

AURORA

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The Royal Astronomical Society of Canada - Windsor Centre

September 2001



Solar Cycle 23 On The Wane by Bert Huneault

The "peak" in the current solar cycle came and went without too much fanfare. Determining just when maximum solar activity occurred is not an easy task, for the simple reason that "Solar Maximum" is generally a broad period - typically lasting a couple of years - when Old Sol is most active in terms of solar flares, sunspots, solar flux and geomagnetic activity; and these various phenomena do not necessarily coincide in time.

Solar data can be examined in different ways: on a daily basis, or averaged over a period of time such as monthly or annually. Figure 1 (see below) is a plot of mean monthly values of 10.7 cm solar flux. From this graph one could conclude that Solar Max occurred in March, 2000 when the average value of the flux reached 208.

But what if we look at daily values of solar flux?...That could lead to a different conclusion because the flux can be quite high on a specific day even though the average for that month may not be particularly high. An example was March 28 this year, when solar flux reached its highest daily value in Cycle 23, an impressive 274. But if we look at the graph in Figure 1, we see that the mean value for this March was only 178. So, who's the winner in the solar flux department?... March 2000 or March 2001?

And how about sunspots? Well, that can also be a different kettle of fish. Figure 2 (see page 3) is a plot of mean monthly values of sunspot numbers. According to this graph, Solar Max occurred in July, 2000 when the average sunspot value was 236. I've been keeping a daily log of sunspot numbers, and the highest value recorded so far in Cycle 23 was a whopping 401 on July 20, last year; the second highest value was 352 recorded on March 28 this year, the same day that saw solar flux reach

(Continued on page 3)

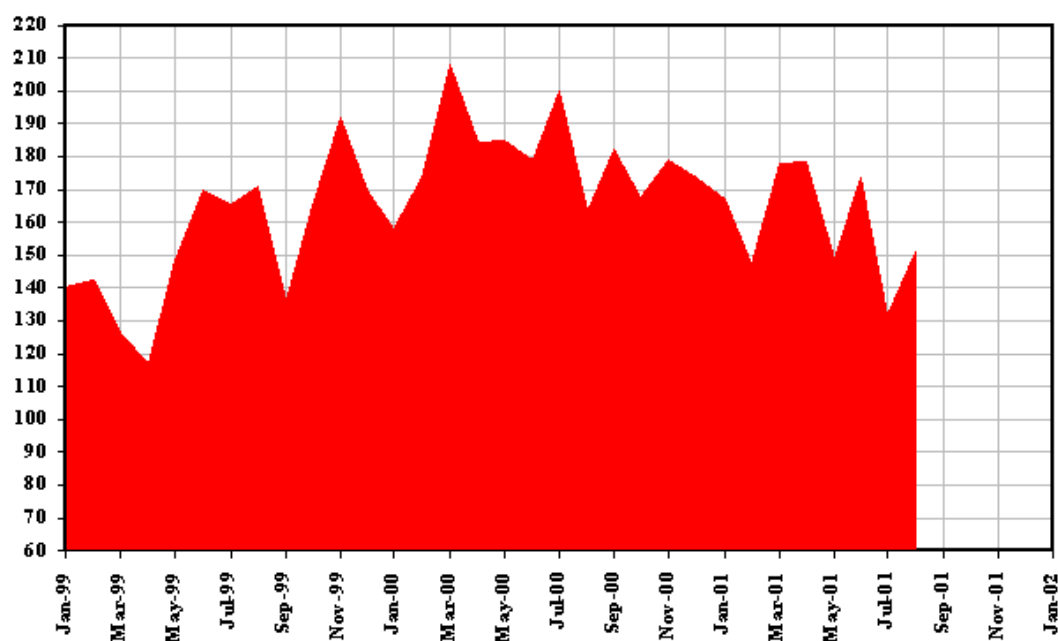


Figure 1: Mean monthly solar flux values

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Calendar of Events

Our next meeting...

Tuesday, September 18, 2001
8:00 p.m.
at
St. Stephen's Church
Howard Road, 1.4 kms. south of
Hwy # 3

Main Speaker...

J. Randy Attwood

Topic...

"Sending a Spider to the Moon"

Activities...

Saturn Occultation: September 10 at 9:07 a.m. Look for the Moon in the early morning sky and then scan the daylight limb with a telescope for Saturn.

