



SASKATOON SKIES

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of The Royal Astronomical Society of Canada

In this Issue



What Happened in History
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Some Great Articles

What Happened in History

- 1 USSR Veneta 3 in 1966 was the first probe to land on Venus.
- 2 In 1968, the USSR attempted to send Zond 4 on what probably was a flight around the Moon. It reached only parking orbit near Earth and fell back into the atmosphere March 3, 1968.
- 3 James A. McDivitt, David R. Scott and Russell L. Schweickart, in 1969, flew the lunar module for the first time on Apollo-Saturn 9.
- 4 In 1972, the interplanetary probe Pioneer 10 left the U.S. on a 620 million mile flight through the Asteroid Belt to Jupiter, passing the giant planet December 3, 1973. The craft is leaving the Solar System.
- 5 USA Voyager 1 flew near Jupiter in 1979.
- 6 USSR Vega 1 in 1986 sailed near the comet Halley.
- 7 Astronomer John Herschel was born in 1792.
- 8 Japan's Suisei flies past Comet Halley in 1986 photographing its atmosphere with ultraviolet camera, watching the nucleus rotate.
- 9 USSR Vega 2 in 1986 flies near comet Halley.
- 10 Rings around the planet Uranus were found in 1977.
- 10 In 1986, Japan's Sakigake flies past comet Halley, studying solar wind and magnetic fields, detected

How to Reach The Editor

If you have an article or an ad or picture that you want to submit to the Saskatoon Skies please mail them to the address below. If you have any questions please call. Check the last issue of the newsletter to find out when the deadline is to make sure you don't miss getting your submission put in the issue you want it in.

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- 11 plasma waves.
- 12 In 1960, the interplanetary probe Pioneer 5 left the U.S., orbiting the Sun between Earth and Venus, setting a record by sending radio signals 20 million miles.
- 13 Uranus is discovered in 1781 by William Herschel.
- 13 Astronomer Percival Lowell was born in 1855.
- 13 In 1986, European Space Agency's Giotto flew closest of several probes from Earth to Comet Halley, probed atmosphere, magnetic fields, sent back best pictures of the comet's nucleus.
- 14 Albert Einstein was born in 1879.
- 16 Robert Goddard in 1926 launched his first liquid-fueled rocket.
- 16 In 1966, Neil A. Armstrong and David R. Scott, Gemini-Titan 8, first docking of one space vehicle with another. The flight ended when controls broke down.
- 18 First spacewalk, by USSR cosmonaut Aleksei A. Leonov in 1965, lasted 10 minutes. He was with Pavel I. Belyayev in Voskhod 2.
- 21 In 1965, U.S. Ranger 9 flew to the Moon, took 5,814 photos and crashed at Crater Alphonsus.
- 22 Sally K. Ride in 1983 becomes the first U.S. woman in space, riding shuttle Challenger.
- 23 The first photograph of the Moon was made in 1840.
- 23 Virgil I. Grissom and John W. Young in 1965 flew Gemini-Titan 3, the first manned spacecraft to change path in orbit.
- 24 Astronomer Walter Baade was born in 1893.
- 25 Saturn's moon Titan discovered in 1655 by Christiaan Huygens.
- 27 The asteroid Pallas was discovered in 1802 by Heinrich Olbers.
- 27 Yuri A. Gagarin, the first man in space, died in an airplane crash in the USSR in 1968.
- 27 In 1969, the interplanetary probe Mariner 7 left the U.S. for Mars, coming within 2,000 miles of the Red Planet August 5, 1969. The probe sent back data and tv pictures.
- 27 USSR launched Venera 8 to Venus where it landed July 22, 1972, sending atmosphere and surface data 50 minutes. Surface pressure and heat crushed and burned the instrument capsule.
- 27 USSR Mars probe Phobos 2 stopped transmitting to Earth, 1989.
- 28 The asteroid Pallas was discovered in 1802 by Heinrich Olbers.
- 28 The asteroid Vesta was discovered in 1807 by Heinrich Olbers.
- 29 First planet Mercury flyby, by U.S. Mariner 10 in 1974.
- 31 In 1966, USSR Luna 10 flew to the Moon, going into orbit around that natural satellite of Earth April 2, 1966.

Betcha Didn't Know

Vast Blue Arcs Are Mirages.
Glowing blue lights arching across trillions of miles of uncharted space are merely illusions, according to astronomers who have been staring at them since the vast energy arcs were discovered in 1987.

