

SASKATOON SKIES

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Saskatoon Skies Information

Commercial vendors wishing to advertise in the "Saskatoon Skies" may do so at the following rates: \$50.00 per page, \$25.00 per half page and \$12.50 for business card ads. Individual RASC members and other parties (at our discretion) may advertise items and events for free.

Next months deadline is Saturday, November 27, 1993. Please have any submissions in to me by then in order to be included in the next issue. Submissions may be in typewritten form or on a floppy diskette (3.5 or 5 inch size and formatted for MSDOS) preferably as ASCII files. Electronic submissions are preferred as it saves me some typing. Mail or bring your submissions to:

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E-mail submissions to sarty@math.usask will also be accepted. Saskatoon Skies is a monthly publication of the Saskatoon Centre of the Royal Astronomical Society of Canada.

Minutes of the September Executive Meeting
September 20, 1993
Room B10 Health Sciences Bldg.

Attendees: Richard Huziak, Bill Hydomako, Mike Williams, Jim Young, Al Hartridge, Sandy Ferguson, Ed Kennedy, Gordon Sarty

1. Meeting Called to order 7:00 p.m. (R. Huziak)
2. Meeting Rooms have been booked with E. Kennedy's help for the following year: Both in Health Sciences - Executive Meetings at 7:00 p.m. in Room B10; General Meetings in Room A226, 8:00 p.m. These changes are permanent due to class commitments for traditional meeting rooms. The one exception will be the December meeting which will be held on Monday Dec. 13. (R. Huziak)
3. General Assembly
 - (a) Overview of the General Assembly meetings and events. National is still looking for feedback on direction for the Journal. As well the speaker travel grants will be discontinued.
 - (b) Fee Increases passed. Regular fees will be \$36.00 and student fees will be \$22.50. The seniors category will be dropped. (J. Young)
 - (c) We have received an update package for the RASC Manual, including the revised Speakers Travel Ass't rules and the revised Bylaws. We have to locate our copy or request an up-to-date copy if necessary. (R. Huziak)
4. Articles from the Hamilton Centre newsletter *Orbit* discussed with respect to proxy vote controversy. Hamilton Centre is voting on whether or not to secede from the RASC. The Executive to review the *Orbit* articles and comment on them for the next meeting. (R. Huziak)
5. Fee increases.
 - (a) New rates for the Saskatoon Centre: Regular - \$40.00, Junior - \$22.50. Motion to set these rates: J. Young. Second: A. Hartridge. Motion carried by show of hands.
 - (b) Brochures to be updated by Rick H. (for room # and fees). Note that brochures are currently being produced for approx. 1.8 cents each!
6. Helen Sawyer Hogg Fund - Discussion on Centre donation to fund. (E. Kennedy).
Motion to donate \$25.00 to the Helen Sawyer Hogg Fund: M. Williams. Second: A. Hartridge. Motion carried by show of hands.
7. Elections for October Meeting (R. Huziak)
 - (a) Propose a new exec position - Membership/Promotion: Promotes the RASC as a whole wherever possible. i.e. free advertising, brochure distribution, media stories and coverage of events, where we can be visible. Keeps track of members, solicits renewals, seeks new members, polls old members as to why they didn't renew. Can also promote Centre at General meetings through arranging for door prizes, give-a-ways, panel displays, etc.
Motion to add a new position to the executive called Membership and Promotion: R.Huziak. Second: G. Sarty. Motion carried by show of hands.
 - (b) All positions are up for grabs this year. (except past pres (D. Friesen), honorary pres. (E. Kennedy), Centre Rep (Jim Young - appointed). President and VP terms are up this year.
 - (c) Article in newsletter to appear in Oct. describing the election/nomination process for the elections (so new members understand) and should include a mail-in proxy form.
8. R. Huziak and G. Sarty will be presenting a Light Pollution informational session to Saskatoon City Council on Oct 12. The purpose is to inform the City of lighting options and the problem of light pollution.
9. Electrical problem in the dome. Report. Seems to have originated due to the moist conditions from the dome leak. The revamped dome has completely dried out the dome and electronics. No residual effects have been found and everything works alright. (R. Huziak)
10. Motion to adjourn meeting: J. Young. Seconded: B. Hydomako. Meeting adjourned 7:58 p.m.

