



NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC

VOLUME 2003 ISSUE 2

MARCH/APRIL 2003

Space Station's Future?	1
Forms of Light	2
President's Message	3
Pictures of the Night Sky	6
Artificial Star Party	7
First <i>Astronomical</i> Light	8
February 1, 2003	10

Looking Ahead

Remember, you are always welcome to attend meetings of Council, held on the first Tuesday of every month at 7:30pm in the G.S.O.

Mar. 11: Dr. Fred Raab, Dir. of Hanford's Gravity Wave Observatory.

Apr. 8: Dr. Mark Halpren of UBC speaking on the recent release from the MAP spacecraft and its meaning for cosmology.

May 13: Dr. Steven Brahm of SFU on Devon Is. as a training ground for Mars exploration; making an Earth-Mars Internet.

Next Issue Deadline

Material for the May Nova should be submitted by Monday, May 5, 2003. Please send submissions to:

Gordon Farrell
(gfarrell@shaw.ca)

Space Station's Future?

by John Nemy and Carol Legate

<http://www.nemy.com>

The International Space Station, the world's first international orbital outpost celebrated the second anniversary of continuous residency and

permanent human presence in space November 2, 2002. The American Space Shuttle program has played a major role in the Space Station's development. The loss of the Space Shuttle Columbia will

dramatically affect the future of the ISS (International Space Station).

At the present time, the ISS is occupied by its 6th crew of astronauts. Expedition Six Commander, Ken Bowersox; Station Science Officer, Don Pettit; and Russian cosmonaut/

Flight Engineer, Nikolai Budarin are in the third month of their four month mission on board the Space Station. The three astronauts were due to return to Earth on March 1, when the shuttle Atlantis was

scheduled to deliver a replacement crew. That mission, and all future shuttle flights, are on hold until investigators learn what caused Columbia to disintegrate 40 miles above Earth on Saturday, February 1st.



Space Shuttle Endeavour followed by the International Space Station as they (travelling right to left) passed over Blackcomb Mountain, Whistler, B.C. Canada, December 2, 2002 17:35 PST. The Shuttle and ISS had undocked 5 hours prior to this photo. Video clip taken by Carol Legate & John Nemy of The Pacific Observatory

Along with the Space Shuttle, the ISS also relies on Russian unmanned rockets to provide life support supplies. The Russian cargo ship, Progress 10, launched from Baikonur Cosmodrome, Kazakhstan on Sunday, February

Forms of Light

by Marc Verschueren

Asking questions about the universe is always inspired by the visual beauty of it. This winter, not as horrible for astronomical purposes as winters have been in the last few years, has allowed us at least some view of the winter spectacle. The special guests are of course Saturn and Jupiter, but there is always Orion, the giant of the winter sky and we all look time and time again at M42.

I observe from a rather poor location because of light pollution, but the gem of M42 is as fascinating as ever. It is no doubt one of the first objects that the beginning amateur sees, and it is very often the prime attraction that gets many hooked for good. And you do not need athletic star hopping to find it; my 6-inch allows me to separate the smallest separation of the Trapezium—always gratifying. It is pleasing that a simple instrument can show this impressive star formation. And then there is the nebula, with its colour. From my poor site it is virtually impossible to see nebulae; the sky is just too bright. I can see no galaxies except the brightest such as the Andromeda, but I can see M42. Most nebulae we only see as a very pale white. This is because they are so faint that our eye cannot register the colour they may have, but M42 has colour: a mysterious green.

We always want to know a little bit more about what we see. That's why we have all these

books and read the magazines. We are told that M42 is a star nursery—new stars are being formed in it. But how do we know that? I always like to know, at least in principle, how such conclusions are reached. You do not necessarily want to know the smallest detail of the astronomical science connected to an object like M42, but we should know at least a broad outline of the thinking of the astronomers who describe the nature of such an object. I like to dig a little bit deeper into the information which is readily available to most of us to see how one can justify some statements made and what they actually mean. So I went to look here and there and did a little bit of thinking.

The M42 nebula appears a pale green to our eye because it contains oxygen. This can be seen from the spectrum of the light. That spectrum contains two strong lines around 500nm and they are very characteristic for oxygen. There are many other gases, but it is the oxygen that gives it the visible green. To see this for ourselves we would have to install a spectrograph on our scope to analyze the light we see. This is not impossible, but it is not very common yet (there are amateur versions of this most important instrument). In the meantime, we will accept the word of the specialists. The spectrograph tells us what form of light we are watching. Because there are the two lines, we know that the cloud

of gas emits its own light—it is not scattered light. The atoms in the gas are excited by the light of the embedded stars which, due to the electrons falling back to lower levels, create the light. The embedded stars are young stars. We can know this from the form of the light they emit; they are of the O-type or close to it. In a plot of brightness as related to the colour of the light, these stars appear where very young stars should appear. Some may only be a few 100,000 year old. In this way, we can say that M42 is a star nursery, even if I find this a somewhat silly description. And it is the detailed properties of the light that tells us this. When we look at it all we see is the beauty of the green glow of the nebula and the brilliant stars in it.

Good old Burnham tells us that M42 is somewhere between 1600 and 2000 light years away, with a good degree of uncertainty. Distance is always a critical element to grasp the reality of what we are looking at in the eyepiece. To be a bit more accurate, I had a look at the website of Hipparcos. It is not exactly your usual chart (you have to get used to it) but there was a parallax angle for 3 of the members of the trapezium of 1.85 mas, which gives approximately 1700 light years. So Burnham's figures are right. This distance is measured geometrically by measuring angles. The nature of the light is

continued on page 5

President's Message

As usual, we have started slowly this year, but as Spring approaches, things are starting to get busy. I have just sent out an e-mail reminding those of you who have registered your addresses with us about the events of the next two months. At the beginning of March, a small group went down to Boundary Bay for the first Messier Marathon. They reported seeing a few Messiers but it was not a Marathon.

