

SASKATOON SKIES

Volume 22, Number 10

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Saskatoon Skies Information

Next month's deadline is Friday, November 27, 1992. 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. I prefer electronic submissions as it saves me some typing. Mail or bring your submissions to:

Gordon Sarty
422 Edmund Park,
Saskatoon, Sask.
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OR
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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.

SASKATOON CENTRE EXECUTIVE FOR 1992-93

At the October General Meeting, the elections for the Centre Executive were held. As a result we now have the following people in our Executive:

Past President	Darryl Rybotycki	249-2803
President	Don Friesen	343-1136
Vice President	Rick Huziak	665-3392
Secretary	Bill Hydomako	384-4781
Treasurer	Mike Williams	668-4365
Editor	Gordon Sarty	374-8803
Librarian	Jim Wood	373-6007
National Council Rep.	Jim Young	343-0971
Honorary President	J.E. Kennedy	374-4614
Activity Coordinator	Sandy Ferguson	382-0898
Councillor	Al Hartridge	373-0034
Councillor	Carol Blenkin	244-1927

Please feel free to contact any member of the Executive to find out more about the Saskatoon Centre's activities or if you would like to instigate some.

EDITOR'S NOTES

So, as you can see from the above list of the Centre Executive, I'm now the official editor of this newsletter. Thanks to all who supported me at the October General Meeting.

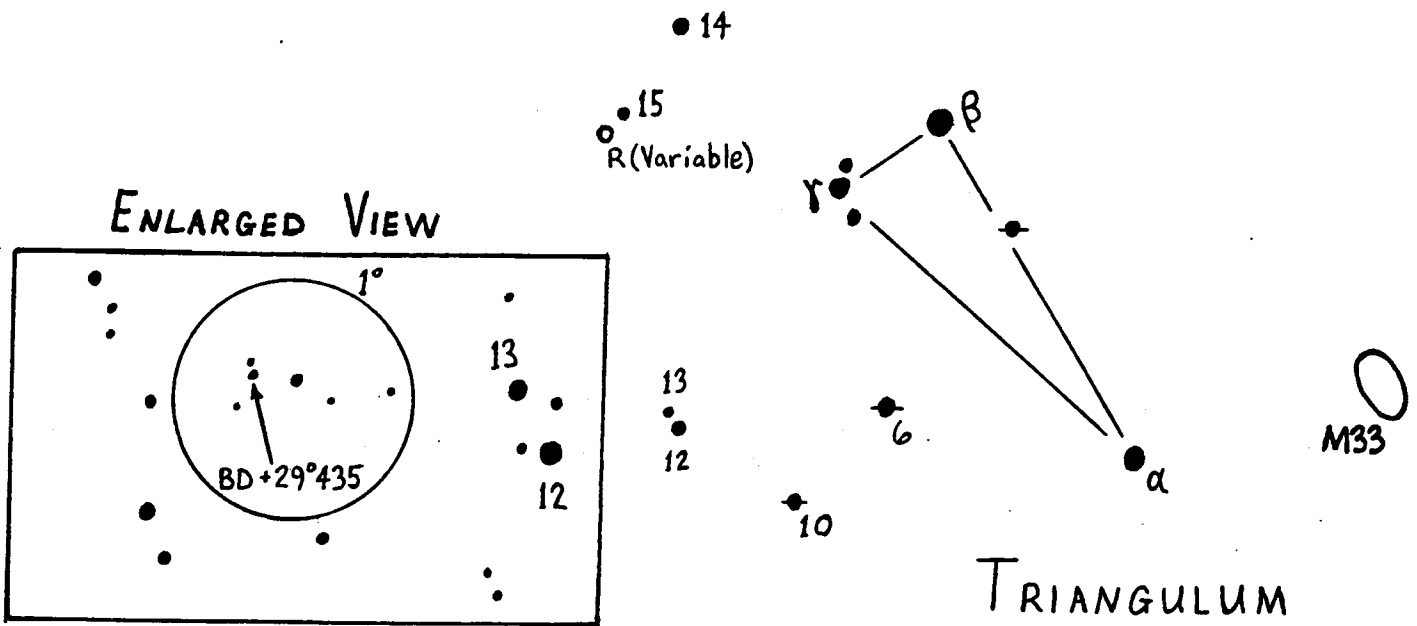
I must apologize for not having the minutes of October's meetings to include in this issue. I did not receive them in time to include. But there is a really nice "Seeing Things" article by Rick Huziak here. I'll certainly be hunting down the objects he described at my next observing opportunity. Rick's second cluster, NGC 457, is known to some observers as the "Owl Cluster". I like to see drawings of sky objects so if you have any that you think are cool, send them to me. Even if you have little or no commentary, I can surround your drawings with some sort of article.