Minutes of the September General Meeting
September 20, 1993
Room A-226, Health Sciences Bldg, U of S

1. Meeting Called to order 8:05 p.m. (R. Huziak)
2. RASC Centre introduced, returning members, new members and faces welcomed. (R. Huziak)
3. Call for Motion to adopt minutes as published in the July Newsletter. Moved: J. Young. Seconded: A. Hartridge. Carried by show of hands.
4. Time for renewal of memberships - DUES ARE DUE. Centre membership fees have increased. Members already paid are asked to submit the difference. Fees are \$40.00 for Regular Membership and \$22.50 for Youth (21 and under). The seniors category (we didn't have one in this Centre) has been revoked. Life memberships are available on request. Please renew early to allow Mike Williams to order Observer's Handbooks. Remember the year begins October 1.
5. Elections for the executive will be held at the October Meeting. All positions are open (except appointed positions as noted). New position created - Membership/Promotions.
6. Donations are being accepted for a hand truck for Eetook and the rebuilding of dome at Rystrom's. The total cost of repairs of the dome is \$690.00. The Centre contributed \$250.00 towards this and to date we have an additional \$160.00 in donations. This leaves a shortfall of \$280.00 to make up.
7. Light pollution presentation to be given to City Hall on Oct. 12 by G. Sarty and R. Huziak.
8. *Sky and Telescope* and *Astronomy* magazines are available in Coles Bookstore. (We get some money if *Astronomy* is subscribed to through us).
9. Observer's Group Meeting at the Rystrom Observatory is set for Oct. 16 at 8:00 p.m.
10. U of S Extension Division is presenting some basic astronomy and science programs. Brochures are available, call R. Huziak or Stan Shadick for more info.
11. The Summer Activities Programs introduced/ summer events summarized:
 - (a) The Noctilucent Clouds of June 20, 1993 by R. Huziak
 - (b) The Mount Kobau Experience by G. Sarty
 - (c) The 1993 Halifax General Assembly by J. Young
12. Meeting adjourned 9:30 p.m. (R. Huziak)

Christmas Gift Suggestions

The Saskatoon Centre of the RASC has a couple of items for sale that would make good Christmas presents. One is the 1994 RASC CALENDAR. They are available for \$6.50 each (G.S.T. included). Also the 1994 versions of the BEGINNER'S OBSERVING GUIDE are available. We must order these as the demand arises, so order early.

Contact Rick Huziak at 665-3392 or at the monthly General Meeting if you would like to purchase either of these items.

Observers' Group Meeting

An Observers' Group observing session will be held on November 13 at Rystrom Observatory, weather permitting. Time: After 8:00 p.m. To find the observatory, drive south on hiway #11 to the Grasswood Esso station and drive-in, turn left past the KOA campground and head down the road approximately 1.5 miles to the last mailbox on the right before the railway tracks. The mailbox is the Rystrom's. Go down the driveway past two homes and around the large equipment building to the right. Be sure to dim your lights.

In addition to the Observers' Group meeting, members are welcome to visit the Rystrom site at any time provided you phone ahead. The number to call is 955-2370, ask for Nelson or Gloria. If you do not have a key, find a member who does and talk them into a trip to the dome. After you have been checked out on the equipment there you are entitled to a key of your own.

Minutes of the October Executive Meeting
October 18, 1993
Room B10 Health Sciences Bldg

Attendees: Richard Huziak, Bill Hydomako, Mike Williams, Jim Young, Al Hartridge, Jim Wood, Ed Kennedy, Gordon Sarty