Coming up on March 16 is the Artificial Star Party, where you can get help checking out your telescope and learn how to do it yourself. Then on March 22, you have the opportunity to meet some of the members of the Bremerton Astronomical Society, who are coming up for a visit to the Space Centre. On March 28/29, weather permitting, the second Messier Marathon is being planned at the Boundary Bay viewing site. Contact Jason Rickerby or Doug Montgomery for more information.

A new event for us this year is National Dark Sky Week (April 1 to 8), which was initiated by a high school student from Virginia. The concept is simple; ask everyone to turn off their outside lights and then go out and look at the sky. It is not only a light pollution initiative, but also an attempt to get people to experience the night sky as it should be seen. For more information, see: <http://>

continued on page 5

2003 Vancouver Centre Officers

President

Bill Ronald 604-733-7036
ronaldb@shaw.ca

Vice-President

Nicole van den Elzen 604-501-2656
nicole@deepskyobjects.ca

Secretary

Ron Jerome 604-298-3292
jerome3292@shaw.ca

Treasurer

Marc Verschuere 604-986-1485
marcver@shaw.ca

Librarian

William Fearon 604-939-1895
williamfearon147@hotmail.com

National Representatives

Pomponia Martinez 604-215-8844
pomponia@telus.net

Bob Parry 604-215-8844
robpar@telus.net

Membership

Dan Collier 604-732-6046

Chair, CARO Committee

Bob Parry 604-215-8844

Director of Telescopes

Phil Morris 604-734-8708

Public Relations

Norman Song 604-299-7924
norman_song@telus.net

Speakers

Barry Shanko 604-271-0615
barry.mail@intouch.bc.ca

Merchandising

Doug Montgomery 604-596-7058
moondoug@home.com

Nova Editor

Gordon Farrell 604-734-0326
gfarrell@shaw.ca

Webmaster

Jason Rickerby 604-502-8158
rickerby@dccnet.com

Greeter

Greg Price 604-377-5547
glm-price@telus.net

Trustees

Sally Baker 604-324-3309
Lee Johnson 604-941-5364

About RASC

The Vancouver Centre, RASC meets at 7:30 PM in the auditorium of the H.R. MacMillan Space Centre at 1100 Chestnut St., Vancouver, on the second Tuesday of every month. Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$51.00 per year (\$26.00 for persons under 21 years of age) and can be obtained by writing to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd numbered months. Opinions expressed herein are not necessarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor, mailed to the address on page 5, or uploaded to SpaceBase™ at 604-473-9358, 59.

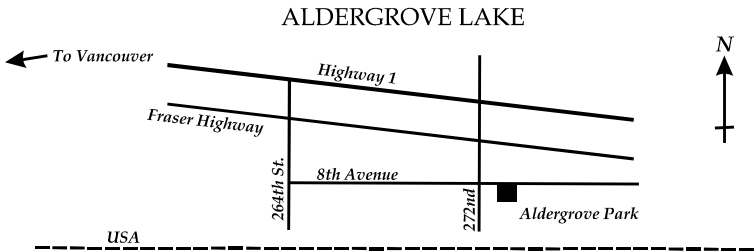
Advertising

Nova encourages free use of its classified ads for members with items for sale or swap. Notify the editor if you wish your ad to run in more than one issue.

Commerical Rates

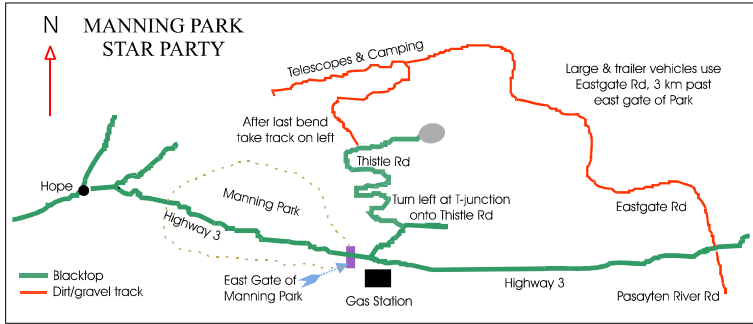
1/2 Page: \$25.00 per issue
Full Page: \$40.00 per issue
Rates are for camera-ready, or electronic files. Payment, by cheque, must accompany ad material. Make cheque payable to: RASC Vancouver Centre.

Observing Sites

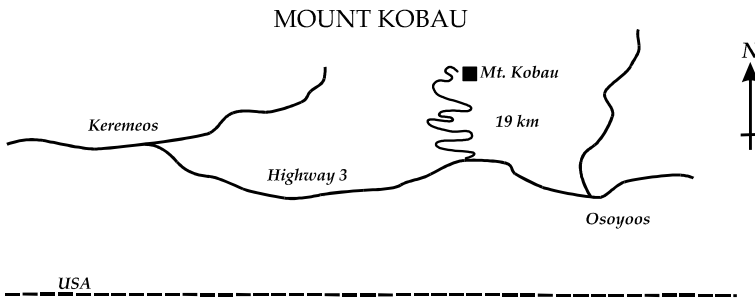


Dale McNabb Observatory in Aldergrove Lake Park (RASC Vancouver Centre's regular viewing site)