We had some great presentations at last month's General Meeting. First, Ed Kennedy treated us to some humorous cartoons that he had also shown at this summer's Annual General Meeting in Calgary. Next Sandy Ferguson showed us some slides of last May's Astronomy Day activities at Lawson Heights Mall. After Sandy's presentation, I showed everyone my new homemade 8 inch telescope. Finally, Rick Huziak gave a presentation on occultations of stars by asteroids. He mentioned that there were two predictions of asteroid occultations coming; one on the night of October 30/31 and another on the night of November 11/12. I have more to say about these occultations below. So be sure to come to November's General Meeting when we will have more star-studded entertainment.

Mars is coming! Rather the Earth is slowly catching up to Mars in it's orbit. Mars will be nearest to Earth in January, 1993 as the Earth catches and passes Mars then. Meanwhile the disk of Mars is getting larger and larger so it is now worth taking a look at in a telescope. More information on Mars can be found in the *Observer's Handbook* on pages 134 to 138. My last serious observations of Mars were in 1973 and I have a couple of drawings from 1975. And these were made with a 2 inch refractor. I managed to see quite a bit of detail in that small telescope with the help of a filter I made using an unexposed color negative. Really! It's not perfect but it does improve the contrast of markings on Mars. I've recently made another such filter and will be using it this year to watch Mars in my super duper 8 inch reflector. You may want to try out such a filter for yourself, but the real secret to seeing detail on Mars is to watch for long periods - you can only see things for short bursts of time when a spot of calm air passes between you and Mars.

Although the potential occultation of the star BD+20°1055 by the asteroid 455 Bruchsalia on October 31st was clouded out, there will be another occultation opportunity soon. According to *Sky and Telescope*

Magazine, the 9.5 magnitude star BD+29°435 will be occulted by the 12.7 magnitude asteroid 524 Fidelio between 8:24 and 8:30 UT on November 12. That's between 2:24 and 2:30 a.m. CST on the morning of November 12. The occultation is predicted to last for up to 8 seconds. These times are all predictions which can be several minutes off so you should probably plan to observe BD+29°435 pretty much continuously between 2:15 and 2:40 a.m. I have drawn a finder chart for the star BD+29°435 below. The star lies at Right Ascension 2h 34.1m and Declination 30°00' (2000 coordinates). You are encouraged to watch this event - it should be easy to see from your yard in the city if you have a small telescope. You will not be able to see the asteroid because it will be too faint and too close to the star it will be occulting. So just watch the star, which at 9.5 magnitude may be fairly faint in your telescope (depending on the size of your scope and the sky conditions). At the time of occultation the star will dim to 12.7 magnitude, the brightness of the asteroid. For me with my 8 inch telescope on my front lawn that means that the star will disappear since 12.7 magnitude is too faint to see from the city with that telescope, especially since the nearly full moon will only be 31° away. If you want to make a serious observation of this event, tune your short wave radio to one of the time signal stations listed on page 22 of the *Observer's Handbook* and record the signal on a tape recorder along with your voice. When you see the star blink out and also when it blinks back, shout it out to the tape recorder. The tape you have will then contain a valuable, accurate timing of the occultation which can be used by professional astronomers. Phone me if you have made such a tape and I will make sure it gets to someone who can use it.