1. Meeting Called to order 7:01 p.m. (R. Huziak)
2. Executive and General Meetings will be held on Tuesday, March 15/94 to accommodate the visit of National President Peter Broughton. Rick will arrange changing room booking. We have been requested by him to contact the Regina Centre to see if they would like to come up to Saskatoon to have a joint meeting when Peter arrives. Jim Young will contact Regina about this. (R. Huziak)
3. A copy of the RASC Manual has been provided to us by E. Kennedy. I will endeavor to keep it up to date. (R. Huziak)
4. Articles from the Hamilton Centre newsletter *Orbit* discussed with respect to proxy vote controversy. Hamilton Centre is voting on whether or not to secede from the RASC. The Saskatoon Centre will monitor the situation. (R. Huziak)
5. Elections to be held at General Meeting discussed. All positions are up for grabs this year. (except past president (D. Friesen), honorary president (E. Kennedy), Centre Rep. (Jim Young -appointed). Accepted by the executive.
6. Rystrom dome fixes.
 - (a) The dome cost \$693 to fix. Status of donations to date is \$321.00. Centre has previously allocated \$250. This makes a shortfall of \$122.00 to be made up by the Centre current account if no other donations are received. (Mike Williams)
 - (b) The dome has been mysteriously painted two-tone blue. (R. Huziak)
7. Hand truck fund status of donations is now at \$35.00. (M. Williams)
8. Light Pollution Committee report:
 - (a) R. Huziak and G. Sarty presented a Light Pollution informational session to Saskatoon City Council on Oct 12. The purpose was to inform the City of lighting options and the problem of light pollution. The presentation was well received and referred to the Public Works & Utilities Dept. We will follow this up and maybe give them an extended presentation. S. Ferguson, Kerry O'Shea, A. Hartridge and S. Shadick were our cheering department.
 - (b) Approaching the U of S (Bldgs & Gnds or Dr. Caplan) about the same topic may be an idea.
 - (c) The new constructor near the Rystrom Obs has installed a well shielded light that does not affect observing at all.
 - (d) The Saskatoon City Works & Utilities has been written to with respect to providing an extended presentation on light pollution.
9. RASC Observatory Display. Sandy is updating. (R. Huziak)
10. RASC will promote the November lunar eclipse in the media but will not hold a public starnight. (R. Huziak)
11. (a) RASC Calendars have arrived (unsolicited). The Centre will set the selling price for these at \$6.50 each. (GST is included in the price). (R. Huziak)
 - (b) Revised Beginning Observer's Guides are available. The Centre will put an add in the newsletter and order the BOGs as requested. The U of S Bookstore may be interested in some of our publications. (R.Huziak)
12. (a) Observer's Group Meetings set for Sat., Nov. 13. (R.Huziak)
 - (b) OG meetings could use a theme to encourage new and old members to do something useful at these. i.e. work towards Messier Certificate, learn variables, learn starhopping, etc. A suggestion was made that the OG group post minimum number of objects that would be looked at in the evenings observing session. (R.Huziak)
13. Two copies of the Asteroid Charts are available for sale at the General Meeting at \$2.00 each.
14. From the GA minutes, there are 2 unattached members in Saskatchewan. The Centre will write to them to find out if they are interested in joining the Saskatoon Centre. (R.Huziak)

15. Insurance is due: \$274 (M. Williams). Move to pay: J. Young. Seconded: G. Sarty. Carried.
16. Inquiry about material that should go to U of S archives. Some copies of the David Dunlop Doings may be retrievable from the archives through Cheryl Avery. (E. Kennedy)
17. U of T Astronomer Judith Irwin will give a lecture entitled *Galaxies in Upheaval* in 165 Physics (U of S) on Friday Nov. 5 at 8:30 a.m. as part of the Canadian Undergrad Physics Conference. We are invited to attend if we want. (G. Sarty)
18. Meeting adjourned 7:52 p.m.

Minutes of the October General Meeting

Monday, Oct 18, 1993

Room A-226, Health Sciences Bldg, U of S

1. Meeting Called to order 8:00 p.m. (R.Huziak)
2. RASC Centre introduced, returning members, new members and faces welcomed. (R. Huziak)
3. Time for renewal of memberships - DUES ARE DUE. Centre membership fees have increased. Members already paid are asked to submit the difference. Fees are \$40.00 Regular, \$22.50 Youth (21 and under), \$900 Life. (R.Huziak)
4. Mailbox - We have received a letter from an amateur in Iran. He is requesting info on amateur astronomy. Any takers for a penpal? (R.Huziak)
5. Light pollution presentation was given to City Hall on Oct 12 by G. Sarty and R. Huziak. (R.Huziak)
6. (a) 1994 RASC Calendars are available for \$6.50 each.
(b) 1994 copies of the Beginners Observing Guide will be ordered on demand. (R.Huziak)
7. Observer's Group Meeting at the Rystrom Observatory is set for Nov 13 at about 8:00 p.m. We will be looking at themes for these meetings. (R.Huziak)
8. U of T Astronomer Judith Irwin will give a Lecture on Nov. 5. See executive minutes for details. (R. Huziak)
9. Consultation to theatrical group about the *Transit of Venus* was described. (E. Kennedy)
10. Elections of 1993-4 executive held:
Results:

Honorary President	Dr. E. Kennedy (appointed)
Past President	Don Friesen (inherited)
President	Rick Huziak
Vice-President	Scott Alexander
Secretary	Bill Hydromako
Treasurer	Mike Williams
Librarian	Jim Wood
Activities Coord	Sandy Ferguson
Membership/Promo	Mike Wesolowski
Newsletter Editor	Gordon Sarty
Centre Rep.	Jim Young (appointed)
Councillor	Al Hartridge
11. Programs for tonight:
 - (a) M. Wesolowski - Summer Activities Slides
 - (b) A. Hartridge - Rystrom Obs. Fixes
 - (c) R. Huziak - Light Pollution Presentation
12. Motion for meeting to adjourn: G.Sarty. Seconded: B.Hydromako.
13. Meeting Adjourned 9:20 p.m.

Did you see the Bright Fireball?

On Saturday evening, October 30, a very bright fireball was seen over large areas of Saskatchewan and Manitoba. If you saw it and can give an accurate account of its path in the sky as well as the time and your geographical location, please contact the editor as your information may be useful in recovering any associated meteorite. This fireball was seen and heard to explode over the Dauphin, Manitoba area. Some there reported that their houses shook so there is a definite possibility of an impact.

Editor's Notes

This month I am devoting my editorial space to a discussion about an RASC publication that I enjoy, the *Journal of the RASC*. The *Journal* has been getting some bad publicity the last few years, both from opinions held by Centre members and from written articles to be found in other Centre's newsletters and even in our national newsletter, the *Bulletin*. But there has also been some positive commentary and I would like to add to that here.

The most common objection to the *Journal* is that it costs a lot to produce and only a minority of RASC members read it. Therefore, so some arguments go, based on the principle of democracy, the publication of the *Journal* should be discontinued. However, the day the RASC degrades to a democracy is the day I cease to be a member. It is not enough for the RASC to be attractive to the majority of its members. The RASC must be attractive to ALL its members. Why? Because there is absolutely no reason for the minority to stay if their interests aren't enriched by membership in the RASC. That is why the RASC must cater to all astronomers, from the armchair astronomer to actively researching professional astronomers. This diversity is what makes the RASC unique in the world and it is why I am a member. We cannot count on the general democratic principles, so useful for solving the everyday problems of the RASC, to protect the richness that our Society gets from such a diverse buch of people.

"But what about the cost?" you may ask. Given that the main goal of the RASC is to "promote the advancement of astronomy and allied sciences", we should be aware that the *Journal* does this in a very direct way. Subscriptions to most peer-reviewed scientific journals cost hundreds of dollars per year. A mere individual such as myself cannot afford such prices. We have to rely on the libraries at universities to have access to these journals. The library here at the University of Saskatchewan pays millions of dollars per year to continue its journal subscriptions. And, since these millions of dollars come from the provincial government, cutbacks have caused the library to cancel many subscriptions, forcing researchers into obtaining long-lead-time interlibrary loans so they can read the articles relevant to their field. Or they may simply be deprived of knowing about the latest advances in their field. But our economical *Journal* will not likely get cut, nor will it matter to any of us RASC members if it does get cut because we get the *Journal* at such an amazing bargain.

So even if you do not read the *Journal*, your subsidy promotes the advancement of astronomy in a significant way, if only to keep rising costs of scientific journals down in one case. As it stands now, people who are not so close to a university but want to get *real* serious about their hobby can, because of the *Journal* and because of the professional and serious amateur astronomers who are in the RASC where they feel welcome. At a time when the general public is debating the value of scientific research, we at the RASC can feel proud that, in part because of the diverse nature of the RASC, astronomy is still considered valuable my many people. But hardly anyone reads the *Journal* you say? I'd bet cash that the majority of our membership in the Saskatoon Centre RASC does not even bother to read this newsletter. But I can't imagine that that is a good reason to stop publishing *Saskatoon Skies*.

