra Kellogg presented the digital slide presentation “*Constellations*” before an audience of 16 residents in the Theatre of the Chartwell Riverside Retirement Residence, 201 Riverside Drive, London, Ontario, on Tuesday, April 18<sup>th</sup>, 2017, 7:30 p.m. She followed this with the “*Constellations*” activity, distributing 15 “*Star Finder*” planispheres, helping assemble them with adhesive tape and showing everybody how to use them.

RASC London Centre was represented by Mark Pickett, Everett Clark and Bob Duff. Cloudy skies ruled out celestial observing when Mark Pickett set up his Explore Scientific David H. Levy Comet Hunter 152mm Maksutov-Newtonian telescope on a Twilight II altazimuth mount on the parking lot sidewalk of the Chartwell Riverside Retirement Residence. Following Kendra’s presentation and activity, Bob brought a group of 5 residents outside to see Mark’s telescope. Since the sky was cloudy and it was still daylight, everybody talked and viewed some tree branches through Mark’s 152mm Maksutov Newtonian telescope (25mm Tele Vue Plossl eyepiece, 29X).

Kendra, Mark, Everett and Bob talked for a while after the residents had gone back indoors, until 8:45 p.m. when Mark packed up his telescope and everybody went home after an enjoyable evening explaining astronomy despite the cloudy skies.

#### Exploring the Stars, 84<sup>th</sup> London Cubs, Wednesday, April 19<sup>th</sup>, 2017

Cloudy skies greeted 15 visitors (10 children and 5 adults / leaders) from the 84<sup>th</sup> London Cubs for Exploring the Stars at Western University’s Cronyn Observatory, Wednesday, April 19<sup>th</sup>, 2017, 7:00 p.m. Graduate student Jeff Vankerkhove presented the digital slide presentation “*The Scout / Guide Astronomy Badge*” with the title slide “*The Basics*” and fielded questions. Jeff followed this with the activity “*Kitchen Comet*,” making a comet from dry ice and other materials.

RASC London Centre was represented by Everett Clark and Bob Duff. The dome remained closed due to the cloudy sky. Everett set up the observatory’s 8-inch (20.3cm) Meade Schmidt-Cassegrain (20mm Plossl eyepiece, 100X) inside the dome so as to view the lights on the communications tower in south London through the door to the roof patio. When everybody arrived upstairs in the dome, Bob gave a talk on the history of the Cronyn Observatory and the technical aspects of the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X) for demonstration. He explained the Schmidt Camera and Cassegrain Reflector telescope piggy-backed on the 25.4cm refractor and fielded questions. Bob then called everybody’s attention to the 2 clocks on the east wall of the



observatory and the difference between Standard and Sidereal Time.

Bob supervised as the Cubs viewed the lights on the communications tower through the 8-inch (20.3cm) Schmidt-Cassegrain, and explained how this reflector telescope worked. The Cubs asked good questions and expressed their thanks for an enjoyable evening learning about astronomy before leaving around 8:30 p.m.

### **Exploring the Stars, Circles, Saturday, April 22<sup>nd</sup>, 2017**

Clear skies greeted 20 visitors (11 children and 9 adults) from Circles for Exploring the Stars at Western University's Cronyn Observatory, Saturday, April 22<sup>nd</sup>, 2017, 7:30 p.m. Graduate student Kendra Kellogg presented the digital slide presentation "*Our Solar System*" and fielded questions. Kendra followed this with a planispheres activity, distributing 20 "*Star Finder*" planispheres and helping assemble them with adhesive tape and showing everybody how to use them.

RASC London Centre was represented by Everett Clark, Paul Kerans and Bob Duff. When everybody arrived upstairs in the dome, Bob gave a talk on the history of the Cronyn Observatory and the technical aspects of the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X) for demonstration. He explained the Schmidt Camera and Cassegrain Reflector telescope piggy-backed on the 25.4cm refractor and fielded questions. Bob then called everybody's attention to the 2 clocks on the east wall of the observatory and the difference between Standard and Sidereal Time.

Everett operated the big 25.4cm refractor (28mm Meade Super Wide Angle eyepiece, 157X) in the dome, showing the visitors Jupiter and the star Sirius, with Kendra later showing them the double-star Castor, which made an impressive sight through the big telescope. On the roof patio outside the dome Kendra and Bob showed visitors Jupiter through London Centre's home-built 30.5cm Dobsonian (17mm Nagler eyepiece, 88X) and 25.4cm Dobsonian (18mm Radian eyepiece, 62X), with Bob also showing a couple of visitors the star Sirius.