NOTICE OF OBSERVERS GROUP MEETING

The next Observer's Group meeting will be at the Rystrom Observatory at 7 P.M. on Saturday, ^{Grasswood} November 21, 1992, weather permitting. To find the Observatory, drive south on hiway #11 to the Glenwood 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.

UNIVERSITY OBSERVATORY HOURS FOR PUBLIC VIEWING

The university observatory will be open to the public on Saturday evenings from 7:30 - 9:30 p.m. during the period of October through February. It will be closed on Dec. 26.

Visitors will be able to view: Saturn and its rings, the Andromeda Galaxy, the Albireo Double Star System and other celestial objects.

Observatory assistants will be present to answer questions about astronomy and to assist the public in viewing through the telescope. The observatory is located on campus, one block north of the corner of Wiggins Ave. & College Drive.

Stan Shadick
Astronomy Instructor
966-6434

NOTICE OF ~~OCTOBER'S~~ GENERAL MEETING

^{November} The ~~October~~ General Meeting will take place on Monday Evening, November 16, 1992 at 8:00 P.M. in Room B-111 of the Health Sciences Building. There will be an exciting astronomical presentation so be sure to bring your friends and get them interested in joining our centre.

NOTICE TO EXECUTIVE MEMBERS

Please note the change in the location of the Executive Meeting for the month November, 1992. The Executive Meeting will be held in Room B-111, Health Sciences Building, beginning at 6:50 P.M., and ending at 7:50 P.M. This move is due to commitments of the Observatory by Stan Shadick's astronomy classes. Use of the Observatory AFTER the General Meeting is still probably possible after 9:30 P.M..

Rick Huziak

BLACK HOLES NOW GOING OUT OF VOGUE

Astronomical bodies such as stars and planets are not crushed to a single mathematical point by their own gravity because the matter making them up somehow provides a resisting force. In solid planets such as Earth, Mars, Venus, etc. this force is provided by the strength of the material making up the body. This strength comes from the crystalline and chemical bonds in the matter making up the planet. In gaseous planets such as Jupiter, Saturn, etc. the force comes from gas pressure as given by the Boyle's Law that we learn in high school chemistry - at least in the outer, very large atmospheres of these planets.

Stars are composed of gas but are so massive that simple gas pressure can no longer resist the weight of that gas. As a result, the gas at the core of a star gets compressed to the point of pushing atomic nuclei together. This results in the release of nuclear energy when some of the atomic nuclei fuse. This energy causes the star to shine and provides plenty of pressure to prevent the star from collapsing to a point.

Nuclear fusion can only happen until the nuclei reach such a heavy state that no more fusion is possible (that is, when the matter in the core is all fused into oxygen for lighter stars or iron for heavier stars). Although the life cycles of stars are complicated and not yet fully understood, there comes a point when the star core will begin to collapse because of the lack of nuclear fusion pressure. Provided the mass of the star core is not more than approximately 1.4 times the mass of the sun, another mechanism will kick in to provide pressure to stop the collapse and a white dwarf star will be formed. This mechanism is a quantum mechanical one (Pauli's exclusion principle) and arises because the star's gas has become so dense that the electrons in the gas have been pushed very close together. So now, in addition to the pressure provided by the gas (from Boyle's law), the electrons provide a pressure to resist the force of gravity. Since the behaviour of the gas is no longer like that of an ordinary gas, but now influenced by the squeezing of the electrons, the gas is known as a degenerate electron gas. Many white dwarfs have been found with the most famous being the companion of Sirius. For amateur astronomers though, the white dwarf named omicron 2 B Eridani, located about 1 hour west of Rigel, is supposed to be the easiest to see in a small telescope.