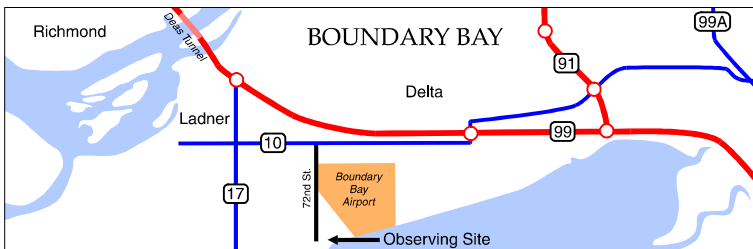
Contact Mike Penndelton (604-888-1505) or Howard Morgan (604-856-9186)



Site of the annual star party organized by the RASC Vancouver Centre



Site of the annual Mt. Kobau Star Party organized by the Mount Kobau Astronomical Society



Site of the regular Thursday night star party. On the dike at the foot of 72nd St.

continued from page 2

not important, but all the other properties we can only find by looking at the detailed structure of the light we see.

Light gives us the story of a nebula and its stars. Radiation is our only contact with these objects, but the light can change on its way to us. It changes colour—in some extremes it becomes radio waves—and then it tells us the story of the universe, not only of a nebula. Lately, some new results have been published, such as the measurements made by the MAP satellite. We should have a look at that at some other time. In the meantime let us be enthralled by the beauty of Orion and M42 and its green light. ★

continued from page 3

www.nationaldarkskyweek.htmlplanet.com/

Finally, on April 11/12 we will hold our first Sidewalk Astronomy event of the year. It will be at English Bay as usual, but if we have enough volunteers, we might also set up at Kitsilano Beach. Let's hope for clear skies and a good turnout by both the public and our members. ★

ASTROCOMPUTING

SpaceBase™ (604-473-9358,59). Affiliated since 1992 with RASC Vancouver, our link to RASC Net, RASC Members only chat area. Future data distribution hub for CARO Project. Features include latest HST images, current world space news and astronomy programs. Provides a file uploading facility for submitting articles and imagery to Nova.

LIBRARY

The centre has a large library of books, magazines and old Nova's for your enjoyment at the GSO. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

RASCVC on the Internet

<http://members.shaw.ca/rascvan/>
or <http://www.rasc.ca/vancouver>

H.R. MACMILLAN SPACE CENTRE

The Pacific Space Centre Society is a non-profit organization which operates the H.R. MacMillan Space Centre and Gordon M. Southam Observatory. Annual Membership (\$30 Individual, \$65 Family) includes a newsletter, Discounts on Space Camps, special programs and lectures, Vancouver Museum Discounts, and free admission to the Space Centre. Admission to the Space Centre includes: Astronomy shows, Motion Simulator rides, multimedia shows in GroundStation Canada, and access to the Cosmic Courtyard Exhibit Gallery. For Membership information, call Mahi Jordao at 604-738-7827, local 237 for information. You can also reach them on the Internet at <http://www.hrmacmillanspacecentre.com/>

MEMBERSHIP HAS ITS PRIVILEGES!

New members, did you know? The Vancouver Centre has 8 telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10" diameter. For more information see Phil Morris, Director of Telescopes in the lobby of the GSO *after* the members meeting. All telescopes are to be picked up and returned at the GSO. The loaner period is for one month, to be returned after the next meeting. Telescopes are not allowed to circulate outside of these meetings. You can now reserve 2 different telescopes per year and use what is left at the end of the meeting anytime. Phil can be reached at 604-734-8708.

Your greatest opportunity as a member of the R.A.S.C. is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get active! Take in the club meetings; engage other members with questions; come out to observing sessions (also known as "star parties"), and, by all means, volunteer to take part in our many public events.

Observing takes place at the Dale McNabb Observatory in the Aldergrove Lake Park, located in Langley, on 8th Avenue, just east of 272nd Street. We are there most clear nights. Contact Mike Pennedlton at 604-888-1505 or Howard Morgan at 604-856-9186.

RASC
1100 Chestnut Street
Vancouver, B.C.
V6J 3J9
604-738-2855

Pictures of the Night Sky

by Ron Jerome

The postie pushed the mail through the slot in the door. Among the items that fell on the floor was a catalogue from one of the local colleges offering a myriad of continuing education courses. I sat at the kitchen table, leafing through the possibilities: Glassblowing with Pyrex; How to Earn Money as a Speaker; Sugar Gumpaste Flowers; Acting, Theater for the Terrified; Past Life Regression; Martial Arts Combo Dragon Temple; and Astronomy, Adventures in the Night Sky.

In university, I had a roommate who had taken an introductory astronomy course because he needed a science credit. Although I don't recall that he actually competed it (or many others), he had had some very positive things to say about it. Besides, wasn't the media full of Hubble Space Telescope photographs, that wonderful eye candy that makes looking at the stars and planets so appealing? When you gaze up at the night sky, nothing really looks like those pictures, but maybe that's because it is all too far away. With a good telescope I had no doubt that I would be able to see some of those wonderful images for myself. I signed up for the astronomy course.

Cary Smielek, the instructor, was setting up an overhead projector as his class began to arrive. He was probably in his late thirties, about five foot six inches

tall, with brownish hair and a smile that made it immediately clear he was about to embark on something he really enjoyed. Fifteen of us had agreed to appear every Tuesday night at 7:00 p.m. for the next eight weeks. Ages ranged from twenty to sixty and the knowledge level ran from slightly above zero to Mr. Sixty who had actually taken some star photos.