Paul showed the visitors his meteorites, including the chondrite (stony) and iron meteorites as well as the Moon and Mars meteorite samples in small plastic display cases. Paul invited them to "*walk on the Moon*" by stepping on his lunar meteorite sample display case placed in a wooden block with a transparent Lexan polycarbonate sheet cover. The visitors were gone by around 9:00 p.m. after an enjoyable evening learning about astronomy, meteorites and telescopes under clear skies.

### **Exploring the Stars, 10<sup>th</sup> London Guides & Pathfinders, Monday, April 24<sup>th</sup>, 2017**

Clear, somewhat hazy skies greeted 9 visitors (5 children and 4 adults / leaders) from the 10<sup>th</sup> London Guides & Pathfinders for Exploring the Stars at Western University's Cronyn Observatory, Monday, April 24<sup>th</sup>, 2017, 7:30 p.m. Graduate student Jeff Vankerkhove presented the digital slide presentation "*Constellations*" and fielded questions. Jeff followed this with the activity "*Kitchen Comet*," making a comet from dry ice and other materials.

RASC London Centre was represented by Paul Kerans and Bob Duff. Paul made ready the big 25.4cm refractor in the dome, installing the 28mm Meade Super Wide Angle eyepiece (157X). When everybody arrived upstairs in the dome, Bob gave a talk on the history of the Cronyn Observatory and the technical aspects of the big 25.4cm refractor. He explained the Schmidt

Camera and Cassegrain Reflector telescope piggy-backed on the 25.4cm refractor and fielded questions. Bob then called everybody's attention to the 2 clocks on the east wall of the observatory and the difference between Standard and Sidereal Time.

Jeff directed the 25.4cm refractor towards Jupiter in the southeastern sky and supervised as the visitors looked through the big telescope. Paul had set up the London Centre's home-built 30.5cm Dobsonian (17mm Nagler eyepiece, 88X) on the roof patio for the visitors to view Jupiter and later Betelgeuse. Bob explained how the 30.5cm Dobsonian reflector telescope worked and supervised observing.

Paul showed the visitors his meteorites, including the chondrite (stony) and iron meteorites as well as the Moon and Mars meteorite samples in small plastic display cases. Paul invited them to "*walk on the Moon*" by stepping on his lunar meteorite sample display case placed in a wooden block with a transparent Lexan polycarbonate sheet cover. The visitors were gone by around 9:00 p.m. after an enjoyable evening of astronomy.

### **Exploring the Stars, 80<sup>th</sup> London Scouts / Venturers, Wednesday, April 26<sup>th</sup>, 2017**

Clear skies greeted 9 visitors (7 children and 2 adults / leaders) from the 80<sup>th</sup> London Scouts / Venturers for Exploring the Stars at Western University's Cronyn Observatory, Wednesday, April 26<sup>th</sup>, 2017, 7:30 p.m. Graduate student Viraja Khatu presented the digital slide presentation "*Black Holes*" and fielded questions. Viraja then introduced the "*Crater Experiment*" activity, which involved dropping various size balls into a pan—placed on the floor—filled with flour and topped with chocolate powder to demonstrate impact cratering.

RASC London Centre was represented by Everett Clark and Bob Duff. Everett opened the dome and made ready the big 25.4cm refractor, installing the 28mm Meade Super Wide Angle eyepiece (157X). When everybody arrived upstairs in the dome, Bob gave a talk on the history of the Cronyn Observatory and the technical aspects of the big 25.4cm refractor. He explained the Schmidt Camera and Cassegrain Reflector telescope piggy-backed on the 25.4cm refractor and fielded questions. Bob then called everybody's attention to the 2 clocks on the east wall of the observatory and the difference between Standard and Sidereal Time.

Everett operated the 25.4cm refractor throughout the evening, showing the visitors Jupiter, Sirius and Betelgeuse, through the 28mm Meade SWA eyepiece (157X). He then swapped in the 17mm Nagler eyepiece (258X) to show them the double-star Castor and the star Pollux in the constellation Gemini. Bob gave a tour of stars and constellations on the roof patio and one of the Scouts / Venturers asked if the North Star, Polaris, could be viewed through the telescope. Everett directed the 25.4cm refractor towards Polaris and everybody had a good view of the North Star through the 17mm Nagler eyepiece (258X).

The visitors were gone by around 9:35 p.m. after a very enjoyable evening of astronomy under clear skies.