If the burnt out star core has a mass greater than 1.4 solar masses, the pressure from the degenerate electron gas is no longer enough to prevent further collapse and the electrons get crushed into protons to form neutrons. The star will then be composed entirely of neutrons and if its mass is less than about 10 suns another quantum mechanical effect kicks to prevent the collapse to a point. The effect produces pressure in the degenerate neutron gas that now makes up the neutron star. Neutron stars are seen in the sky as pulsars, beacons of pulsating radio energy.

If the mass of the collapsing star core is greater than 10 suns, no force known to theoretical astronomers could prevent further collapse and so the idea of a black hole was born. In a black hole, the matter of the star core has collapsed to this mathematical point producing a region in space having a very high gravitational field from which not even light could escape. In effect, the star has crushed itself out of existence. This is really a rather silly idea and the more careful theoreticians would call their models for strange objects, such as Cygnus X-1, "compact objects" instead of black holes.

The reason that the idea of black holes survived is that nobody knew enough about physics to be able to point to some process that was capable of providing the pressure needed to prevent collapse. The biggest problem was that Einstein's general theory of relativity that describes the nature of gravity fails when used to describe physics inside an atom. At the atomic level the theory of quantum mechanics, invented in the early years of the twentieth century, works better. A successful combination of the two theories has not yet been achieved but a partial success comes from a set of equations known as the "Einstein-Yang/Mills equations".

In the October, 1992 issue of the *Bulletin of the American Mathematical Society* (vol 27, pp 239-242), J. Smoller, A. Wasserman, S.T. Yau and B. McLeod have announced that they have proved the existence of a "globally defined smooth static solution" to a version of the Einstein-Yang/Mills equation that includes the effects of the nuclear weak force. The existence of this solution means that the nuclear weak force is able to provide a pressure, in some complicated sort of way, that is stronger than any of the pressures mentioned above. This pressure would then be enough to prevent a star from collapsing into a black hole.

continued on next page...

Although the results of Smoller et al are preliminary, they seem to show that nature has numerous ways of preventing the collapse of a stellar core into a black hole. With heavier and heavier collapsing stars there are probably ever more exotic processes in nature to provide resisting pressure to allow the formation of ever more exotic astronomical "compact objects". Now that we no longer believe in black holes, I wonder what Cygnus X-1 really is!

Gordon Sarty

TRANS-PLUTO OBJECT FOUND

(Reprinted from the October 1992
issue of THE STARSEEKER,
the Calgary Centre newsletter.)

On September 14th, the astronomical world learned that astronomers David Jewitt and Jane Luu had discovered a very faint object in southwestern Pisces. Based on its slow apparent motion and the lack of any appreciable parallax, Brian Marsden of the IAU's Central Bureau for Astronomical Telegrams estimates that the mysterious object is an astonishing 37 to 59 astronomical units from Earth!

Whether it is a minor planet or comet is not yet clear, but nothing in our solar system has been seen so far from the Sun since Pluto's discovery in 1930. Shining at visual magnitude 23.5, the Jewitt-Luu object is 1,000 times fainter than Pluto would be at a similar distance. It may just be a fair-size asteroid, but a comet so far away would be huge - some 200 kilometers across! It is also very red, suggesting that its surface may be rich in organic compounds.

The two astronomers have actually been looking for such objects for about five years. They found this one on six CCD images taken between August 30th and September 1st with the University of Hawaii's 2.2-meter telescope on Mauna Kea. Marsden has given it the preliminary designation of a minor planet, 1992 QB1.

Once the bright Moon disappears next week more observations are planned. [The full moon of Sept. 12 is referred to here. -Ed] But the object's orbit may not be determined for several weeks or even months. So, you'll just have to stay tuned!

DUES ARE DUE

Please remember to renew your membership as soon as possible. Note that the membership year runs from October 1, 1992 to September 30, 1993. Pay early as not to lose any benefits.