Cary began by providing a list of reference sources, then followed up with a brief tour of what was out there to be seen. He introduced the constellations with a series of connect-the-dots overheads and proceeded to describe how the ancients had conceived of all sorts of wild and fantastic images from the collection of hundreds of tiny points of light in the sky. Starting with the Big Dipper seemed quite logical. Even I knew that one. As it turned out, some of the younger audience were not acquainted with the term *dipper*, which might have been as old as those who had named that constellation. He provided names for many of the more prominent stars, of which quite a few had an Arabic origin. As it turned out, much of the best early astronomy had been done in that part of the world.

"How big do you think the moon is?" Cary asked, "the full moon." We all agreed that it looked to be somewhere between a quarter and a loonie in size. "If you hold your little finger up at arms length, it will completely

cover the moon. That is one degree." We all doubted his statement, but had to wait until after class to prove him right. He went on to explain how distances were measured in degrees, minutes and seconds. Suddenly I felt stirrings of my high school geometry and university trigonometry, two classes that had caused me no end of grief. Did I still have those old texts around? I pulled my course confirmation slip from my pocket to be sure I had not inadvertently signed up for Past Life Regression.

One evening class was planned outdoors, at a local park. Being October, it was weather dependent. One of the problems with being a star gazer in the Pacific Northwest is the high probability of low visibility. A typical week's weather forecast looks something like this:

Monday - cloudy, with a chance of showers
Tuesday - cloudy, with a chance of rain
Wednesday - rain
Thursday - rain, sometimes heavy in places
Friday - i n t e r m i t t e n t showers
Saturday - cloudy
Sunday - cloudy, with sunny periods

It is this last glimmer of hope that keeps the local astronomical community going. Besides, it is only like this for half of the year.

We met Cary in a parking lot

continued on page 11

Artificial Star Party

by Seamus Dunne

When: 12:00 noon, Sunday
16 March 2003 (light rain or shine).

Where: Hillcrest Park on Clancy Loranger Road (north side of Nat Bailey Baseball Stadium at Ontario St. and 33rd Ave, Vancouver).

This star party is all about getting your telescope out of mothballs and giving it a spring tune-up while visiting with fellow astronomers. Last year we had a fairly big turnout and it was a great success. Long-time members got to visit with old friends and meet new members while sharing their knowledge. I hope we can repeat it this year. It's intended to help members get the best performance from their equipment, regardless of its optical design. An artificial star is used for testing the optical performance of a telescope system—the primary mirror, a secondary mirror and an eyepiece as a complete, aligned system. Why make an artificial star when there are already zillions in the sky? We use this because we can see it under more controlled conditions that create closer-to-perfect seeing conditions. Why not use a real star? An artificial star can be made steady, bright, and motionless. The word motionless bears repeating. Further, no motor drive or polar alignment is required, so any errors here are eliminated. Certainly the star Polaris could be used, eliminating the need for motor-driven optics,

but if you've ever tried this sort of test on Polaris, or any star, you will know that sufficiently steady atmospheric conditions required for this testing occurs very rarely, perhaps only hours per year.

A star test, whether the star is artificial or real, is intended to reveal defects in your telescope's optical system, defects perhaps you didn't know were there. In many cases these defects simply require a minor adjustment to remedy, in other cases there is no simple remedy. An example of the former is a collimation error; an example of the latter is an imperfectly figured lens or mirror. Nevertheless, even a small adjustment in your telescope's collimation can bring about a remarkable improvement in performance and greatly increase your enjoyment of it.

The artificial star, which I have made from an old projector, has a 50-watt quartz-halogen lamp at its heart. Light from this is reflected by a condenser mirror through a small aperture stop, then through a microscope objective. The result is a dazzling point of light approximately one tenth of a millimetre in diameter, with a very high colour temperature. The star is placed at a distance of 50 to 100 metres from the scope and aimed at it. Misleading results are obtained if the scope is not a considerable distance from the star. For the test, you must very critically observe the appearance of the star using high

magnification while moving the eyepiece just inside and outside of focus. I hope to publish construction details about the artificial star in a future issue of *NOVA*.

A cool, overcast day is best; this provides the best 'seeing.' When it's good, the artificial star's diffraction circles and Airy disk appearance is as steady as still photograph. However if the sun is shining then the seeing deteriorates and the star appears to squirm, making evaluation more difficult.

We will also need volunteers who are experienced in star testing of telescope systems. Although some defects (pinched optics) can be easily detected, other defects (such as turned-edge) take a trained eye to recognise. So I am asking here for those with some expertise to come out and assist us.

If you plan to attend keep these things in mind:

- this is a free service to RASC members.
- you should plan to have your equipment set up and cooling off about one hour before we start; tube currents inside a scope make this evaluation very difficult.
- there is no need for any clock drive or electricity in your equipment.
- however, you may wish to bring a laptop computer and CCD imaging equipment and capture images of the star. You must supply your own power.

Upcoming Events

March

16 – Artificial Star Party. See p. 7 for details.
28-30 – Messier Marathon 2

April

1-8 – National Dark Sky Week
11-12 – Sidewalk Astronomy 1
25-26 – Sidewalk Astronomy (rain date)

May

10 – Astronomy Day
15 – Total Lunar Eclipse

June

1 – Fraser River Festival
26 – 2003 General Assembly begins

July

1 – 2003 General Assembly ends
25-26 – Manning Star Party & Manning Outreach
26 – Mt. Kobau Star Party begins