Astrofest 2001 Star Party: September 13 - 16 at Camp Shaw-Waw-Nas-See near Kankakee, Illinois.

Zodiacal Light: Look for the Zodiacal Light in the morning sky just before the start of morning twilight for the last two weeks of September and October.

Autumnal Equinox: Fall begins on September 22 at 7:04 p.m.

Double Shadow Transits on Jupiter: The month of October is prime time for observing the moons of Jupiter. On October 5, 9, 13, 16, 20, 21, 23, 27, 28 and 30!!! there will be double shadow transits on Jupiter. Not all of the above events will be visible from Windsor. See the 2001 Observer's Handbook for details.

Council Meeting: Tuesday October 9 at Tim Bennett's house. Meeting begins at 7:30 p.m.

Raffle Drawing: Tuesday October 16 at 9:00 p.m. during our regular membership meeting.

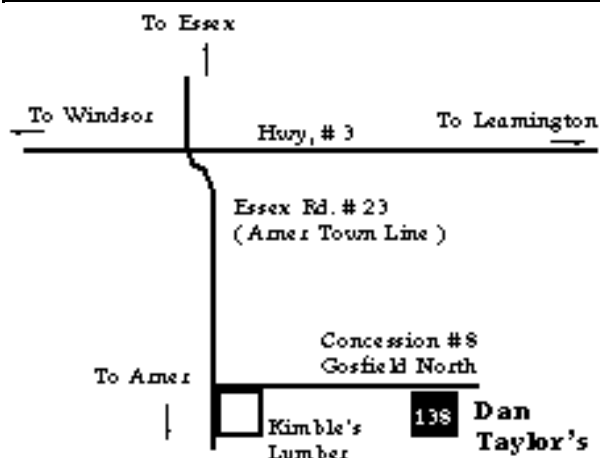
Public Observing Night: Saturday October 29 at Malden Road and Forest Glade Parks.

Observing Nights

Frank Shepley's.....Last Quarter Moon
Dan Taylor's.....New Moon

(please call before showing up)

Maps



Submissions

Aurora is published monthly except for August. The September, November, January, March, May and July issues are full newsletters (usually 6 pages) with a number of member submitted articles. The October, December, February, April and June issues are short flyers (2 pages) with one short article. Submitted articles can be of any length from a paragraph to multiple pages. I can scan pictures and/or diagrams (both prints and film) to support your article and the originals will be returned to you.

Submission deadline is the 1st of the month. I will accept Emails at the address below, floppy disks, or written submissions.

Editor: Steve Mastellotto

Email: smastell@wincom.net

Membership

The Windsor Centre of The Royal Astronomical Society of Canada meets on the 3rd Tuesday of every month (except July and August) at St. Stephan's church. In addition to regular meetings the centre hosts a number of observing nights, a picnic and a December social. Members receive a copy of the Observer's Handbook, the RASC Journal, a subscription to SkyNews magazine and access to the Centre's library and telescopes.

Annual Membership Fees are Regular - \$44.00, Youth - \$27.50 and Life - \$880.00.

Contact Frank Shepley at (519) 839-5934 or visit our website at: www.mnsi.net/~rasc for more information.

Solar Cycle 23 On The Wane (continued)

(Continued from page 1)

a peak of 274. So, can we confidently state that Cycle 23 peaked on the former or the latter date? By the way the exceptionally high solar activity on March 28 resulted in a severe geomagnetic storm a couple of days later, with aurorae seen as far south as Mexico.

Before declaring a winner, we should perhaps consider one more important aspect of solar activity: X-ray flares generated by extremely violent solar explosions. The most powerful flares are classified as M-class and X-class; X-class being the most powerful. My daily solar log shows that in April this year, M-class flares were recorded on 13 days, and X-class flares on 6 days, including April 2nd when the most powerful solar flare ever recorded occurred in the Sun's huge active region No. 9393 which was 13 times larger than Earth! Since April, the number of X-ray flares has declined dramatically; so far this month (August, 2001) only 3 M-class and no X-class flares have occurred. So, should we declare April 2001 as being the most active in the current cycle?