Gord Sarty

November Lunar Eclipse

Those who enjoy sleeping in on Monday mornings will have a perfect excuse on Monday morning, November 29. On the preceding night (Sunday night, November 28), the full moon will undergo a total eclipse with circumstances that couldn't be much better for those of us in Saskatoon (excepting the time of year, of course!). With mid-eclipse occurring just after midnight, the moon will be high in the sky and well placed for the entire duration of the eclipse.

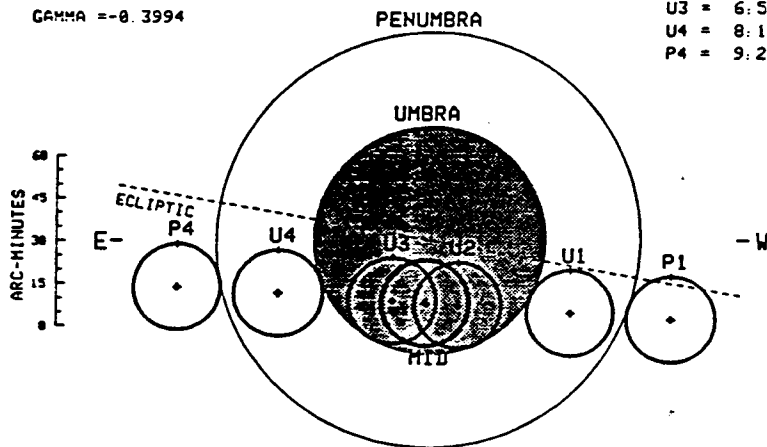
The specific circumstances of this eclipse are as follows:

Penumbral Phase Starts:	21:27 CST November 28
Partial Eclipse Starts:	22:40 CST November 28
Total Eclipse Starts:	00:02 CST November 29
Mid-Eclipse:	00:26 CST November 29
Total Eclipse Ends:	00:50 CST November 29
Partial Eclipse Ends:	02:12 CST November 29
Penumbral Eclipse Ends:	03:25 CST November 29

The accompanying figure from the Observer's Handbook 1993 shows the geometry of the eclipse at these times.

MID = 6.26.1 UT
 PMAG = 2.1893
 UMAG = 1.8921
 GAMMA = -0.3994

CONTACTS
 P1 = 3.27.8 UT
 U1 = 4.48.3 UT
 U2 = 6.2.4 UT
 U3 = 6.58.8 UT
 U4 = 8.12.8 UT
 P4 = 9.25.2 UT



Typically the beginning and end of the penumbral eclipse do not result in any visual phenomena that can be seen by the unaided eye. An observer will generally not see any darkening of the moon until about half an hour or more after the penumbral eclipse has started. This will be visible as a gradual shading of the moon's upper left corner. The shading becomes more visible until the moon actually enters the umbra, or dark part of the shadow. As the eclipse progresses, more and more of the moon enters the umbra until it is totally eclipsed. Following mid-eclipse, the pattern reverses itself. From experience, a low power telescope or binoculars are very useful for observing these phenomena.

The two lunar eclipses visible in 1992 were both very dark, because of volcanic material in the atmosphere. Since then, the atmosphere has had a chance to clear and the indications are that this eclipse will be brighter than before. (To give some idea of how dark the moon was at the last total eclipse a year ago, it was all but invisible at mid-eclipse. A companion observing with me was unable to locate it using binoculars, although that was due mainly to not knowing exactly where to look and what to look for). Quite possibly some of the more "typical" eclipse colors will be visible (that is, orange, red, yellow) although this remains to be seen.

In addition to visual observations, you may also want to attempt photography of the eclipse. Since the size of the moon's image on the photographic film will be about 0.5 mm using a 50 mm lens, a telephoto lens on a tripod is almost mandatory. As far as exposure times go, the *Handbook of Astrophotography for Amateur Astronomers* by G.N. Patterson uses the following equation for determining exposure times:

$$T = \frac{f^2}{SB}$$

where T = exposure time in seconds; f = focal ratio of system; S = ASA-ISO rating of film; B = brightness of object being photographed. A suggested value of B is 220 for a full moon, and 0.005 for the umbra. You may also want to take proportions of these for the various partial phases. The major point to be recognized here is that the exposure time given for your system is just a best guess - you have to bracket the recommended exposure by a factor of 0.25, 0.5, 2.0, and 4.0 to allow for variables which don't show up in the equation.