\$35.00 Regular Membership (over 21 years old)
\$20.00 Junior Membership (21 years or younger)

Note that this is the last year in which life memberships are available from the RASC. If interested, please call Mike Williams at 668-4365 for current rates. Memberships can be paid either in person at General Meetings, or by mailing your cheque to the Center mailbox. Key holders to the Rystrom Observatory, please remember that there is a voluntary \$5.00 surcharge for your key which goes toward maintenance of the observatory.

SEEING THINGS

Three Great Fields

This month's "Seeing Things" features three interesting and diverse fields for the larger telescope. All of the views shown were seen through Eetook, the 12.5 inch Dobsonian at the Rystrom Observatory. I do believe that all the objects should be visible in telescopes of much less aperture. Please let me know if you can see them.



cluster Galaxy
↓ ↓
NGC 6939 and NGC 6945⁶

NGC 6939 and NGC 6945⁶

The first field features an odd pair; a galaxy and an open star cluster in the same field. Although this field, which straddles the Cepheus and Cygnus border, is almost always accessible to Canadian observers, it is rarely view. NGC 6939 is a huge galaxy, almost 1/2 the size of the moon! I find it ghostly and homogeneous. Can anyone see any detail in it? NGC 6945 is a small open cluster, about 10' in diameter, and appearing sparse at low power. However, with some magnification, this object resolves neatly into a beautiful cluster of about 50 13th magnitude stars. The view shows these two objects at 36X magnification. (North is up, east to the right in all views).

NGC 457

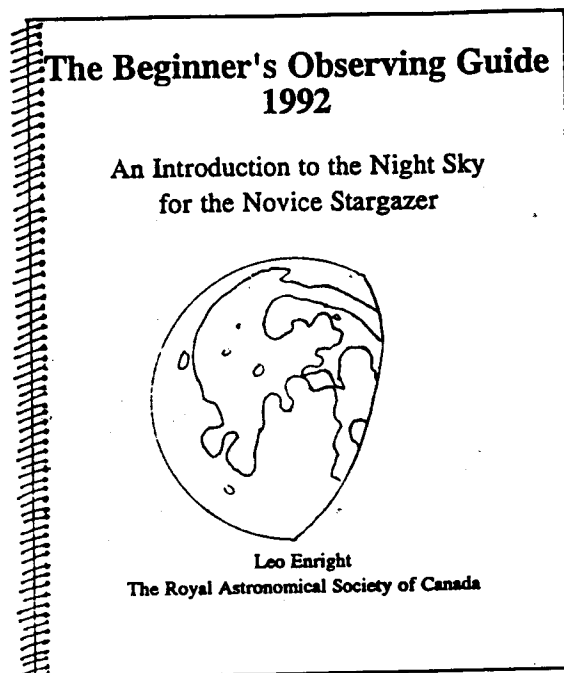
This beautiful open cluster in Cassiopeia has amazing left/right symmetry and looks like a bird in flight. (It's tough to illustrate this in the drawing). Like NGC 6945, this cluster looks sparse at low power, containing about 22 stars to 12th magnitude. However, higher power brings out about 100 stars to 14th and really brightens up the cluster. The cluster is situated just below ϵ Cas. The view shown is at 36X.

PK 36 -1.1

This planetary nebula is situated in Aquila and is plotted in Uranometria 2000 (with a bizillion other obscure PN's). However, there is nothing obscure about the look of this object. This is a large but faint planetary, about 1' across and containing a 14th magnitude central star. I found it quite easy with the 12.5". The nebula is round and homogeneous and looks like a ball of smoke - very tenuous. Because of this planetary's large size, it is worth the effort to look for it. The view shows the field at 114X.

That's all for now. There will be more exciting objects in future Saskatoon Skies. Good observing.

Rick Huziak (phone: 665-3392)



NOW AVAILABLE!

The Beginner's Observing Guide
by long-time RASC member, Leo Enright.

1992 edition, 116 pages, softcover, spiral bound

This publication is just what beginning observers need. It has clear and concise descriptions of what to look at, how to see it and what instrument to use. It emphasises using your eyes, binoculars and small telescopes. A great value and excellent resource for the beginner. And at this price, you can afford to buy one for a friend.