As you can see, it's next to impossible to pinpoint "Solar Maximum" to a specific day or month... It all depends on the solar parameter being tracked. At any rate, we can confidently say that Cycle 23 is now in its downhill progression, MAX having occurred some time within the last several months. But the declining stage can still produce occasional surprises in the form of powerful flares and large sunspots; anything is possible in the months ahead. Today's solar indices (Aug. 14) are not particularly exciting: solar flux is 147; and although the sunspot number was down as low as 59 a couple of weeks ago, it is 133 as I write this. It will probably be another 10 or 11 years before solar activity rises again to the next maximum.

As solar activity fluctuates over an 11-year cycle, it can affect events here on Earth, such as generating magnetic storms, influencing shortwave radio communications, knocking out power lines, producing aurora borealis and disabling equipment aboard satellites, to name a few.

Some people claim + without solid evidence + that weather, stock market performance, agricultural crops and even the length of mini-skirts are affected by sunspots.

Wanna have a little fun?... Were you born during a solar maximum or minimum?... Did the Great Depression occur dur-

ing a scarcity of sunspots?... Was the Second World War fought under an active Sun?... Did you win the lottery on a day when the Sun was exceptionally active?... If you have access to the Internet, find out by going to the "Sunspots in History" page at this URL: <http://spaceweather.com/java/sunspot.html>, scroll down to the Sunspot Plotter section, select a date and click on the Refresh button. Enjoy!

Update (August 30, 2001)... True to form, the Sun has again been "acting up" lately, as it often does during the period shortly following "solar max". At 16:45 UTC on August 25, the large sunspot group AR9591 unleashed a powerful X-class solar flare and hurled a coronal mass ejection (CME) into space. It was the most powerful flare since April 2nd. The event triggered an hour-long radio blackout over parts of

Europe, Africa and the Americas. An inter-planetary shock wave buffeted Earth's magnetosphere on August 27 and triggered aurorae across Canada and the northern United States. One observer, Jody Majko, said: "I watched the aurora here in Winnipeg for about an hour this morning at 1 AM CST. They were such a bright green that stretched across the northern sky that I was able

to see them through all the light pollution in the city." The shock wave was the leading edge of the solar CME that left the Sun on August 25.

X-ray flux from the Sun is measured by satellites, in the wavelength range of 1 to 8 Angstroms (0.1 - 0.8 nanometre). To qualify as an M-class event, the flare's peak flux must have an energy output between 10 and 100 microwatts per square metre, while X-class events (major flares) have a peak flux exceeding 100 microwatts per square metre. Weaker flares (C-class: less than 10 microwatts/sq.m) are usually not considered an "event". Background x-ray flux from the Sun is typically under 2 microwatts/sq.m.

To put the August 25 solar flare in perspective, its x-ray flux peaked at 530 microwatts/sq.m.

But the granddaddy of them all was the whopper which erupted on April 2nd this year; its flux peaked at nearly 2,000 microwatts/sq.m, the most energetic on record.

Yesterday (Aug. 29), a new pair of sunspots (9600 & 9601) appeared near the Sun's northeast limb; they pose a substantial threat for strong flares. So, stay tuned, folks!

