

# NOVA NOTES

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THE NEWSLETTER OF THE HALIFAX CENTRE OF THE RASC

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**Notice of Meetings** and Other Stuff

## EDITOR'S REPORT: BY SHAWN MITCHELL

**A** New Year starts in a couple of days and while I sit here putting this issue of Nova Notes together, I can't help but reminisce about the past year. Being my first year as Editor I had a lot to learn about putting a publication together (still more to learn). Some how with a lot of help and support from members who have submitted articles, 6 full issues containing about 8 pages per issue were published this past year. Each issue had about 210 copies printed and distributed. There were some delays with a few issues, several which were caused by our printing company. This issue is being printed by a new



## ASTROPHOTO OF THE MONTH – LEONID METEOR IN THE BIG DIPPER

Our President Clint Shannon took this photograph on the night of Nov 16/17 during the Leonid Meteor shower, capturing a Leonid as it passed through the bowl of the Big Dipper (Ursa Major).

company as test. Hopefully they will work out ok and I will not have to look any farther and the printing delays will be reduced. Putting Nova Notes together is not that hard of a job, it typically takes two evenings. What takes a long time is preparing Nova Notes to be mailed. Folding, stuffing and addressing 200 envelopes takes about three-hour by myself or about one hour if I Shanghai someone to help. For the coming year I am looking forward to continuing to be the Editor of Nova Notes. However all editors need help

in producing Nova Notes. Nova Notes needs the support of as many members as possible by submitting articles, observing reports, photographs, sketches, news notes or anything else that you as a member might think others in the Centre might find interesting. Oh, Mary Lou I haven't lost your other articles. As you can see I had a lot of articles that are of time sensitive content so I published them first. Your other articles will be in the next issue I promise.  $\Omega$



**NOVA NOTES**, the newsletter of the *Halifax Centre of the Royal Astronomical Society of Canada*, is published bi-monthly in February, April, June, August, October, and December. The opinions expressed herein are not necessarily those of the *Halifax Centre*. Material for the next issue should reach the editor by February 19<sup>th</sup>, 1999. Articles on any aspect of astronomy will be considered for publication. "Letters to the Editor" or to our resident expert: GAZER are also most welcome. Contact the editor at:

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**PRESIDENT'S CORNER BY:  
CLINT SHANNON**

The propane heater/furnace installation has been completed in the warm

room building at the St. Croix Observatory. Everyone can now look forward to the comfort of a lovely warm room this winter when the bones become chilled from observing in the roll-off. A word of advice though, is tendered in regards to igniting the unit. If you have not been checked out in how to properly start the heater you must pay particular attention to the instructions found at the bottom of the Heater otherwise it will not ignite.

Editors note:

Detailed instructions for the start up and shutdown procedures for the propane furnace will be posted on the wall beside the furnace as soon as we figure them out.

I would like to take this opportunity to wish one and all best wishes for a wonderful holiday season and a happy and prosperous new year. Ω

## NOVEMBER MEETING

REPORT:

BY ROY BISHOP

Rainy skies on November 20 meant that the observers had to join the armchair members and talk about astronomy. The regular monthly meeting was held in its usual location, in the lower theatre of the Nova Scotia Museum of Natural History on Summer Street, Halifax.

President Clint Shannon opened the meeting one day late, at 00h 00m 00s UT November 21. After extending a warm welcome, Clint pointed out the remarkable bargain available through membership in the RASC: one receives a year's membership in the Society, a \$21

Observer's Handbook, a \$24 subscription to Sky News, an \$80 subscription to the RASC Journal, an invaluable subscription to Nova Notes, borrowing privileges at the Centre's library, use of the Centre's St. Croix Observatory, and ten servings of Ralph Fraser's refreshments. For only \$36, this is certainly a "wonderful investment"! In addition, the annual Observer's Calendar, the Beginner's Observing Guide, T-shirts, lapel pins, bumper stickers, a key chain, and crests are available at modest additional cost.

Clint announced that the December meeting would be held on the third Friday as usual (rather than the second Friday) since the meeting room had been assigned to us for that day. The December speaker will be Dr. Larry Bogan who will describe GPS, the impressive, satellite-based Global Positioning System.

Mike Boschat, Observing Chairman, gave his monthly "What's Up", a review of anticipated observing highlights for the next month. Among these were conjunctions of some bright stars and planets with the Moon, and the Geminid Meteor Shower.

The Centre's Annual Meeting then took place. Various officers gave their reports for the past year:

Secretary Mary Fraser read the minutes from the 1997 annual meeting which, on motion by Shawn Mitchell and seconded by Dr. Michael Falk, were approved.

President Clint Shannon reviewed many highlights of the past year, including the Caribbean total solar eclipse, receipt of the RASC Service Award by Dave Lane, progress on the St. Croix Observatory, and a very successful Nova East (see Clint's report elsewhere in this issue). Clint also announced the members of the Executive for 1999 (\* indicates a new person):

Honorary President: Dr. Roy Bishop\*  
President: Clint Shannon  
1st VP: Pat Kelly  
2nd VP: Ian Anderson\*  
Secretary: Steve Tancock\*  
Treasurer: Dave Lane  
Nova Notes Editor and Observatory  
Chairman: Shawn Mitchell  
Representative on National Council:  
Dave Lane  
Librarian: Dr. Michael Falk\*  
Observing Chairman: Michael Boschat  
Councillors: Dave Chapman, John  
Jarvo\*, Tony Jones  
Auditor: Walter Zukauskas

Second Vice-President, Darren Talbot, reported a \$556 profit from sales of Calendars, Handbooks, etc.