### **Early Outreach Conference @Cronyn Observatory, Friday, May 5<sup>th</sup>, 2017**

Cloudy skies with rain greeted more than 200 Grade-8 students with adult leaders from the Early Outreach Conference for a tour of Western University's Cronyn Observatory, Friday, May 5, 2017, 1:00 p.m. The Early Outreach Conference (REACH) is an annual University Student Council (USC) week-end long conference introducing low-income youth to post-secondary educational opportunities.

The students were divided into 3 groups for the slide lecture, the “*Transit Demonstration*” in the “*Black Room*” and a tour of the dome. Professor Jan Cami made 8 presentations of his digital slide presentation “*Astronomy at Western*” with the title slide “*Welcome to the Cronyn Observatory.*” Downstairs in the “*Black Room*” graduate student Jeff Vankerkhove did the “*Transit Demonstration*” activity, showing them the “*Transit Demo*” model—demonstrating the transit detection method for finding extra-solar planets.

RASC London Centre members Paul Kerans and Bob Duff gave the tour of the dome, which remained closed due to rain. Paul set up 2 amateur telescopes inside the dome, including the observatory’s 15cm Orion AstroView 6 Equatorial Newtonian reflector on the Sky-Watcher EQ5 mount and the London Centre’s home-built 30.5cm Dobsonian reflector. Bob directed the 30.5cm Dobsonian (17mm Nagler eyepiece, 88X) through the door to the roof patio, so as the view an exhaust chimney support on the east side of the Engineering building. Paul directed the 15cm Newtonian (20mm Plossl eyepiece, 37.5X) so as to view some scaffolding set up in front of the Western Sports & Recreation Center.

As each group of students arrived upstairs in the dome, Bob gave a talk on the history of the Cronyn Observatory and some of the technical aspects of the big 25.4cm refractor, using the 32mm Erfle eyepiece (137X) for demonstration. Bob explained the Cassegrain Reflector telescope and Schmidt Camera piggy-backed on the 25.4cm refractor as well as the 15cm Newtonian and 30.5cm Dobsonian reflector telescopes set up inside the dome. Bob also explained the 2 clocks on the east wall of the observatory and the difference between Standard and Sidereal Time.

Paul explained how the 15cm Newtonian and the EQ5 computerized mount worked and Bob explained how the 30.5cm Dobsonian reflector worked as the students viewed through these amateur telescopes. Paul also explained how the *Rigel QuikFinder* reflex sight, recently installed on the big 25.4cm refractor, made it easier to locate objects in light polluted skies. The students left the dome around 2:35 p.m. after a very interesting afternoon learning about astronomy at Western University and the Cronyn Observatory.

### **Cronyn Observatory Public Night, Saturday, May 6<sup>th</sup>, 2017**

Cloudy skies with rain greeted 8 visitors to Western University’s Cronyn Observatory Summer Public Night, Saturday, May 6<sup>th</sup>, 2017, 8:30 p.m. Professor Els Peeters presented the digital slide presentation “*Carbon in the Universe: Our Cosmic Roots*” and fielded questions. Graduate student Taranpreet Kaur was in charge of “crowd control” and talked with the visitors. There were in all 8 visitors including 6 who listened to the slide lecture and 2 who went directly upstairs into the dome.

Professor Jan Cami was telescope operator but since rainy weather ruled out opening the dome, he spent the evening organizing the storeroom downstairs. Staff member (and RASC member) Henry Leparskas arrived early, around 7:00 p.m., to work on the software of the donation box—the cabinet size 1940 radio inside the entrance of the observatory.

RASC London Centre was represented by Everett Clark, Heather MacIsaac, Peter Jedicke, Bob Duff, Mark Tovey and Edith Tovey. Heather set up her Celestron Go-To 90mm Maksutov (32mm Plossl eyepiece, 39X) and also helped Everett set up the observatory’s 8-inch (20.3cm) Meade Schmidt-Cassegrain (20mm Plossl eyepiece, 100X) inside the dome so as to view out the roof patio door towards an EXIT sign in the window of the

Western Sports & Recreation Center. Heather explained the big 25.4cm refractor to a couple of visitors, using the 52mm Erfle eyepiece (84X) that Bob handed to her for demonstration.

Mark and Edith worked downstairs on the “*1967 Period Room*” recreating the early control room of the Elginfield Observatory to celebrate the 150<sup>th</sup> anniversary of Confederation—Canada 150. This is to complement the “*1940s Period Room*” recreating Dr. H. R. Kingston’s office. They were visited by Peter, Heather, Everett, Bob and Henry.

The visitors were gone by 10:00 p.m. and everybody left the dome by around 10:10 p.m., with the telescopes put away, after an interesting evening at the Cronyn Observatory despite the cloudy rainy weather.