August

2 – Manning Star Party ends

12 – Perseid meteor shower; observing at Aldergrove Lake
TBD – Mars Week

September

26-27 – Merritt Star Party

October

17-18 – Sidewalk Astronomy 2

December

9 – AGM

continued from page 1

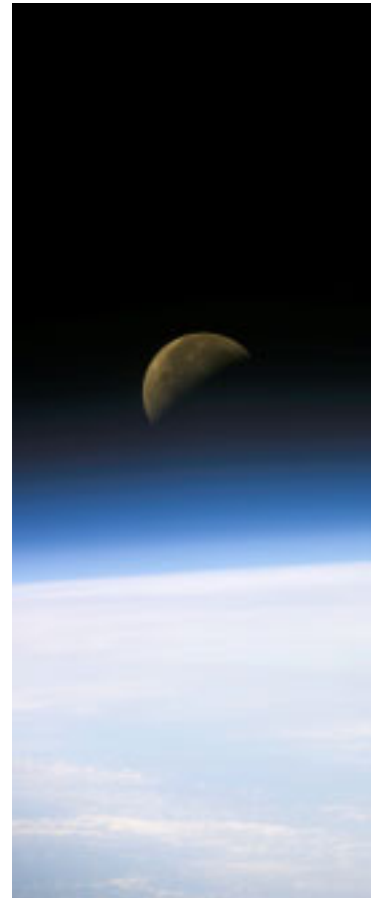
2, was scheduled to dock with the station about 7:55 a.m. PST, Tuesday, February 4. Progress 10 will deliver new supplies, equipment and fuel to the station. At the time of the loss of Columbia, it seemed that the cargo aboard the Russian supply ship would be appropriate to sustain the current crew of the ISS until June, if necessary. The continued assembly and future existence of the ISS depends on space flight.

The first component of the ISS was placed into orbit November 20, 1998. Since then, 16 Space Shuttle flights, 17 manned and unmanned Russian flights and 50 spacewalks have serviced the Station. In six visits by crews to the station, 6000 meals and 4000 snacks weighing 3629 kg (8000 lbs.) have been consumed. The international effort to make the ISS a reality involves more than 100,000 ground personnel and 500 contractors. Canada's

major contribution to the Station is the Canadarm2. The next generation of this famous robotic arm uses a Mobile Base System. The system allows the arm to travel along the ISS. The Canadarm2 is also more flexible than the original Canadarm, giving it a greater ability to bend, rotate, and manoeuvre around the large and complex environment of the Space Station. The arm is also designed so that certain components can be swapped in space for new units when the old ones wear out or fail. Unlike the Canadarm, the Canadarm2 is designed to be repaired in space and probably will never return to earth.

The entire Space Station is
continued on page 12

A quarter moon is visible in this oblique view of Earth's horizon and airglow, recorded with a digital still camera aboard the Space Shuttle Columbia. Photo taken 26 January 2003. Image courtesy of NASA.



First Astronomical Light

by Dan Collier

Acquired on February 25, 2003 at 0330 UT at Southam Observatory using the Cookbook CCD camera illustrated in the last issue of NOVA. The camera was operating in 378 by 242 mode and exposure

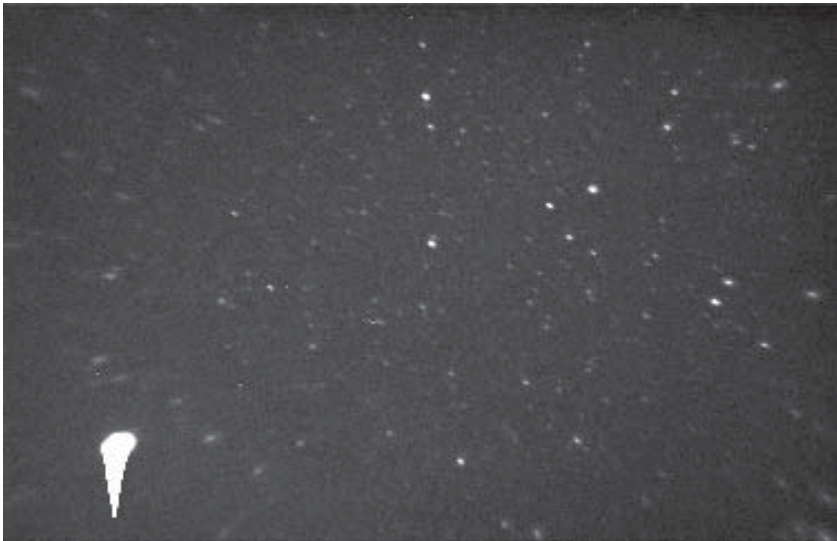
was 30 seconds. The raw data was reduced to a Windows bitmap with a Quick Basic program. A dark frame was subtracted, the data were reduced to 8 bits by clipping the

MSBs, and the contrast and brightness were adjusted for printing. No attempt was made to correct for the rectangular pixel shape that the TC245 CCD exhibits in this mode. As a result, the image is slightly elongated in the horizontal direction.

Because the Observatory's 500mm Cassegrain telescope is not in commission at present, a small achromat lens (30mm focal length, 10mm diameter) was installed in front of the CCD to produce this image.

The field is centred on 5h 7m, +51° in northwest Auriga and is

12° wide. North is to upper right. At lower left, the Snowcone-Like Object (SLO) is actually Capella, which conveniently drifted into view to enable identification of the field. The camera was resting on a table in the dome and pointing



straight up. The stars trailed about 2 pixels during the exposure.

Ambient temperature was about 5°C. The camera's Peltier cooler was operated at only 10 percent capacity because the water system was not connected. Thermal charge in the raw image was quite large, approximately half-scale in terms of analogue-digital units (ADUs).

In parts of the field, stars are not well imaged. The lens is rather strongly curved (f/3), leading to significant off-axis aberrations. Moreover, the CCD is not centred in the camera (by about one mm)

due to the design of the cold finger. In areas where the stars are better focused, the camera has reached magnitude 9.5—in other words, all the stars in *Uranometria 2000.0* are visible. That is pretty good for an untracked exposure with an

aperture of 10 mm. With the Peltier operating at full capacity, mag 21 should be achievable on the 400 mm Overton Telescope.