Nova Notes Editor, Shawn Mitchell, said that each issue of Nova Notes costs about \$200 (about equal amounts for printing and postage), or \$1200 for the year. Shawn reminded members that he could only print what he receives.

Dave Lane, National Council Representative, reported a busy but relatively quiet year for the national Society. Handling of memberships is being transferred back from the University of Toronto Press to the RASC national office. An upcoming issue is the current use of Handbook revenue to subsidize membership fees.

St. Croix Observatory Chairman, Shawn Mitchell, reported that phase 1 (warm room and roll-off-roof building) of the observatory is nearly finished, including installation of solar power and a computer. Refinements in the near future include a propane furnace, camp cots, and a Mary's Lou. Phase 2 (a third building housing a large telescope) requires both planning and funding.

Mike Boschat, Observing Chairman, reviewed observing highlights of the past year, including the February eclipse, the rare triple conjunction of Moon, Venus and Jupiter on April 23. The bright

supernova in M96, increasing solar activity, the spectacular Leonid Meteor Shower early on 17 November, and the launch on 20 November of the first part of the International Space Station.

At this point, Clint called for formal approval of these reports. Approval was moved by Larry Bogan, seconded by John Jarvo, and passed.

Treasurer Dave Lane reported that the Centre's equity has increased dramatically over the past few years, thanks primarily to donations and fund raising associated with the St. Croix Observatory. Including the Observatory upon which over \$18 000 has been spent, the Centre's worth is close to \$33 000. Dave used colorful pie charts to display the various sources and sinks of Centre funds. Net income for the past year was \$726. Approval of the Treasurer's report was moved by Shawn Mitchell, seconded by Sherman Williams, and passed.

The main speaker for the evening was long-time member and incoming Librarian, Dr. Michael Falk. Michael is a physical chemist, recently retired from the National Research Council Laboratory in Halifax. His topic was "Astronomical and Numeric Names for the Seven Days of the Week".

Michael pointed out that the origins of the 7-day week go back at least 3000 years. Although the day and the lunar month have obvious connections to the sky, what is the significance of the 7-day week? Aside from a social need for an interval shorter than the month, to the nearest integer, seven is the number of days between the principal phases of the Moon. Also the Sun, Moon and five naked-eye planets constitute seven obvious celestial objects moving against the stellar background. In some languages the names of the days of the week are related to these bodies. However, in other languages the names have

numeric or religious roots. During his talk Michael presented the names of the days of the week in dozens of languages, many of which I expect few in the audience (myself included) have even heard of: Old Norse, Irish Gaelic, Urdu, Hindi, Basque, Harari, Tajik, Maltese, Farsi, ...!

A point that came out in the several questions and discussion stimulated by Michael's talk is that everyone on Earth agrees what day of the week it is, although the system of months and new years varies amongst cultures.

Furthermore, there is no way to know what day of the week it is except by keeping track of the days continuously (unlike the hours of the day or of the cycle of the months which is linked to the rotation of Earth or the seasons, respectively).

Prior to adjournment for Ralph Fraser's refreshments, Clint chaired an informal discussion concerning the spectacular Leonid meteor shower witnessed by several in the audience less than four days earlier, in the midnight to dawn hours of November 17. All who had been outdoors that night agreed that with its numerous, bright fireballs, the 1998 Leonids provided the best meteor shower seen from Nova Scotia in living memory.

Among the fortunate observers that night were myself, Larry Bogan, Mike Boschat, Paul Evans, Dave Lane, Shawn Mitchell, Clint Shannon, Darren Talbot, and Sherman Williams. What will the 1999 Leonids be like?  $\Omega$

**PRESIDENTS REPORT:  
BY CLINT SHANNON**

**T**he first notable event of the year was the Total Solar Eclipses which was attended

by a respectably sized contingent of Halifax Centre members in February.

A used 17.5 mirror was purchased and *will* be installed in a Dob truss type scope which will be built by our centre some time in the new year. A used Celestron Ultima 8 SCT was purchased to replace the C8 that we lost and will be mounted on a pier, polar aligned at St. Croix and will be available for astrophotography in addition to visual observing.

Our waterfront public observing did not take place due to the weather in July and August. Nova East 98 was considered by all that attended to be a success. There were 40 registrants and families. NE brought in \$ 1685. We spent \$877 on NE expenses, which resulted in a profit of approximately \$880.

St. Croix Observatory's warm room building's interior was painted, the roll-off roof tracts were painted black to prevent them from icing up, protective rubber rain flaps were installed over all door locks and the solar panel was installed on the roof *and* the wiring connected. The observatory was well utilized by members this year.

It is with regret that I must report that for all practical purposes the Planetarium located at Dal has ceased operations due to the burn-out of our Centre volunteers who have operated it since it was rejuvenated.

