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Winnicentrics

The Journal of the Winnipeg Centre of the Royal Astronomical Society of Canada

A Total Eclipse of a Different Kind

by Scott Young

The evening of January 28, 2001 found me sitting on the side of a gravel road in southern Manitoba in a howling wind, trying to keep my fingers from freezing right off. Under normal circumstances, I'd have packed it in an hour ago, surrendering the clear sky to the wind and cold. But tonight I was here for a reason: to observe the eclipse of a distant star.

It started when I received an email from David Dunham, the President of the International Occultation Timing Association, or IOTA. (I'm on several e-mail lists that alert me to special astronomical events which come up suddenly, so we often find out about an event with only a few days' notice.) This particular event caught my eye: a bright star was going to be occulted (or eclipsed) by the Moon, and the edge of the path was just close to Winnipeg. By locating ourselves on the very edge of the occultation path (called the "graze line"), we could see the star be occulted repeatedly as it passed between the mountains and valleys on the edge of the moon. Neat!

It turns out that the polar regions of the Moon aren't really well-known. Sure, the Apollo astronauts landed on the moon, and we've orbited it with spacecraft, but for reasons of orbital mechanics it's been too expensive to map the polar regions in detail. The main source of information on the polar regions is from observations of grazing occultations. By having several observers watch the graze from different positions a few hundred meters apart, you can resolve details in the lunar landscape much finer than can be seen directly. We could help map the moon! Neat.

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Deadline for the next issue is April 22.

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March

March 9

Dr. Jayanne English of the Department of Physics and Astronomy at the University of Manitoba is our guest speaker this month. Before moving to Winnipeg, Jayanne has worked at the Hubble Space Telescope Heritage project, where she used her background in both art and science to help produce the stunning images released monthly by STScI.

Also on deck: Beginner's Session (the Astronomical Dictionary: "B"), Telescope update, What's New, Gail's Constellation of the Month looks at Orion and a report on "Arizona Trip A".

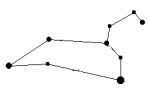
April

April 20

This meeting we'll have a presentation on the Upcoming spacewalk of Canadian astronaut Chris Hadfield, who heads into space aboard the shuttle Endeavour on April 19. Chris will be installing the new Canadian-built robotic arm for the International Space Station while becoming the first Canadian ever to walk in space. We also hope to have a guest speaker yet to be confirmed.

Also on deck: Beginner's Session, Telescope update, What's New, Gail's Constellation of the Month looks at Camelopardalis and a report on "Arizona Trip B".

NOTE THE DATE CHANGE FOR THE APRIL MEETING



TELESCOPE MAKING GROUP

I am very pleased to say that we have 3 confirmed telescope builders and will most probably have telescopes to show to the club at the April meeting. 8" f6 seems to be the popular size and we do have one builder with a 10" mirror! I think I will even build a 6" f8 just to get into the action (I need another scope!) If there are any latecomers to the group, don't worry. The order for the necessary parts will go out at the end of February. Phone or e-mail me with your requests!
RayAndrejowich
randrejo@hotmail.com or phone 667-6896

WINNIPEG CENTRE LOANER TELESCOPES

The club has several loaner telescopes available to members

- 8"f6 Newtonian on Dob mount
- Celestron 8"fork mount Schmidt Cass
- 6" f8 Newtonian equatorial mount
- 4.25" Newtonian on Dob mount
- 70mm refractor on alt-az mount
- 12" lx200schmidt Cass fork mount at observatory (**Gil Raineault** is contact for booking) 253-4989 or raineaul@minet.gov.mb.ca

All scopes are the responsibility of person loaning and damages and repairs will be paid for by such person (I am happy to say there have been no damages in the last 2 years).

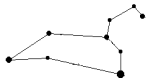
All scopes are available on a first come first served basis. All are available to all members with note of the Celestron 8 which requires that one be a member for at least 1 year and the 12" lx200 which requires a 2 year membership and a series of instruction classes.