The only object of interest is R Aurigae, the

brightest star at top centre. According to the *Observer's Handbook*, it is a long-period variable (LPV) with a period of 459 days and mean maximum visual magnitude of 7.7. *Burnham's Celestial Handbook* gives the range 6.8–13.7. Evidently, R Aur has been caught near its predicted Feb. 17 maximum. LPVs are quite red, and the CCD's red-friendly response has added to R Aur's prominence. However, at the deep red wavelengths which the CCD favours, LPVs exhibit less variation than they do by eye. *

February 1, 2003: Anomalous Co-Occurrences

by Dan Collier

The following is absolutely true.

1. On the morning of Saturday, February 1st, 2003, I woke up earlier than usual and couldn't get back to sleep. While that is not unusual in itself, what is unusual is that I put the TV on. It was tuned to a station broadcasting news of the space shuttle *Columbia*. In January 1986, I learned of the *Challenger* explosion after waking up unexpectedly and turning on the TV set.

2. *Columbia* was lost within a day of the anniversary of the *Challenger* loss. *Challenger* was lost after a problematic launch on a winter day, and the low temperatures played a role in the events. *Columbia* was lost after a problematic launch on a winter day in which low temperatures may have played a role in the events.

3. The crew of the *Columbia* numbered seven, including an African-American man and two

women. The crew of the *Challenger* numbered seven, including an African-American man and two women. During *Columbia's* flight, I had an eerie impression about the crew. One of the women in *Columbia* reminded me a lot of one of the women killed in *Challenger*. The other woman in *Columbia* reminded me a lot of the other woman killed in the *Challenger*.

4. The first shuttle to enter space was the *Columbia*, in 1982, in a flight I witnessed from start to end on TV. Heat-shield tiles were damaged and lost on that ascent. The most probable cause of the *Columbia's* eventual loss nearly 21 years later was damage to, or loss of, heat-shield tiles on ascent. I witnessed that final flight from start to end on TV also (NASA Select TV).

5. Our family car was 32 years old, a 1971 model. The space shuttle program was officially inaugurated in 1971. Our car made its last voyage on the day of

Columbia's planned return. And like *Columbia*, our car did not return home from that voyage.

6. One of the subjects of a book I was writing at the time was the crash of an airliner in the midwestern U.S. due to a hydraulic system failure. While *Columbia* orbited on its last voyage, the brakes on our family car had a total hydraulic failure. Just before the upset that caused *Columbia* to tumble and break apart, telemetry indicated problems in the hydraulic system.

7. The television show *The Simpsons* lampooned the space shuttle program by depicting a re-entry mishap. The crew of the fictional shuttle, the *Corvair*—named after a model of car manufactured, like ours, by General Motors—had only one scientific experiment to deal with, an art farm. *Columbia's* crew had 80 scientific experiments to supervise—and one of them was an art farm. *

continued from page 6

near Ferguson Point in Lord Stanley's Park, adjoining the Teahouse Restaurant. Walking toward the water, away from the building, the street lamps and the trees, provided the better part of a one hundred twenty degree view of the night sky. The first sighting was the obligatory Big Dipper, followed by Queen Cassiopeia. Her traveling companion, King Cepheus, was harder to find and I began to realize that I really did need to memorize those dotted patterns if I were going to find my way around. "Look, there is the Great Square of Pegasus," someone called out. I could not find it and it was much later that I realized the enormity of some of the constellations. I was not used to imagining things on such a grand scale.

The other standout of the night was the star Capella, in the constellation Auriga. This bright, sparkling jewel seemed to change colours—red-to-blue-to-white—giving the impression that it must be a plane or some other man made object. Having looked at this star in the northeast sky from my front driveway, I had often thought it was a light on a radio beacon on Mt. Seymour. When the sky tour ended, we thanked Cary for his efforts and he gave one of those smiles, which said: "A few more converts." He had put out the bait.

Three months later I was sitting in his next class. He talked of the impending lunar eclipse, explaining why they only happened occasionally. Then there

was the life and times of comets—Hale-Bopp had arrived. These were phenomenon to be enjoyed live, not just in pictures, although he teased us with Hubble images and some Jupiter shots from Mt. Palomar. It is certainly possible to buy astrophotographic prints of both interesting and exotic of objects to hang on the wall. A good earth based 35mm camera or emerging CCD technology with computer enhancements can deliver eye catching and artful presentations of the glories of the night sky. I wanted to take my own, not buy someone else's handiwork. I have shot woodlands, meadows, mountains and marmots. I even have a series of photos of a sunrise in Patagonia, taken outside the tiny village of El Chalten, at the base of the Cerro Torres. As the towers turn from granite to gold with the dawning light, a full moon hangs in the sky. I hadn't realized at the time that I had already married photography with astronomy.

Between the first and second set of classes, I paid my first visit to a telescope store, looking for a pair of binoculars. Jeanette Elgas, the proprietress, was a short, excitable brunette, who, in a matter of a few minutes, completely overwhelmed me. She was handling three different customers, including one on the phone, as well as directing the dismantling of a fancy looking telescope that had just been sold. Walking into her store was like diving to the bottom of a very deep pool. By the time I returned to the surface, I was gasping for breath. I left after 30

minutes, unable to digest all the information being provided. All I could remember of the first conversation was that I was likely to spend about \$300. When I went back a couple of weeks later, the din had subsided. Jeanette showed me three pairs of high quality binoculars. After describing their respective features, she pointed to the second: "This is a very popular choice and if you don't like them, bring them back." I liked what she said. I was hooked.