Bert Huneault

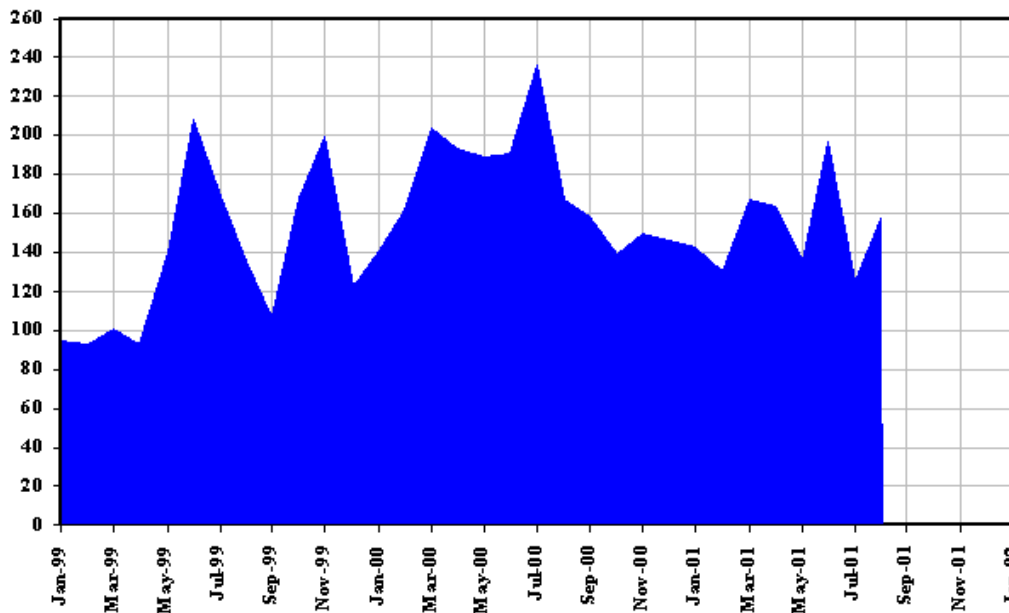
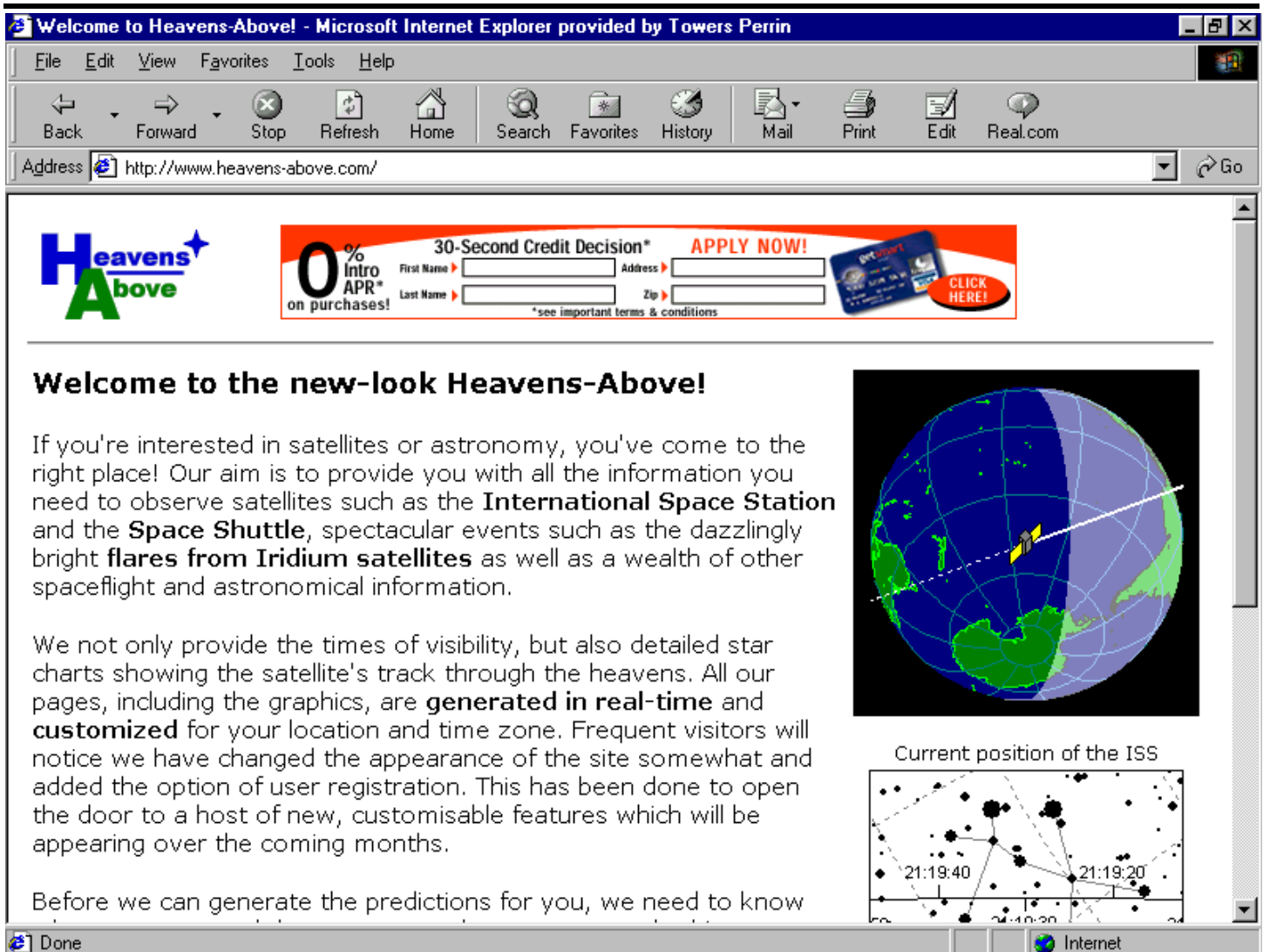


Figure 2: Mean monthly sunspot numbers

Web Site Recommendation - www.heavens-above.com



I think the description above on the home page of Heavens-Above (www.heavens-above.com) describes perfectly what its purpose is. I first visited the site in late July looking for information on the Space Station passes and noticed the Iridium flare predictions. I printed out the predictions for the next week and one coincided with a Space Station pass.