However, the fact there are such mirages suggests the Universe may end eventually in an inward collapsed big crunch.

Three mysterious, vast blue arcs of light in deep space were revealed in 1987 by Arizona and California astronomers who later had "nightmares" trying to explain them.

The astronomers at Kitt Peak National Observatory, Tucson, and Stanford University, California, pictured one arc stretching 1.9 million-trillion miles through a cluster of galaxies named *Abell 370*.

One galaxy, such as our own Milky

Way, is a collection of 100 billion or more stars like our Sun. The galaxy cluster *Abell 370* is about seven billion lightyears from Earth. That's about 41 billion trillion miles. A lightyear is the distance light travels through space in a year, just some 5.9 trillion miles.

Another blue arc of light seemed to be in a galaxy cluster known as *2244-02*. And there were faint signs of a third arc in a cluster of galaxies labelled *Abell 2218*.

Cosmic mirage. Analyzing light from the arc in the *Abell 370* cluster led the astronomers finally to view the arc as a "cosmic mirage."

The mirage was created when a massive galaxy in the foreground bent light from a galaxy in the background. The background galaxy was directly behind the foreground galaxy and twice as far away. The astronomers suspect the other arcs also are illusions.

Light moving toward Earth from a faraway galaxy spreads out. Along the way, gravity from an intervening galaxy in *Abell 370* acted as a "gravitational lens," bending light like a glass lens. The bent light looked like an arc to observers on Earth.

The arc illusion was like a mirage on Earth which lets you look across flat land and see mountains hidden over the horizon. Light bouncing from mountains is bent by an inversion layer of cold air over hot air. The image of mountains bends down toward you.

Interestingly, the light-bending galaxies contain billions of stars but not

enough stars with sufficient brightness to be counted from Earth. The stars exist in those distant galaxies, giving off great quantities of energy, as do all stars. But the energy they radiate as visible light doesn't amount to much.

Cataclysmic explosions cause distant galaxies and other natural deep-space bodies to emit radio signals, visible light, infrared light, ultraviolet light, x-rays and other radiation.

Dark matter. Since they are massive enough to bend light from another galaxy, they must contain considerable "dark matter" invisible to astronomers on Earth.

Many astronomers think the Universe started expanding outward with a massive "Big Bang," 15 to 20 billion years ago. The theory suggests the Universe may eventually stop expanding outward and start shrinking back in on itself.

Something, of course, would be needed to stop the expansion so astronomers came up with the idea of dark matter. It might make the difference, they say, supplying enough gravity to slow the outbound expansion of the Universe.

Thus, astronomers have been searching for dark matter lately, thinking the amount of bright visible matter seen in the Universe is not enough to exert the gravitational force needed to stop the Universe from expanding forever.

Big Crunch. If all galaxy clusters sprinkled through the Universe contain as much dark matter as those which apparently formed the blue-arc mirages, the expansion eventually would grind to a halt. The Universe would reverse direction and collapse inward in a "Big Crunch," advocates of the theory say.

The National Optical Astronomy Observatories (NOAO) operates the Kitt Peak Observatory. NOAO referred to the blue arcs in 1987 as the largest visible structures in the

Universe. However, since then, astronomers have discovered a supercluster complex of galaxies 500 times larger.

Other known illusions have been blamed on gravitational lenses created by massive objects in space. For instance, a double image of a single quasar has been seen. A quasar is a quasi-stellar object. Quasars are the brightest objects in the Universe.

Doppler effect. The astronomers found the arc in *Abell 370* to be an illusion by measuring the so-called redshift or Doppler effect on light from the arc.

The Doppler effect makes a train whistle seem to increase in pitch as a train moves toward you. It causes an apparent decrease in pitch after the train passes and is moving away from you.

Higher pitch is a shorter wavelength. A lower pitch is a longer wavelength. If the Universe is expanding, distant galaxies are moving away from Earth. Their light increases in wavelength, shifting toward the red end of the light spectrum. The farther a galaxy is from Earth, the faster it and the Earth are moving apart and the more its light is shifted toward red wavelengths.

The redshift in the arc in *Abell 370* was about twice as great as the red shift of light from stars in that cluster. That indicates the light in the arc comes from a source twice as far away as the cluster.