My Christmas presents that year were the binoculars (from my wife) and a new tripod (from my kids). Santa gave me a few clear nights. My first treat was Saturn. I could clearly distinguish a ring around the sixth planet in our solar system. While the image was small, there was no question about what was out there. It was no longer just a yellowish dot in the sky. Then, even more wonderful was Jupiter. Not only could I see this giant satellite, I could resolve four tiny points of light encircling it. The dance of the four moons was exciting and I eventually learned the names of each of the players. To do this necessitated a trip to my favourite second hand bookstore, where I acquired a 25 year old astronomy text. It was a place to start.

We were visited by Comet Hale-Bopp over much of that winter. Newspaper and magazine articles recounted a variety of comet sightings that had already occurred during my lifetime, all preludes to the current show. I

continued on page 13

continued from page 7

- you **must** bring the eyepieces and Barlow lenses which give you maximum magnification, typically 200x or more. High magnification is necessary. Insufficient magnification makes this test inconclusive.

- be prepared to do any optical testing by observing straight through your scope, that is, without a star diagonal in place. You will get more useful results. Later, you should do the same testing with your usual set-up—that is, using a star diagonal. Only by eliminating the star diagonal can you be certain it is not a problem.

- bring any special tools you need to access & adjust your optics: small screwdrivers, pliers, wrenches, hex wrenches, masking

tape, notepad... sledge hammer if you need it. We simply supply assistance and advice; we cannot supply tools.

- bring a lunch. This sort of thing is not accomplished in 15 minutes.

- rain gear

- Dobsonian owners: For your comfort bring a *stable* platform or table about 30 inches high on which you can set up your scope since you will be looking at the artificial star which is on the horizon. Maybe we'll have one there, too. Without this, you must crouch very low for a long period in order to look through your eyepiece. A folding chair would be useful, too.

Where: Hillcrest Park on Clancy Loranger Road (north side of Nat Bailey Baseball Stadium at Ontario St. and 33rd Ave,

Vancouver). You can park and unload on Clancy Loranger Road. The road is only 100 metres long. There is free parking for lots of cars and a public washroom there, too.

When: Sunday 16 March, 12 noon until 4pm.

Weather: Ideally the day will be cool and overcast. Colder is better, so dress for a cold day. We decided that we would cancel the date in the event of anything more than very light rain (scope owners likely will not want to allow more than a few drops on their equipment). If we should cancel during the event, I suggest we then retire to Solly's Bagels for coffee at 28th and Main.

Questions? Seamus Dunne (604-327-7262) seamus@xtcfx.ca *

continued from page 8

designed to never return to Earth. Even at such a high altitude (400 kilometres above earth) the Station barely skims over Earth's thin atmosphere. Our atmosphere combined with the solar wind causes the ISS to slow as it travels around Earth. The Space Station requires an occasional external

boost to keep it in orbit. This is one of the Space Shuttle's main roles.

The last Shuttle to the ISS was the Endeavour in late November. It remained until early December 2002. The docked spacecrafts made several orbital passes over the Whistler region during that mission. On December 2, 2002 at

17:35 PST, the ISS and Endeavour made a historic pass as the last time a shuttle and the ISS were seen together.

To follow the International Space Station as it orbits Earth on the internet, visit <http://heavens-above.com> and on NASA Television. *

continued from page 11

could not remember witnessing a single one. Where had I been? I was not going to let this one escape.

Knowing almost nothing about taking pictures of the night sky objects, I took my 35mm to what looked like a darkish kind of site—a school yard in my neighbourhood. There I set up my tripod, mounted it with my 35mm camera and set about capturing a trophy for my wall. I had had beginners' luck on the same spot a few months earlier with my lunar eclipse attempts. They were not magazine quality, but I was encouraged enough to look forward to this next attempt. Again, as luck would have it, I succeeded in capturing 3-4 satisfactory results. The success of these efforts and the pictures in *Astronomy and SkyNews*, to which I now subscribed, only led me to raise my sights.

As Cary Smielek's second course wound up, he took the opportunity to include us in the audience at a meeting of the Royal Astronomical Society of Canada, Vancouver Centre, a disparate group of amateur astronomers, ranging from the bright lights of the mathematics and science departments of the city's two major universities, to industry specialists and finally to those who just had an abiding interest in what was going on in that dark space overhead. I eventually joined the group and soon discovered the loaner program: take a scope home and try it; you will like it. I did.

My favourite planets became even more entrancing, and the Orion Constellation hosted a series of enticing possibilities that had been out of reach, until now. I even glimpsed the night skiers on the Grouse Mountain chairlifts, traveling upside down as they returned to the top for another run. I immediately understood the concept of image reversal. I had resisted buying a telescope for several reasons. First, was the weather factor. Second, I was not sure about spending money on something I still was not entirely convinced I was devoted to, in spite of all the hours of reading and looking I had already done. Third, I really wasn't sure what my primary viewing interest would be.

Riding the bus to and from work each day took me past a number of pawn shops on the edge of the Hastings Street tenderloin district. B.C. Collateral Loan was bigger and better kept than the rest. Two weeks before the next Christmas arrived, I caught sight of a dark blue telescope, a 5 inch Skywatcher, astride a set of wooden legs, in the middle of the feature window of that shop. One of the employees had an interest in telescopes and had convinced management to feature a few, along with the cameras and binoculars that were acquired in the ordinary course of business. I felt better upon learning it was not an unredeemed pawn of unknown origin, and I took it home that weekend. Over the next couple of years I treated myself, friends, neighbours, and even total

strangers, to glimpses of the heavens. It began to look like it just might become a hobby after all.