I got the kids out on the back deck about 5 minutes before the ISS pass and right on schedule it appeared in the west crossed the dipper and went out of site in the NNE. Immediately after the pass I had the kids watching just above the north horizon when a star appeared out of nowhere grew to the brightness of Venus and then faded back to black all in about 4 - 5 seconds. I was pretty amazed and so were the kids. At maximum brightness I could see a fainter glow ahead of (to the east) and behind (to the west) of the flare. These were other Iridium satellites in the grid that just weren't at the optimum sun angle to produce a bright flare from my position. Throughout the month of August I have observed over a dozen flares and they are very interesting to watch.

The Heavens-Above site asks you to register which does not cost anything and you can save a number of observing sites in a database which is important for the Iridium flares. You will notice in the predictions a column for the distance to flare centre and it will say something like 56km E. This means that if the observer moves 56 km to the east they will get a maximum flare and it will also give the intensity at flare centre. As an example there was one event that was predicted as magnitude -1 for my location in Tecumseh however a move of just 32 km to the east would produce a maximum of magnitude -7!!! That would put me at the club observing site in Comber. So be sure to enter fairly accurate latitude and longitude and do not just pick the city unless you live in Windsor.

Another site with a great description of the Iridium satellite project, pictures of flares and the satellites as well as a description of why these satellites reflect the sun so brightly can be found at www2.satellite.eu.org/sat/vsohp/iridium.html

Good luck and let me know what you think of the site as well as any observing report

Observatory Update by Steve Mastellotto



Shoreline photo/Karen Fallon

On Monday August 13 Peter Bondy and Randy Groundwater presented our case to Lakeshore Council for a zoning amendment to allow an observatory structure to be built and defined as permitted use of David Ainslie's agricultural land. The RASC Windsor Centre Observatory is currently sitting on Dave's property waiting for permanent installation a few hundred yards from its current temporary location.

Council approved the request and directed the town planner Cindy Price to draft a by-law to change the zoning to allow use of the observatory. The by-law will be presented at the regular September council meeting and with any luck will be passed.

Construction will then begin on the permanent footings and grade adjustments for the site after the by-law is passed.

A number of Windsor Centre members attended the meeting and pictured above from left to right are Dave Pantan, Dave Ainslie (standing), Robin Smallwood, Harry Brydon, Randy Groundwater and Peter Bondy

A Spider on the Ceiling by Dave Pantan

It was late, time for our little granddaughter Sydney's bedtime. On being tucked in she spotted a spider casually walking across the ceiling. "He'll fall on me in the dark, I can't go to sleep, I'm afraid of him".

No problem, I thought as I picked out a big wide drinking glass from the kitchen cupboard. Just trap and release him outside. Now find a stiff card to slip under the glass. There on my desk, perfect for the job, lay my Messier Card. Quickly he was trapped and on the way out to freedom off the front porch.

Sydney held the door and joined me outside to see him dropped off in the shrubs. Soon he was hanging by a thread and then slid down to a wondrous outside night. We glanced up and noticed a big bright moon shining above. It was a perfect night with big sharp edged puffy white clouds rushing along in front of the moon. Sometimes they glowed inside from the moon light above. Moments later big glowing moon rays shone out from mountainous gaps in the clouds lighting up smaller clouds below.

Sydney was enchanted. What if we could fly to the moon? Wouldn't it be fun to walk on it? What makes it so big and bright? In the sky above we also saw a satellite cruising along it's leisurely path high overhead across the stars. We also heard some storm rumblings and spotted big flashes of bluish white light from inside big dark clouds far to the south.

Then fire trucks and ambulance sirens began to howl nearby rushing off to one of mankind's many emergencies. The magic moment was over.