On a sad note, we witnessed the passing away of Dr. Murray Cunningham *who* was our long-time Honorary President. As a result of the Cunningham family designating the Halifax Centre as the beneficiary for donations, \$700 was recieved toward the St. Croix Observatory project.

On a happy note, the Centre is indeed fortunate to have Dr. Roy Bishop as our new Honorary President.

The Halifax revised Simon Newcomb Award Criteria was accepted by the National Council and

Dave Chapman was appointed to the National Awards Committee.

David Lane added to his laurels by becoming the recipient of the Service Award in 1998.

Our present Centre membership is at 164 which is up from 135 in 1997. Ω

## TREASURER'S REPORT: BY DAVID LANE

**F**or the Halifax Centre of the Royal Astronomical Society of Canada 1997/98 has been another fine year. At our September 30<sup>th</sup> year-end, we had a surplus of \$726 despite a few extraordinary expenditures this year. In continuation of past accounting practices, the observatory capital expenditures were expensed. If those expenditures had been capitalised, our operating surplus would have been \$3394.

Membership levels were up significantly this year reaching nearly 170 members, up from 135 members in 1997. I attribute this increase to membership retention (due of the inclusion of SkyNews and the new *Journal*) and the flexible membership year (which allows new members to join right away).

Revenue from donations represented 44% of our revenue compared to 30% from membership fees. These donations were received from two sources: the generosity of our members, who donated towards the 17.5" telescope to be built for St. Croix and donations received for the St. Croix Observatory Project in memory of our deceased Honorary President, Murray Cunningham. We are grateful to the Cunningham family who chose our project as the sole beneficiary of memorial donations.

Nova East was also a big money maker this year, earning \$807. Congratulations to those members who worked hard to make Nova East a

success for those who attended and for the Centre's coffers. This increase in earnings from Nova East was unfortunately offset by an over 50% drop in earnings from merchandise sales.

Work on phase one of the St. Croix Observatory was essentially completed this year with another \$2668 being spent. The lost Celestron C8 telescope was written off in this fiscal year, which represented a \$1566 loss to the Centre (it is shown on the Income Statement under Miscellaneous Expenses). However, during the summer, the Centre was able to replace the C8 with a much better (used) Celestron Ultima 8 telescope for only \$1100, an excellent deal indeed. This telescope will be permanently mounted at St. Croix in the spring. The other major capital expenditure this year was the purchase of a 17.5" mirror, which will be soon built into a second telescope for St. Croix. Finally, the accounting records for the Centre have become computerized using the software package "Quick Books". This has made the maintenance of the centres records quite easy and allows for up-to-date statements to printed at the push of a button each month. However, at the recommendation of Ian Anderson (last year's treasurer), the paper ledger of the "cash" account has been maintained.

### Significant Details of the 1997/98 Income Statement

#### REVENUES:

**Membership Fees \$2,177:** Membership fees were up this year by over \$500 simply because we have many more members than last year.

**Life Members Grant \$432:** Our grant from National Office was the same as last year and represents 30 life members.

**Donations \$3,177:** Members donated \$2,477 towards the observatory and telescope project. Donations in

memory of Murray Cunningham resulted in \$700.

**Interest \$87.83:** This was earned in our money market account. Our bank account earns no interest.

**Sales of Merchandise (net) \$447:** Merchandise sales were weak this year when compared with last year.

**Nova East (Net) \$807:** Nova East attendance was very good this year and expenses kept in check resulting a large net profit — over 4 times that of last year.

**Miscellaneous \$5:** One \$5 observatory key fee was collected this year.

#### EXPENSES:

**Meetings and Newsletter \$1,398:** \$278.63 was spent on our meeting treats and meals for our out-of-town speakers. Nova Notes cost us \$504.85 to print and \$630.03 to mail it to our members and other Centres. This is higher than last year because more issues were printed and distributed to our larger membership.

**Office Administration \$167:** Half of this cost is the rental of a post office box. Next year it will be the Atlantic Space Sciences Foundation's turn to pay for it.

**Insurance \$500.00:** This is entirely the insurance for the observatory.

**Educational Activities \$118:** This item paid for 800 of our centre and "getting started in astronomy" flyers.

**Awards and Donations \$81:** This item paid for the Burke-Gaffney Award prizes for both this year and last.

**Observatory \$2,691:** Construction continued at the St Croix Observatory. This figure also includes the \$1 land lease paid in April and a few consumable items. Capital spending to date on the observatory has totalled \$18,724 since the project was started in the spring of 1996.

**Miscellaneous Expenses \$1566:** This item is entirely the write-off of the lost Celestron C8 telescope. This amount

was determined from its book value (\$1916) less several items (valued at \$350) that were not with it when it was lost.

#### Significant Details of the 1997/98 Balance Sheet

##### ASSETS:

**Cash \$4,892:** On September 30, 1998, our cash balance at the Toronto Dominion Bank in Halifax was 4,891.96. There were four outstanding cheques totalling \$327.91. About mid year, the TD Bank account in Kentville was closed after a new TD account was established at the Bayer's Road TD branch.