The idea of astrophotography had gotten sidelined, although, along with some eyepiece upgrades, I had acquired the necessary tools. Frustration set in, however, when I eventually tried to marry my reflector to my camera. They didn't get along at all on the first date. I could not get the target objects to focus properly and I couldn't figure out the right combination of lenses and adaptor parts to make it work. Explaining my problem to various people elicited little help, since most of the good photographers were using refractors and digital equipment. I felt like a throwback to another era. Perhaps I would have to get a different scope. A chance call to a technician at Harrison Scientific Instruments Ltd. put me in touch with Boyen, whom I had never met. "No worries," was his response to my perplexing puzzle. "I can help you out. We're having a star party at the Cypress parking lot on Saturday night. Join us if you can."

There were probably eight scopes hard at work by the time I arrived, all attended by really intense star gazers. Boyen greeted me in short order. A balaclava circumscribed an oval face, adorned with a bushy mustache. That was all of him I could make out, as he was wrapped up in at least two layers of clothing, trying to stay warm through the night vigil. I was overwhelmed with help

continued on page 14

continued from page 13

in setting up my equipment and during the course of the night, I had the opportunity to look through some serious telescopes. One sported a two inch eyepiece and, as I stood peering through it, I felt as Alice must have when she entered the looking glass. I could reach out and touch each of the new born stars wrapped in the dust cloud of the Orion Nebula.

“So, Boyen, can you help me with my camera problem?” I asked hopefully, having discussed my frustrations at length with him on a couple of prior occasions. He replied in his

patented response: “No worries.” After ensuring I had all the requisite pieces he began stacking lenses and adaptor parts like a construction engineer. His first attempt to get a focused image fell short, but after rearranging parts

of the sequence he had success! With everything screwed down tightly, he pointed the scope at the moon. “Should be easy to try this out and it will be a very short exposure.” He covered the aperture, while I triggered the cable release to open the shutter, then opened it and counted, “One



Missouri, Two Missouri.” After the second count, he covered the scope, instructing me to close the shutter. We did this several more times. “See how those work out.” I stayed for a couple of hours, until my feet were so cold, I was no

longer sure they were mine. Even Boyen’s special libation failed to reach them. I packed up and headed home.

My wife took the film to Costco the following Monday and waited the obligatory hour to get the photos finished. That evening, we examined the pictures together.

After a few moments of careful, silent scrutiny Anne succinctly summed up the results: “The moon,” she observed in a serious tone, “looks like a football with little bite marks all around the edges.” What could I say? The critics had spoken. While she set about preparing dinner, I reviewed the results a few

more times. It was hard to argue with her comments and I could only conclude that the group of technicians in charge of the Hubble Space Telescope would not have to start looking for new career opportunities just yet. ✪



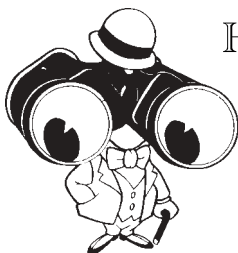
Galaxy Cluster Abell 1689
Hubble Space Telescope • Advanced Camera for Surveys

NASA, N. Benitez (JHU), T. Broadhurst (The Hebrew University), H. Ford (JHU), M. Clampin (STScI), G. Hartig (STScI), G. Illingworth (UCO/Lick Observatory), the ACS Science Team and ESA
STScI-PRC03-01a

RASC MERCHANDISE

Available for purchase after meetings:

Calendars	\$12.00
Beginners' Guides	\$15.00
Observers' Guides	\$20.00
Star Charts	\$10.00
Cloth Crests	\$11.00
Lapel Pins	\$ 6.00
L.E.D. Flashlights	\$22.00



HARRISON SCIENTIFIC INSTRUMENTS LTD.

**Telescopes - Binoculars
Microscopes & Accessories
Weather Instruments**

DEALER FOR

**ZEISS • PENTAX • CELESTRON •
BUSHNELL/BAUSCH & LOMB • SKYWATCHER •
OLYMPUS • STEINER**

CD-ROM Astronomy Skymaps for PC's
"Like New" Consignment Equipment

1859 West 4th Avenue, Vancouver, BC V6J 1M4
tel: 604-737-4303 fax: 604-737-4390
e-mail: harscope@direct.ca

Vancouver Telescope Centre

Telescope, Binocular, Microscope Specialists
PROPRIETOR JOHN HARTLEY
2565 Yew Street, Vancouver, B.C. V6K 2E3
Phone 604-738-5717

New

Telescopes, Binoculars, Spotting
Scopes and accessories by

**MEADE
CELESTRON
BAUSCH & LOMB
OMCON-KOWA
BUSHNELL
SWAROVSKI-STEINER
SWIFT-PENTAX
CARL ZEISS-NIKON
SKY WATCHER
VISTA ANTARES**

Assorted eyepieces, barlows,
star diagonals 0.96" - 2"

New and second hand

Visit our Web site at

www.vancouvertelescope.com

e-mail: john_hartley@telus.net

Second Hand

JMI NGC Micro-max (C8/GP mount)	\$ 300.00
Meade 4" Ring Tube C/Weight	\$ 45.00
Meade APO Universal Thread Adaptor	\$ 39.00
Meade 2080 8"SC + many accessories	\$ 2500.00
Meade Pictor CCD Autoguider model 201XT	\$ 599.00
Meade 10" f/4.5 Starfinder/equatorial mount plus accessories	\$ 1500.00

Now in stock: Pentax XL Eyepieces