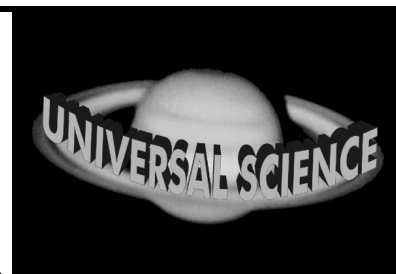
Thank you little spider.

UNIVERSAL SCIENCE

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Contact Robin Smallwood

Monday - Friday 9:00 a.m. - 5:00 p.m., Saturday 9:00 a.m. - Noon, Closed Sunday

Telephone: (519) 967-1655 Fax: (519) 967-1657

Email: unisci@sympatico.ca

Windsor Centre News

Aurora Newsletter Archive

You can now download copies of old newsletters online from the Windsor Centre's website (www.mnsi.net/~rasc). Just click on any of the newsletter links on the homepage and you will be brought to the archive page. The plan is to keep a years' worth of newsletters in PDF format on the page. A link is available on the archive page for you to download a free copy of Adobe Acrobat Reader which is required to read and print PDF files.



Membership Listing

Included with this newsletter you will find the 2001 RASC Windsor Centre Membership Listing. Please review your data to ensure that it is correct. Any changes can be sent to me via Email at smastell@wincom.net or call me at 735-9046.

September Meeting

Topic: Sending a Spider to the Moon

July 20, 1999 was the 30th anniversary of the first manned lunar landing. This talk will take a detailed look at what was involved in the design and construction of the Apollo Lunar Module. Conceived in 1962, the original Lunar Module did not look much like the "Eagle" which made the first lunar landing. Over a period of seven years, as many engineering problems were solved, the design of the LM evolved. Angular in shape, flimsy in construction and bug-like in appearance, the LM was the first true manned spacecraft not meant to fly in the Earth's atmosphere. The talk will be illustrated with many pictures depicting the evolution and construction of the Apollo Lunar Module. A description of how the LM was guided to the lunar surface will be presented as well as analysis of the first lunar landing.

Speaker: J. Randy Attwood

Randy became interested in astronomy in 1970 and joined the Toronto Centre in 1971. He is a Life member of the Society and

2002 RASC Calendars

A reminder that 2002 RASC Calendars will be available this fall and you may be receiving a flyer with your membership renewal notice. However it is better for you to buy your copy of the calendar from Frank Shepley since you will save money (roughly \$3.00 + postage) and the Windsor Centre will make money from each sale.

To order a calendar you can reach Frank at (519) 839-5934, Email him at fshepley@wincom.net or see him at a meeting.

Windsor Centre Lottery

The Windsor Centre is holding a raffle with a first prize of a Samsung DVD Player, second prize a pair of Bausch and Lomb binoculars and third prize of \$150 cash. Tickets are \$1.00 each or 10 for \$10.00. The winners will be drawn at 9:00 p.m. on October 16 at our regular meeting.

The proceeds of the lottery will be used to purchase a digital projector for our monthly meetings. The projector is part of our overall observatory project plan and is included in that budget and is part of our observatory fundraising. The projector will be used both for our meetings and in conjunction with public education. The projector that we currently use is borrowed each month from my employer.

You can get tickets to sell or you can purchase tickets from Frank Shepley at the September meeting. If you do not regularly attend meetings or just can't make it to the September meeting you can reach Frank at (519) 839-5934 or Email him at fshepley@wincom.net

served as President of the Toronto Centre between 1982 and 1986. At the National level, Randy has been a centre representative, served on the Finance Committee and served as First Vice-President for two years and as National President from 1998 to 2000.

Randy's interests are observing, astrophotography, and introducing beginners to the beauty of the night sky. An avid eclipse chaser, he has seen 8 total and 2 annular solar eclipses. In addition, he has a strong interest in the manned and unmanned space programs and closely follows the space shuttle program. His interest in popularizing astronomy lead to an 8 year experience with cable television. He produced and hosted over 60 television programs on local cable tv in Toronto during the 1980's. ASTRONOMY TORONTO covered all aspects of amateur and professional astronomy. In addition to local television, Randy has appeared nationally on CTV's Canada AM, CBC Newsworld and the Discovery Channel.

Randy lives in Mississauga with his wife Betty, daughter Beth. When not working on RASC matters, Randy is a self-employed mainframe computer programmer.