**Undeposited Funds \$122:** \$112 in cheques were on hand but not deposited at year end.

**Accounts Receivable \$43.50:** As of September 30, 1997, the Discovery Centre, for merchandise sales, owed us \$43.50.

**Merchandise Inventory \$1,453:** This consists of 28-T-Shirts, 36-BOGs, 72-1999 Calendars, 52-centre Pins, 2-key chains, and 6-bumper stickers.

**Investments \$2,000.00:** The Halifax Centre holds a money market account with the Toronto Dominion Bank.

**Accrued Interest \$278.29:** Accrued interest on our money market account as reported on quarterly statements from the TD Bank.

**Estimated Library \$2,630:** Our library's value is probably an estimate of all money spent there since the beginning. An addition of only \$28.50 (three used books) was added to the library this year.

**Observatory Equipment \$3,010:** There was a lot of activity in this account this year. As previously noted, the lost Celestron C8 was written off, and a used Ultima 8 and 17.5" mirror were purchased. In addition, two telescopes (an 80mm refractor and a 6" Maksutov) donated to the centre by Mike Boschat were added to the books at a nominal value of \$1 each.

**Est'd Misc. \$452.54:** Other holdings of the Centre are estimated at \$452 in value. Historically, a \$250 estimate of their value has included a slide projector, a mirror grinding apparatus, and some slides and material available for use at the planetarium.

##### LIABILITIES:

**Accounts Payable \$856:** National Office was owed for 100 1999 calendars at \$8.56 each.

**Fees Owed to National Office \$36:** The fees of a new member who signed on at the September meeting had not been sent to U of T at year-end.

Respectfully submitted,

David Lane, 1997/98 Treasurer. Ω

#### WHAT'S UP: BY MIKE BOSCHAT

##### January

Sun.3 - Quadrantid Meteor Shower peaks 7pm - rates about 100/hr, sharp maximum of 1 or 2 hours only. Fast meteors.

Fri.15 - Double Shadow Transit on Jupiter at 1:51 am

Tue.19 - Venus 2degrees South of a 2 day old Moon.

Fri.22 - Double Shadow Transit on Jupiter at 4:31 am

Sun.31 - Penumbral Lunar Eclipse - visible in Western Canada.

##### February

Tue.2 - Regulus occultated: Disappears behind the bright limb at 7:27 pm. Reappears from the behind the dark limb at 8:05 pm

**ROYAL ASTRONOMICAL SOCIETY OF CANADA, HALIFAX CENTRE**  
 COMPARATIVE INCOME STATEMENT FOR 1996/97 AND 1997/98 MEMBERSHIP YEARS

	<b>YEAR</b>	<b>YEAR</b>	<b>Increase</b>
	<b>Oct '97 - Sep '98</b>	<b>Oct '96 - Sep '97</b>	<b>over 1996/97</b>
<b>REVENUE</b>			
Membership Fees	\$2,177.06	\$1,649.87	\$527.19
Life Members Grant	\$432.00	\$432.00	\$0.00
Donations and Obs. Donations	\$3,176.91	\$3,599.02	-\$422.11
Interest	\$87.83	\$73.84	\$13.99
Handbook Sales (Net)	\$0.00	\$122.56	-\$122.56
Sales of Merchandise (Net)	\$0.00	\$1,016.39	-\$1,016.39
Nova East (Net)	\$0.00	\$169.11	-\$169.11
Miscellaneous	\$5.00	\$729.21	-\$724.21
<b>Total Income</b>	<b>\$5,878.80</b>	<b>\$7,792.00</b>	<b>-\$1,913.20</b>
<b>EXPENSES</b>			
Meetings & Newsletter	\$1,398.49	\$1,124.48	\$274.01
Equipment & Supplies	\$0.00	\$189.30	-\$189.30
Office Administration	\$167.36	\$81.83	\$85.53
Legal Expenses	\$0.00	\$25.00	-\$25.00
Educational Activities	\$112.70	\$0.00	\$112.70
Insurance	\$500.00	\$500.00	\$0.00
Awards & Donations	\$81.34	\$20.00	\$61.34
Observatory - Operating	\$2,690.73	\$6,427.22	-\$3,736.49
Miscellaneous Expenses	\$1,565.57	\$660.04	\$905.53
<b>Total Expenses</b>	<b>\$6,516.19</b>	<b>\$9,027.87</b>	<b>-\$2,511.68</b>

**ROYAL ASTRONOMICAL SOCIETY OF CANADA, HALIFAX CENTRE**  
 COMPARATIVE BALANCE SHEET FOR 1996/97 AND 1997/98 MEMBERSHIP YEARS