Please feel free to call me regarding booking a loaner scope. @ 667-6896 or email randrejo@hotmail.com
Ray Andrejowich

APRIL 18 AT GLENLEA

Once again, we are looking for volunteers to help with a group of grade 6 students from Bairdmore School. There will be 20 students (plus parents) so it would be great to have 3 or 4 volunteers with their telescopes. If you don't have a scope, bring your binoculars and show that we don't need a lot of expensive equipment to enjoy the night sky. If you don't have a pair of binoculars, come on out anyways and show them how to find some of the constellations. We are shooting for Wednesday, April 18 from 7:00 until 8:00 p.m. If you would like to come out and inspire some young astronomers give **Gail** a call at 253-8297 or email her at gail@pangea.ca

Are you working on your Messier list?
Finest NGC's?
Herschel 400's?
Let me know how many you have and I will publish it here so we can encourage each other!



Humans in Space

by Ray Philippe

This is the first installment in a series that will take us back in time to explore the human race's quest for space flight, and its eventual conquests and failures in space travel, from the dreams of the early visionaries to the manned space missions of today and tomorrow.

Part 1

It was a time of tremendous technological innovation: Thomas Edison had invented the electric light; the Wright brothers were working on their first flying machine. The year was 1898. Konstantin Tsiolkovsky, a deaf, forty-one-year-old Russian math teacher, had just written a paper on how human beings might achieve space travel and the exploration of other planets. Amazingly, Tsiolkovsky had developed theories on extraterrestrial life, worked out calculations, and conceived of a liquid-fuel rocket ship he called a "reaction machine" entirely on his own, out of touch with the rest of the world. Inspired at a young age by the Jules Verne novel *From the Earth to the Moon* and its sequel *Round the Moon*, Tsiolkovsky was passionate about space travel. His vision of humanity's future in space was in fact more important to him than the actual rocket. He

An illustration from the Jules Verne novel *From the Earth to The Moon*

believed that someday humans would eventually travel to and inhabit many distant worlds. He predicted that we would design space suits, build space stations, and explore the moon and Mars.

It took Tsiolkovsky five years to find anyone willing to print his outlandish paper, but it was finally published by a Russian science magazine in 1903, under the title

"The Investigation of World Spaces with Reaction Machines." Tsiolkovsky was but the first of many astonishing characters who, over the years, would play important roles in the amazing story of humans in space.

"If there isn't a law against it, it will happen." These were the words of Robert H. Goddard, American rocketry pioneer and professor of physics at Clark University in Worcester, Massachusetts.

From his boyhood, Goddard was fascinated with the possibilities that technology presented, and had a strong drive to achieve greatness. But he was a sickly boy, and spent a lot of time recovering from illness, isolated from others, with nothing to do but read. By the time he was sixteen he had fallen two

D Robert Hutchings Goddard

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years behind in school. He was frustrated because he felt he had to accomplish something extraordinary in his life, but felt unable to find a suitable goal on which to focus his energy. In 1898, while recuperating from an illness, he read the H.G. Wells story *The War of the Worlds*. The story gripped his imagination. About a year later, after sitting for a long time up in a cherry tree in his grandmother's orchard, his vision came to him. In his mind, he pictured a device that could carry him from Earth to Mars powered by centrifugal force. He had finally found the one goal that would give his life purpose.

Goddard graduated from high school in 1905, then took a science degree at Worcester Polytechnic Institute. This was followed by graduate and doctoral degrees in physics at Clark University. He wrote numerous papers, but was still struggling in his spare time with the issue of space travel when, in 1909, he finally realized that the best vehicle for traveling into space was the rocket. Five years later, he was awarded his first patent for a liquid-fueled, multistage rocket, and he soon went to work building prototypes in the physics shop at Clark University, where he had gotten a job as a physics professor. (*Note: you can view full-page images of Goddard's original patent, number 1,102,653, at the U.S. Patent and Trademark Office web site. The patent database search page is www.uspto.gov/patft; you will need a G5 TIFF viewer to display the images).*

Robert Goddard was not only a first-rate physicist and engineer. Like Tsiolkovsky, he also envisioned that rockets would carry human beings to the moon, the planets, and

even to other stars. For example, at age thirty-six he wrote an essay on how the inhabitants of Earth might escape extinction, due to a dying Sun, by building a fleet of enormous arks, each one carrying its passengers off toward a different cluster of stars.