From last year's eclipse, some of the good exposures that I got used the following data for a 150 mm telephoto lens:

<i>Partially eclipsed moon</i>	<i>Totally Eclipsed Moon</i>
Film Speed = 400	Film Speed = 400
Exposure Time = 1/90 second	Exposure Time = 10 seconds
f/ratio = 24	f/ratio = 3.5

Note that the partial eclipse shots basically showed the moon as it appeared to the unaided eye; there was no color to the eclipsed portion at all. The total eclipse photos were somewhat blurry because of the Earth's rotation; this is a definite limitation of tripod mounted cameras.

In order to emphasize the need for bracketing exposures, let me point out that I took five pictures in quick succession for every "good" photo - I used up two 36 exposure rolls of film. I had actually planned my photographic series in advance; knowing how much film I had available, I planned the times at which I would take the pictures, an approach I recommend and plan to use again.

New members take note! Although there will be several lunar eclipses in the near future, the next really "good" one will not be until September 26, 1996. Make your plans now to observe this event!

Mike Wesolowski

Persephone Theatre's *Transit of Venus*

Those of us amateur astronomers who like live theatre were treated to a bonus when Persephone Theatre presented the play *Transit of Venus* on October 14-27.

The play is based on the true life story of French astronomer Le Gentil who made it his life's mission to accurately measure the distance between the Earth and the Sun by carefully timing the transit of Venus across the Sun's face. Transits of Venus are very rare events; the diagram below depicts all the transits that have or will occur in the time period from the seventeenth to the twenty-first century. As you can see there are only eight and none occur in the twentieth century.

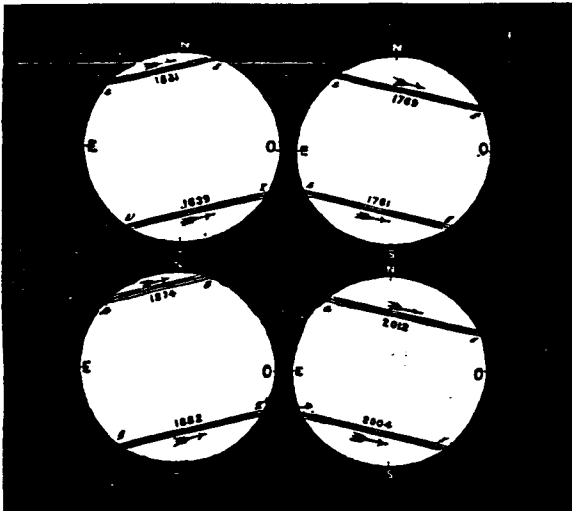


FIG. 93.—LINES FOLLOWED BY VENUS IN THE EIGHT TRANSITS FROM THE SEVENTEENTH TO THE TWENTY-FIRST CENTURY, FROM THE ENTRY TO THE EXIT

The diagram is taken from *Popular Astronomy* by Flammarion as translated by Gore in 1907. That source of information was unearthed by our Honourary President, Professor E. Kennedy because the actors for *Transit of Venus* had asked him to have a chat with them before they staged the play. The actors wanted to get more into their roles by finding out how a real astronomer (Prof. Kennedy) viewed life. And according to Professor Kennedy they dug deep to ask him a very wide variety of questions on topics that ranged from the importance of observing a transit of Venus to the relationship between the Church and astronomy.

According to *Popular Astronomy*, Le Gentil left France in 1760 for India to observe the transit of 1761. But the English war in India prevented him from landing until after the transit. Thus he missed the first transit. Since the next eclipse was only eight years away, he decided to remain in Pondicherry, India until the next transit of 1769. While there, he built an observatory, learned the language of the country and became sure of his upcoming success because of the generally cloudless weather that occurred during June when the transit was due. But the day of the transit saw cloudy skys that mercilessly cleared only minutes after Venus had left the face of the Sun and then remained clear for days afterward! The poor astronomer returned to France but not until he had twice escaped from shipwrecks. In the meantime, back in France, he had been presumed dead and so lost his position in the Academy of Sciences, and all of his inheritance had been given away. Since he was legally dead, he could not recover these possessions either. The story ends when Le Gentil actually dies.