	YEAR Oct '97 - Sep '98	YEAR Oct '96 - Sep '97	Increase over 1996/97
<b>ASSETS</b>			
Cash	\$4,891.96	\$5,901.33	-\$1,009.37
Undeposited Funds	\$122.00	\$0.00	\$122.00
Accounts Receivable	\$43.50	\$139.00	-\$95.50
Handbook Inventory	\$0.00	\$258.51	-\$258.51
Merchandise Inventory	\$1,452.63	\$1,504.69	-\$52.06
Investments	\$2,000.00	\$2,000.00	\$0.00
Accrued Interest	\$278.29	\$197.92	\$80.37
Estimated Library	\$2,629.50	\$2,601.00	\$28.50
Observatory Equipment	\$3,009.99	\$2,473.56	\$536.43
Estimated Miscellaneous	\$452.54	\$452.54	\$0.00
<b>Total Assets</b>	<b>\$14,880.41</b>	<b>\$15,528.55</b>	<b>-\$648.14</b>
<b>LIABILITIES</b>			
Accounts Payable	\$856.00	\$1,393.55	-\$537.55
Est. Handbook Payable	\$0.00	\$752.75	-\$752.75
Fees owed to National Office	\$36.00	\$36.00	\$0.00
Other Liabilities	\$0.00	\$0.00	\$0.00
<b>Total Liabilities</b>	<b>\$892.00</b>	<b>\$2,182.30</b>	<b>-\$1,290.30</b>
<b>EQUITY</b>	<b>\$13,988.41</b>	<b>\$13,346.25</b>	<b>\$642.16</b>
<b>Observatory Investment to Date</b>	<b>\$18,723.62</b>	<b>\$16,055.36</b>	<b>\$2,668.26</b>

Tue.16 - Annular Solar Eclipse visible in Indian Ocean.

Thu.18 - Venus 1.8d N of Moon at 2 am Jupiter 2degrees North of Moon at noon.

Mon.22 - 4 bright planets in evening sky for next 2 weeks.

Tue.23 - Venus 0.1degrees North of Jupiter at 5 pm !!

### Planet Roundup

**Mercury** Low in southeast before sunrise.

**Venus** Visible with difficulty during evening twilight very low in west-southwest.

**Mars** Rises after midnight, visible in night sky rest of 1999.

**Jupiter** 30 degrees in southwest at end of evening twilight set in Mid-evening.

**Saturn** Sets after midnight. Rings tilt from 14.2 degrees on Jan.1 to 1.1 degrees in late August then close slightly to 19.1 degrees in late December. Ω

### 98 LEONIDS FROM AVONPORT: BY SHERMAN WILLIAMS

Since my initial posting, on Nov 17th, I have played through the tape I made while observing the Leonids and took a better account of meteors observed and their distribution with time. In addition, I have added my observations made early morning, Nov 18. The results are in two tables at the end of this.

Observations made November 17, 1998, from my backyard in Avonport, Nova Scotia, a dark location. Sky conditions varied from clear to occasional hazy cloud but not enough to spoil the view of a

TERRIFIC SHOW!! As I stated before, it is the best meteor shower that I've experienced. My best observations were made from 02:15 AST to 04:45 AST. I used the audio track of my video camera for recording on site comments which I later reviewed; a summary follows:

About 70 to 80 percent of the 206 meteors sighted were brighter than 1<sup>st</sup> (+1) magnitude (in the magnitude scale of brightness, +2 is dimmer than +1, brightest stars are in the range of 1st and "0" magnitude, negative values are even brighter.



Photo by Clint Shannon, 98 Leonid

Sirius is a very bright star, brighter than 0, about -1.5). A large number of Leonids were -1 to -6 or so. Two were equal to or greater than -10, and lit up the area. One of these (at 04:12 AST) left a glowing cloud. Immediately following the brilliant burst in Gemini, the cloud began bright, elongated and "S" shaped; 5 minutes later, its more diffuse, slowly drifting, remnant patch could still be seen with the unaided eye. Others also left glowing trails that persisted up to a minute later, especially if viewed in binoculars.

I found the overall average was slightly better than 1 meteor per minute but the pattern of meteors was frequently "clumpy" and with some running parallel in the same area of sky. There would be two,

three or four bright ones, one right after another within a few seconds of each other, occasionally two at a time. Then there would be a few minutes to wait for the next spectacle. The occasional sporadic meteor (the normal, random distribution of "shooting stars" that appear) would show in great contrast slow, dim, and off the Leonid track (the light streak of a Leonid traces back to the star group, Leo). It did seem that a number of Leonids seemed to flash and zip across near the Dippers, through Gemini, above

Orion and Cassiopeia, however, good ones were seen in all parts of the sky.

Although not a "storm", it was a lively spectacle, well worth the early morning effort in below freezing temperature. I've watched a fair number of meteor showers over the years and certainly what was most

outstanding about this one was the concentrated number of speedy streaks of light, ending in beautiful bursts of brightness.

The numbers of actual meteors seen, recorded over half hour intervals:

- Date: November 17, 1998
- 02:15 AST to 02:45 AST
- 34 Leonids 2 sporadic
- 02:45 AST to 03:15 AST
- 28 Leonids 3 sporadic
- 03:15 AST to 03:45 AST
- 43 Leonids 1 sporadic
- 03:45 AST to 04:15 AST 3
- 5 Leonids 3 sporadic
- 04:15 AST to 04:45 AST
- 17 Leonids 1 sporadic.

I did observe intermittently from 04:45 to 06:30, interrupted by: hazy

cloud, making tea, a catnap and finally daylight, but even so about 39 more were recorded, some backlighting the cloud like lightning.

As contrast, I was out again early November 18, under clear sky conditions; numbers were greatly reduced.