Order yours now at only **\$5.35** for pickup orders.

The Guide will be available at the General Meeting, or call Rick at 665-3392 to receive your advance copy. Please include \$1.60 postage if you want the book mailed to you. Make out cheques or money orders to "Saskatoon Centre, RASC".

Supplement to Saskatoon Skies

November 1992

I would like to report much late breaking news which was received too late for inclusion in the main body of Saskatoon Skies. I hope you find this information interesting and useful. You can call me directly about any information contained in this supplement.

Rick Huziak

Due are Due

As Gordon has suggested, please renew your memberships as soon as possible. In addition to the regular membership fees, Rystrom Observatory keyholders are asked to contribute a voluntary \$5.00 surcharge. This money goes toward continued maintenance of the observatory and telescopes.

General Meeting Programs for 1992 - 1993

I am pleased to announce that lecturers for the General Meeting presentations are now booked and we can rest assured that the General Meeting programs will be interesting and informative. Please note that the list is tentative in that dates may switch around to accommodate the speakers if necessary, and that the programs are subject to change if the speaker cannot attend for some reason. Members are always welcomed to throw in short presentations in conjunction with the main programs and are certainly encouraged to give a main presentation themselves. Bring yourself and your friends so we can have good attendance at these meetings. SUPPORT YOUR CENTRE! If you have any suggestions for the vacant months, please contact me at (306) 665-3392 evenings.

Nov 16, 1992	Around the World in 80 Slides - R. Huziak and others (A view of astronomy around the world, from my 1985-6 world tour). Bring your slides, too, if you'd like to throw them in!
Dec 21, 1992	Thar She Blows! Solar Eruptions and the Northern Lights - Dr. G. Sokfo (Dr. Sokfo is with the Institute of Space and Atmospheric Studies, U of S).
Jan 18, 1993	Vacant (potentially on rocket launches)
Feb 15, 1993	Space Shuttles, Space Stations and Crystal - Dr. Louis Delbaere (A description of biochemistry experiments flown on the Shuttle by this U of S experimenter).
Mar 15, 1993	Starlab - Ron Waldron (The Dept. of Education's portable planetarium will be set up for us).
Apr 19, 1993	Planetarium Programs and other Astronomy Software - Jim Young (A description and demonstration of today's great computer programs)
May 17, 1993	The Dominion Radio Astrophysical Observatory - Eric Valk (Mr. Valk worked at the DRAO in Penticton, B.C.)
June 21, 1993	Vacant (might be a good time to talk about solstices!)

The Beginner's Observing Guide Supplement

Please note that as advertised in the newsletter, we have 10 copies remaining of the 1992 *Beginner's Observing Guide* by Leo Enright. We have just received a 6 page supplement intended to be added to the 1992 Guide to update time sensitive pages to 1993 information. This means that the eclipse tables, planetary tables, etc. will be useful for the coming year. All other pages in the guide are not affected by year of publication. This supplement is intended to help boost sales of UNSOLD Guides, and will not be generally available for those who purchased the Guide previously. The National Office notes that future printings of the Guides will cover a 3-year period, and will not be so affected by date. The price is still \$5.35, so order yours now for Christmas presents!

Comet Swift-Tuttle Returns

Comet Swift-Tuttle (1862III) has been recovered by Japanese comet hunter Tsuruhiko Kiuchi and is now a relatively bright comet in the evening sky. This comet should easily be visible in binoculars despite the bright moon throughout November. Comet Swift-Tuttle is the parent comet for the Perseid meteor shower. The search for this comet was instituted after Brian Marsden of the Harvard-Smithsonian Centre for Astrophysics predicted its return for this year. The comet returns only once ever 130 years or so, so it's worth the look. The comet is sporting a short tail. More information is available in the Dec. 1992 issue of *Sky and Telescope*. The map is reproduced from *Norton's Star Atlas* (1968 edition).