For the next few years, Goddard's theories remained just theories. When he'd build a rocket and carry it out to a field, it never flew anywhere at all. He'd return to Clark, fried missile in hand. As his rockets grew larger, they grew more expensive. Realizing that he could not continue funding his research out of his own pockets, Goddard approached the Smithsonian Institution in 1916 for a research grant. At their request, Goddard submitted a detailed paper on his theories to the institution. The Smithsonian experts liked his paper, and Goddard received a check for $1000, with a promise of $4000 more as he needed it.

Meanwhile, back in Russia, Tsiolkovsky's work had stalled. He had sent papers to the Russian Academy of Sciences, explaining his ideas and asking for support. The Russian government was never willing to give him the attention he deserved. It was not until the new Soviet government took power after the Russian Revolution that

Tsiolkovsky's pioneering work was recognized and embraced. He received a lifelong pension, all his papers were published, and he was honored as the "Father of Cosmonautics."

New England. March 16, 1926. Goddard had just finished building a

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10-foot rocket he christened Nell. He took it out to his aunt Effie's farm outside Worcester, where he made history by successfully launching the world's first liquid-fueled rocket. Granted, it only climbed to an altitude of 41 feet. In 1930, Goddard and his wife Esther relocated to Roswell, New Mexico, with the promise of a $100,000 grant from financier Harry Guggenheim. In the years that followed, Goddard's Nell rockets grew from 12 ft. to 16 ft. to 18 ft., and their altitude climbed from 2,000 ft. to 7,500 ft. to 9,000 ft. He built a rocket that exceeded the speed of sound and another with fin-stabilized steering, and he filed dozens of patents for everything from gyroscopic guidance systems to multistage rockets.

Continued in next issue

THE PLANETS – WHERE ARE THEY NOW?

Saturn, **Jupiter**, and **Mars**, the three evening planets that we've been following faithfully all winter, are still easy to see in the west after nightfall. They are, however, getting lower. Watch them pull together into a shorter and shorter line throughout March.

At their best, these are the three most interesting planets for a telescope. But don't be disappointed by how they look now. **Mars** is very tiny, and all three suffer from the poor "seeing" (fuzzy views) at low altitudes.

Jupiter, which transits in the evening at the beginning of the quarter, will be setting before midnight by the end of March.

Saturn continues to precede **Jupiter** by about a half hour as they move across the evening sky, and is thus also well placed for evening observation during most of the quarter.

On March 15th and 16th we get a conjunction of two planets in the dawn sky. **Mercury** will be just 2.2° above bright **Venus**. That's a little more than a finger's width at arm's length. Unfortunately, they will be hard to see low on the horizon before sunrise. Scan for them with binoculars about 20 or 25 minutes before sunup.

Venus will disappear rapidly into the twilight during March.

Mars rises shortly after midnight during most of the quarter, earlier as the quarter progresses, so that it will be well observable, high in the eastern sky, during the morning hours.

The spring or vernal equinox occurs at 1:36 a.m. Central Standard Time on March 20th. That's when the Sun crosses northward over the celestial equator, marking the beginning of spring in Earth's Northern Hemisphere and autumn in the Southern Hemisphere. Day and night are almost equally long, and the Sun rises due east and sets due west.

BOOK REVIEW

The Urban Astronomer
A Practical Guide for Observers in
Cities and Suburbs
Gregory L. Matloff
Published in: 1991

In the Preface of the Urban Astronomer, Gregory Matloff explains the history of his beginnings to Urban Astronomy, thus giving us the knowledge that all the methods presented have been tried, tested and are effective.

In the introduction, we are told how the Priest-astronomers used their knowledge of the heavens to scare the people into doing what they wanted the people to do. We also look at what the people used astronomy for, such as navigation, and why they don't use astronomy now, such as the Global Positioning Satellite System. The most discouraging fact is that the most favorable places are where you are most likely to run into drug dealers or where you are most likely to be mugged.

In Chapter 1, we learn the 100" Mount Wilson Telescope, near Pasadena California, has become nearly useless because the Light Pollution is so out-of-control. We also learn that the urban dweller has to deal with something called "micro-meteorology" and they do so. Gregory then gives us a list of things to check up on while observing from roof-tops or parks.

In Chapter 2, while dealing with star patterns, the location of the star is as it is seen from our point-of-view. This makes it easy to find the star that is being described.