Actual meteors seen, recorded over half hour intervals:

Date: November 18, 1998

02:00 AST to 02:30 AST

3 Leonids 1 sporadic

02:30 AST to 03:00 AST

4 Leonids 0 sporadic

03:00 AST to 03:30 AST

2 Leonids 1 sporadic

2 were between magnitude -1 and -2  
2 were in the vicinity of magnitude 1 and 0.

7 were magnitude 2 or less.

That is about how the Leonids were for me. Judging from other reports, it appears that we in Atlantic Canada were well positioned for the '98 show!  $\Omega$

### 98 LEONIDS FROM ST. CROIX: BY DARREN TALBOT

**W**ell just got in from a well worthwhile trip to St. Croix to observe the Leonids, and WHAT A SHOW!!! Present were myself, Mike B., Shawn, John Connelly, Paul Evans and Joanne Miriam.

Mike and I arrived at 1:50am and observed easily 50 meteors in about a 40% sky in the north, northeast which was clear of cloud. The skies cooperated occasionally and the Leonids flew all over the place. Here's the numbers I counted. Limiting magnitude was ~ 4-5.3mag.

1:50am-2:30am 50

2:30am-3:00am 53

3:00am-3:15am 28 several -2 to -7mag meteors

3:15am-3:30am 38 several bright ones leaving 30-50sec trains

3:30am-3:45am 40 had a burst of 7 meteors in 10 seconds

3:45am-4:00am 41 one at -10mag est. and another at -11mag with trails lasting over 3 minutes, simply amazing!!

4:00am-4:15am 38 one est. at -13 or brighter left a train

lasting 3 min forming an 'S' shape as it dissolved. Ended recording, noticed that they dropped in numbers after 4:30am many had bright terminal bursts.

One worth mentioning was as Mike and I were at Bayers Road shopping Petro Canada getting gas we saw a fireball with a bright terminal burst and a loud 'POP!' sound was heard very close to the bright burst. It was a VERY good night!  $\Omega$

### 98 LEONIDS FROM ST. CROIX: BY MICHAEL BOSCHAT

**W**ell, the weather was looking pretty poor for the Leonids a few days before the peak period of November 16/17 but by some very good fortune, no massive solar flares or CMEs (Coronal Mass Ejections) to mess up the weather patterns it was clear, at least for the most part of the night.

As I was waiting for Darren Talbot to give me a lift to St. Croix I went on my balcony about 1230 am and was looking about for Leonids, off to my northeast I saw my first two Leonids they were about -4 magnitude and came less than one second apart. I then looked towards Orion and just saw the beginning of a Leonid but the roof being in a bad spot hampered my view, nonetheless I saw a flash of blue that had to be at

least -6 or -7 magnitude and also a curious "crack" sound. It was probably 1:10 am or so when Darren came by we then proceeded to get some gas, we were seeing fireballs even as we drove to get gas and on our way to St. Croix. I should mention at the gas station, a -3 or -4 fireball went by over Zellers, again I heard a slight "crack" even with the car window up and banged the window by Darren had also seen and heard it too. Thinking back I am wondering what the station attendants were thinking about 2 people pointing at the sky and freaking out so to speak.

We finally arrived at St. Croix, I had counted 22 Leonids on the way out which should most likely be added to the ones we saw. After getting there and opening the site, As I got my camera ready for some great fireball pictures. I set up and began photographing, we noticed that the south part of the sky was becoming wishy-washy with cirrus and some alto-cumulous clouds but it held to that area. After a bit the others arrived, John Connelly, Shawn Mitchell, Paul Evans and Joanne Miriam. We were treated to an excellent display of fireballs everywhere falling below the horizon, some bright as -12 magnitude. There were 3 that left persistent smoke trails that I took photographs of. Some Leonids came 3 at a time which was impressive, even though the sky was cloudy to our south we had an occasional burst of illumination indicating a good fireball had flared in that part of the sky.

But I was not having any luck capturing a Leonid through my camera field, I was hopping to different parts of the sky that were clear faster than the fireballs were coming. Shawn gave me some good advice and said to point the camera at one part of the sky and don't move it. Well, I went back to Ursa Major and

as I was lining up a shot a -6 Leonid went right through the field!!!! I couldn't believe it, as a matter of fact with what happened later on I will never believe. I ran out of film, no problem I brought 4 rolls, I began to rewind and it happened, the film had ripped from the container and was wrapped around the other reel, I went into the warm room to look. Later I was told the film could have been saved, but when I had the back open I had a flashlight that was a tad bright even with red filtering over it, plus the fact I was "probing" to find the end of it to take out. Once that had been done in my opinion it may have been fogged.

Wanting more pain I put a new roll in the camera and it was lined up ok with the sprockets, I shot that roll and after it too had run out I began the rewind process again, well needless to say what happened again to that roll! It too had ripped, but in all the first roll had some meteors and 3 smoke trails. To be mild I think I would have made a good person for the Jerry Springer show. The camera in one part of the studio and me in the other with the "bleeps" going and then me jumping out of my chair attacking the camera then being help back by the security guards on the show.