In the play, some fiction is added by the playwright Maureen Hunter, and Le Gentil (played by John Dolan) returns to France between the transits to visit the women in his life. These women are his mother Mme Sylvie (played by Rosemary Hunt), his fiancé Celeste (played by Burgandy Code) and Celeste's mother Margot (played by Heather Lee MacCallium). Margot also happens to be one of Le Gentil's many ex-lovers as well. Le Gentil is accompanied by his assistant Demarais (played by Patrick Chilvers) on his first attempt to view the transit but the trip almost kills Demarais (travel was very difficult in the eighteenth century) and he remains behind when Le Gentil leaves to observe the second transit.

I enjoyed the play very much especially given the theme about conflicts that can arise between an astronomer and their loved ones when they get too passionately involved in their interest.

Gord Sarty

November General Meeting

The monthly Centre meeting will be held on Monday evening, November 15 in room A-226, Health Sciences Building on campus, 8:00 p.m. Note that this is a change from the usual room B-111.

DRAO's Dr. Landecker Speaks at SED Systems

RASC members who work at SED Systems in Saskatoon (there are six of us) were very fortunate to be treated to an impromptu presentation by astronomer Dr. Tom Landecker of the Dominion Radio Astrophysical Observatory (DRAO) in Penticton, B.C. on October 19th. Dr. Landecker was in Saskatoon attending a management conference and contacted Eric Valk of SED Systems, whom he had supervised for his PhD, just to say hello. Eric immediately seized the opportunity of getting Dr. Landecker to talk to SED on the topic of "satellite communication antenna calibration by the use of cosmic radio sources". Luckily, Dr. Landecker was also on his way to an astronomy seminar and happened to have a lot of resource material with him. He agreed and gave a one-hour presentation on antenna calibration and radio astronomy. Since Dr. Landecker's specialty is supernova remnants (SNRs), a good portion of his talk had to do with the nature of the SNRs. (Eric also warned him that there would be astronomers in the crowd). The presentation was very interesting and included slides of the DRAO, and radio maps of cosmic radio sources made by the DRAO. Dr. Landecker is an excellent lecturer and his presentation was well received by both the technical staff and amateur astronomers present.

Rick Huziak

Comet Mueller

The following image of Comet Mueller 1993a was submitted to the internet by the Johannes Kepler University in Linz - Computing Center. They also provided the commentary that follows the picture. The comet is presently leaving the Little Dipper for Draco. A finder chart is given on page 10



This is a CCD image of comet 1993a "Mueller", taken on October 6, 1993, using SBIG's ST-6 CCD-camera and a 288mm f/5.2 Schmidt-Cassegrain telescope. The exposure lasted from 19:11 U.T. to 19:21 U.T. The field of view is 19.6' x 14.4'. The comet has a coma diameter of some-what more than 3' and a fan-shaped tail, up to 7' long, between P.A. 220° and P.A. 310°.

The brightest star visible (PPM 7788) is of photographic magnitude 8.8. In this image, this star and the head of the comet appear to be nearly of the same brightness. However, a close inspection of the original CCD-image (which has a resolution of 16 bit per pixel rather than 8 bit for GIFs) shows that the star trail is saturated at a value of 65535, while the brightest pixel in the comet's head reaches a value of only 15608. According to our measurements, the comet is of mag 10.5 in red light (where unfiltered, thick CCD's are most sensitive). Keep in mind that a comet has usually bright emissions in blue and green light, where our CCD is not that sensitive.

Comet Mueller 1993a Finder Chart

This finder chart is based on the information provided in the October, 1993 issue of *Sky & Telescope*. The information beside the comet icons include the date (e.g. N10 = Nov. 10) and estimated magnitude (eg 93 = 9.3). Note that the times are for 0^h U.T. for the date shown which is 6 p.m. C.S.T. on the day before, e.g. N10 means November 9 at 6 p.m. C.S.T. Stars to 6th magnitude are shown. More detailed finder charts are available from the editor. Phone me if you would like them.