While dealing with the eyes of the telescope, Chapter 3 gives a brief biology lesson about the human eye and tells how Hipparchus used his eyes to catalogue the magnitude of the stars. Then the history and the evolution of the telescope from the time of Galileo to the telescopes of today are described.

The moon has a lot of science associated with it. The fourth chapter is about that science. This science includes how the moon affects the tides. There are 8 different activities that explain the different sciences.

At this point, there is what could be called an intermission. There is a photo gallery of some very nice astrophotos in the middle of the book.

Chapter 5 is about the Planets where the author gives a brief description of the planetary motion and a detailed description of the types of planets. Then Gregory gives a brief description of all the planets that we can see from the urban location. However, there is nothing given on the three outer-most planets.

Chapter 6, titled "Unusual Stars", starts out by giving a description of the H-R diagram albeit a brief one. It also says that there are four classes of double stars but only names two of the four. There are samples of stellar objects that can be seen from the urban location including the Andromeda Galaxy although they call it "The Great Spiral Nebula".

The chapter entitled "To View the Sun and The Dragon That Stalks it" gives a great amount of detail on the sun. How to observe it, what you are seeing, and what to look for while observing. There is a history lesson on Solar Eclipse Expeditions. It even tells what the ancients believed and did during an eclipse. They even tell us that the Holy Book of Islam still contains some of those beliefs today. It goes on to say that the people believed that there was evil involved with eclipses, however, the Pacific Rim and the Australian aboriginals believed that the sun and the moon were making out during eclipses.

The final chapter is on "Visitors in the Skies". This includes asteroids, meteors and comets. Gregory describes some of the theories of how they came into being. The chapter concludes with how the comets are part of Earth's evolution.

The rest of the book is the Appendices and references.

The one thing I like is that there is astronomically appropriate poetry at the beginning of every chapter.

This book is what the title says it is, a Practical Guide.

Reviewed by: Fred Wood

A Total Eclipse continued from page 1

The first step was to get accurate predictions for our area. Like a total solar eclipse, you have to be in the right place at the right time or you'll miss it. I used a program called OCCULT to calculate the graze path and times, taking into account our latitude, longitude, and elevation. It turned out we could see the event from Pembina Highway just south of Morden. I headed out a week beforehand to do a site recon, and make sure I could find good observing sites. By this time we had a number of interested observers, so I had to scope out several spots along the path. I finally settled on a service road just west of Pembina Highway, near the junction of Highway 44. I scoped out 6 observing stations and marked them on my map. A good topographical map and a GPS were helpful in this!

At T-3 hours, the observers all met at Perkins for a briefing. Present were Gail Wise, Patrick O'Connor, Kevin Black, (name missing), and myself. After dinner, we drove in convoy to Morden and on to the site. Again the GPS receiver came in handy, locating the spots I had chosen easily even in the dark. We set up our gear at 4 observing stations and got ready.

To observe a graze, you need a telescope, and also some way of recording your observations and the correct time. I use a mini-tape recorder and a short wave radio that received the WWV time signals. Patrick used a camcorder for both audio and video recording. The idea is, you watch the star and shout your observations into the tape recorder. You can then play back the tape and measure your times from the time signals. You yell out "Out!' when the star goes out of view, and "In" when the star comes back in to view. Easy enough in theory.

In practice, there are a lot of things to worry about. The wind was one: 40 knots, right in the face. Not fun. The wind also played havoc with the microphones on our tape recorders: the tapes were overwhelmed by the whistling wind.

I was at the southernmost station. As I watched, I could see the star approach the dark limb of the moon. Of course, it's really the moon that's moving, but it doesn't look that way in the eyepiece. The star was getting closer and closer. The predicted time was near. I leaned down into the eyepiece and got ready.

"OUT!" The star winked out instantaneously, just gone. I continued watching, knowing that if I had made a mistake in the calculations I might not see anything else. I hoped that I . . . "IN!". . . "OUT!". . . "IN!" The star winked out behind successive mountain ranges on the moon, mountains that I would never see but had nonetheless detected. "OUT!"

I saw a total of 5 pairs of events, with the star winking in and out. Other observers saw multiple events as well, and everyone's tape was good enough to be analyzed. Success!

After packing up and collecting everyone's tapes, we headed home. The easy part was over.

Coming next issue:
Part II - Mapping the Moon