In any event the number of Leonids we saw were "great" at least 300 per hour, hopefully someone may correct me on this, Stephen Tancock in Eastern Passage saw some good fireballs with long persistent trains. Yep, the Leonid meteor that went through Gemini and left a "S" shaped train that lasted more than 10 minutes was nice, I should say that I noticed the first two trains were almost circular in shape and drifted north to south while the "S" train drifted from south to north, which gave an indication of the upper atmospheric wind directions.

Yes, I can hardly wait till Nov.17, 1999. Oh, I should mention,

the camera worked flawlessly the next night when I took shots from the roof of Dal University, but by then the Leonid activity had sort of died, "What...what's that you say Mr. Murphy's Law? Wait till next year?" Yep, I can hear Mr. Murphy laughing and planning for me now for next years shower.  $\Omega$

**98 GEMINIDS FROM  
AVONPORT  
BY SHERMAN WILLIAMS**

**G**EMINIDS: a very good showing, one of my more productive meteor observing sessions, however, it did not come up to the Leonids nor was I expecting it to.

Mid evening on the 13th I noticed that the sky, inspite of being clear at sunset, had filled in with patches and hazy cloud; I returned inside disappointed that I probably would not be seeing any Geminids this night. Just before 11 pm, I looked out again, however, to my surprise, stars were looking at me from every direction. Out I went to sample the Geminid activity.

In the first 15 minutes (11:19 to 11:34) 15 Geminids were logged! With that introduction I decided it was worth going for more. A few minutes were taken to get a little better prepared for observing and withstanding the cold: camcorder, lounge chair with pad, and down-filled sleeping bag. Just before midnight, I was back, ready for at least an hour of observing. I used the camcorder to record observations and times (only a voice record against the time background, no actual video images of meteors) Following 1:15 a.m. I retired for some sleep, however, by 6 a.m. I was back combining a little more Geminid observing with an anticipated view of ISS and Endeavor which were due to

go over about 6:30. The ISS was predicted to make one of the better passes of this series.

A summary of observations follow:

Time (AST)	Geminid Meteors Counted	
2319 to 2334 Dec 13	15	
0000 to 0015 Dec 14	18	
0015 to 0030	12	
0030 to 0045	15	+1
sporadic		
0045 to 0100 "	9	
0100 to 0115	13	+1
sporadic		
0600 to 0615	10	
0615 to 0630	6	+1
sporadic		
0630 to 0645 "	4	

Total Geminids 102 and 3 sporadics for Total of 105 meteors in 135 minutes of observing. In terms of brightness: (I tried to estimate a magnitude for most sightings) 2 were brighter than Mag 0 (one about -1 and one as bright as -2 or more). 12 were about Mag +1 to 0, 22 were about mag +2 to +1. 19 were about Mag +3 to +2, 23 were about Mag +4 to +3, 12 were +4 to +5 or dimmer.

Certainly the Geminids were not the spectacular show that the Leonids had been on Nov 16-17, matching neither, brightness, numbers, nor speed. However, they were still quite an active showed much more numerous, for example, than most Perseids I've watched.

Most had trails that seemed to be in the order of 5 degrees or so, a few however were in the 10 to 20 degrees range. I recorded one as having a trail nearly 40 degrees long. I only saw two streaks of light (trains??) that persisted as long as 3 or 4 seconds, most others lasted only for an instant.

Compared to the Leonid experience one could see that these were slower and lacked the number of bright bursts. Overall one had the impression that the Geminids were further away (being dimmer and

slower) whereas the Leonids gave one the impression of being really close.

The sky was clear and my location at Horton Bluff (Avonport) was dark, except for the observing period from 6 to 6:45 a.m., the seeing overhead was as good as Mag. 5.8; very few clouds were present. Temperatures varied between +1 and 0 deg C. I had a full view of the sky. For most of the period I was positioned looking overhead and eastward (NW to my back).

SPACE STATION, at 0639 the shuttle/ISS came into view, coming out of Auriga in the NW. Its brightness exceeded Capella, probably reaching -1. I was very pleased to discover that they were now two separate objects. When the first was near overhead the second appeared coming out of Auriga, about 20 to 25 degrees behind the first (later, on the CBC news, I had heard they had separated and that Endeavor was preparing for return to Earth).

Based on the second object being dimmer (at most, only about 0 magnitude) I suspected that the first object was Endeavor and the one trailing was ISS. I've noticed in other passes that the shuttle tends to be quite bright. It was quite interesting to see both objects going along, one behind the other, and realize what they were. By 0643 they were passing in the proximity of the crescent moon in the SE and it was just about that time (according to my voice recording) that I saw a +1 Geminid meteor streak overhead, moving almost on the same track of the ISS, as if chasing it.

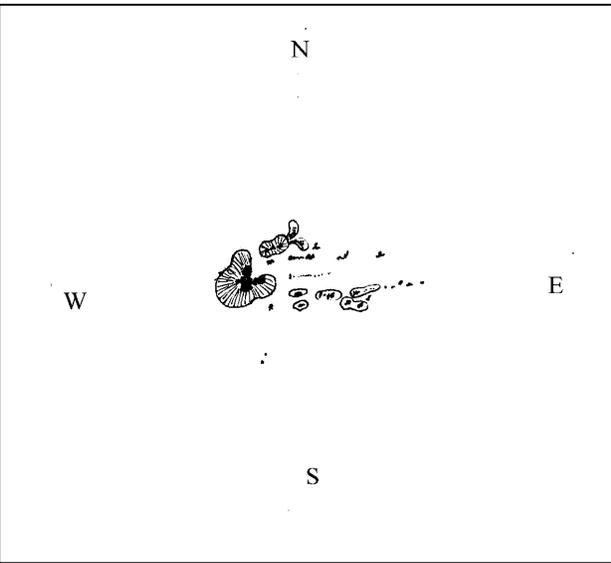
I must also report that at 06:35, as I was awaiting the appearance of the space station, I noted an extremely bright object show itself and then abruptly dim; by then I could see that it was another satellite moving slowly northward. One of its bright surfaces must have caught the

sunlight and directed it my way. In a few seconds it must have brightened to about -8 and just as quickly dimmed to < +2; within a short time, it disappeared.

All in all, it had been a very interesting night/morning of observing!  $\Omega$

## SUNSPOTS GALORE BY MARY LOU WHITEHORNE

I confess. I'm a "lurker" on RASC list – I read it but rarely ever post anything. So, for all you other lurkers out there, by now you are surely aware that the Sun is ramping up its activity at a brisk pace. I have been taking quick peeks at it now and again, with filtered binoculars, looking for big spot groups. But when David Levy gets on the list and



declares that he's never before seen so many spots on the Sun, it makes one sit up and take a little more notice!  $\Omega$

Out came the binocs and sure enough, there was a BIG juicy looking spot group staring back at me. Hmmm, this really does demand something a little more powerful than binoculars! So, I dragged out my 8 inch Meade SCT and set it up in the windy, - 13 C degree front yard, popped on the solar filter and

prepared to have a good look at the face of everybody's favourite star.

Yes, indeed A most remarkable spot group Well, there was several groups in fact, and lots of faculae and super granulation and all that good stuff that makes us yearn for our very own H-alpha filter. I set out to draw the biggest and most complex spot group and the results are presented here. This is not the biggest or most complex group that I have ever seen (that would have been during last solar maximum, in 1989) but it does beat what's been on the Sun recently!

Now that you've all had a good laugh at my artistic non-ability, get off your duffs and go out there and look for yourselves! Do a better drawing and have it published in Nova Notes! Just imagine, a Nova Notes issue filled with sketches of the Sun. It would be unique among

RASC Centre newsletters in Canada. Oh, and by the way, I was having so much fun freezing my fingers while I was drawing this, that I totally forgot to do a proper spot count! Sorry, David!

Notes on the sketch:  
December 31, 1998,  
11:00 am AST Meade  
2080 LX5, 40 mm Plossl  
50 X magnification  
approximate size of spot  
group: 0.1 Solar  
Diameters North is up.

## NOTICE OF MEETINGS AND EVENTS

### REGULAR MEETINGS

Date: **Regular Meeting — Friday, Jan 15 at 8pm;**  
7pm for the council meeting.

Place: Lower Theater, Nova Scotia Museum of  
Natural History, Summer Street, Halifax.  
Access is from the parking lot.

Topic: **Main Speaker:** Sherman Williams  
**The Night Sky From a Disk and a Desktop**

Date: **Regular Meeting — Friday, Feb 19 at 8pm;**  
7pm for the council meeting.

Place: Lower Theater, Nova Scotia Museum of  
Natural History, Summer Street, Halifax.  
Access is from the parking lot.

Topic: **Main Speaker:** Dr. Bob Hawks  
**1998 Leonid Meteor Shower from  
Mongolia**

### BECOME A ST. CROIX OBSERVATORY KEY HOLDER

For a modest key fee, members in good standing for more than a year who have been briefed on observatory can gain access to the centre's observatory. To become a key holder, contact Observatory Committee Chair, Shawn Mitchell.

### JUST WHERE IS THE ST. CROIX OBSERVATORY?

The Centre's Observatory is located in the community of St. Croix, Nova Scotia. To get there from Halifax (Bayers Road Shopping Centre), follow these simple instructions.

1. Take Hwy 102 (the Bi-Hi) to Exit 4 (Sackville).
2. Take Hwy 101 to Exit 4 (St. Croix).
3. At the end of the off ramp, turn left.
4. Drive about 1.5km until you cross the St. Croix River Bridge. You will see a power dam on your left.
5. Drive about 0.2km past the bridge and take the first left (Salmon Hole Dam Road).
6. Drive about 1km until the pavement ends.
7. Drive another 1km on the dirt road to the site.

8. You will recognize the site by the two small white buildings on the left.

### SCIENTISTS AND INNOVATORS IN THE SCHOOLS

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Karen Rockwell

Scientists and Innovators in the Schools  
Centre for Marine Geology, Dalhousie University

Halifax, N.S. B3H 3J5

494-2831 or outside Metro **1-800-565-SITS**

email: SITS@is.dal.ca

### OVER DUE LIBRARY BOOKS

If you have had a Centre book out on loan for more than two months please return it to the library at the next Centre meeting, or if you need it longer for a project contact the Librarian.

### 1998 HALIFAX CENTRE EXECUTIVE

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