Astronomy Day

by Sandy Ferguson

ASTRONOMY DAY - April 20, 1996

This year International Astronomy Week occurs the week of April 15-21, with International Astronomy Day being celebrated on Saturday, April 20th. This is the twentieth year in which Astronomy Day will be held in

Important Info

The Rystrom Observatory

Members are welcome to use the observatory at any time but please phone ahead. Call Nelson or Gloria Rystrom at 955-2370 before 9:00 p.m. if you intend on going out. This lets them know that someone will be roaming around their yard. If they do not answer so anyway. Drive through the yard slowly, and dim your lights as a courtesy to others who may be observing.

Saskatoon Skies 1996

Canada. This year the theme is "Canadian Discoverers", emphasizing the contributions Canadian amateur and professional astronomers have made to astronomical discoveries.

On April 20th we will be setting up our display tables and telescopes at The Mall at Lawson Heights, between 9:00 a.m. and 5:00 p.m. We also expect to have Rick Huziak's solar telescope set up outside at one of the entrances to give passersby an opportunity to check out the sun (and hopefully some spots) should the day be fair.

In the evening our first public starnight of the season is planned (weather permitting, of course). We are currently looking at holding this starnight in the Meewasin Riverbank Park along Spadina Cres. near Whiteswan Cres.

If this proves not to be a suitable site due to light pollution, we will then hold the starnight in Diefenbaker Park in our usual spot, which is on the southwest side of the hill, behind the trees, where we hold our summer starnights. Directional signs will be set up.

If anyone is able to donate some of their time that day to help at our display tables or to stand watch at the solar scope, your assistance would be greatly appreciated.

Also, anyone who can provide time, telescopes and astronomy knowledge will be needed at the starnight as well. Please give me a call at 931-3184 or catch me at a meeting if you can help out or require more information.

General Meeting Presentations

General Meeting Presentation Everyone is welcome to attend the next General

Meeting of the Saskatoon Centre of the Royal Astronomical Society of Canada, Saskatoon Centre. Speakers will be: Erich Keser - "The Florida Winter Star Party" Bill Hydomako - "Great Strides in the Building of the 16-inch Telescope" Erich attended this year's Florida Keys star party, and has some great tales to tell. Bill has been working with the U of S Physics Machine shop steadily for 3 months expediting the build our next telescope. Both presentations consist of a slide show and physical paraphenalia.

Father Lucian Kemble Visits Saskatoon

by Richard Huziak.

The Saskatoon Centre was honored at the February general meeting by a visit of Fr. Lucian Kemble (aka Lamplighter Luc), of Lumsden, Saskatchewan and a member of the Calgary Centre of the RASC. Fr. Luc gave an excellent and inspirational lecture on the pleasures and adventures of the past 50 years as an amateur astronomer.

The lecture was well attended with more than 20 members present. Fr. Kemble arrived the Saturday night before the general meeting. We had planned to spend the evening doing some deep sky observing at the Rystrom Observatory, but we were defeated by the weather (what, cloudy again?!) and by a bout of food poisoning that Luc picked up at the local 'chuck and puke'. Luckily it was not too serious, and Luc survived the night.

On Sunday, I picked Luc up and gave him a tour of the Rystrom Observatory and SED's Radarsat Antenna. For supper, several other Centre members joined us at Peter D's. including Al Hartridge, Ed Kennedy,

General Meeting Information

General Meeting - Monday, March 18, 1996 Room A-226 Health Sciences Building U. of Sask. Campus 8:00 P.M. Executive members are reminded that the executive meeting begins 7:00 pm sharp in Room B-10. Tentative programs for future General Meetings are: April 15 - Jamie Thompson - Canada's Part of the Japan Mars Mission May 20 - Sandy Ferguson - Women in Astronomy June 17 - vacant

Suggestions for general meeting speakers are always welcome. (Call Rick Huziak). Also, every member is welcomed and encouraged to give a presentation, big or small at a general meeting.

For 5 to 15 minute presentations, NO NOTICE is required. You can just show up and talk. We'll gladly fit you in! If you have interesting slides, you've seen something you'd like to share, or you've been somewhere, we'd all like to know.

A slide and overhead projector is always available. Other AV equipment is can easily be booked with 2 or 3 days notice.

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For further information please contact me or mail your questions to the address below.

The Editor

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Gord Sarty and Brian Friesen. Lively discussion ensued for several hours. Following Monday night's presentation, we made the traditional pilgrimage to **Tim Horton's Doughnuts** on 33rd and Idylwyld. However, with the large turnout at the doughnut shop, we soon discovered that this was not the ideal situation for casually meeting out guests. Seats here can be crowded and the tables are arranged in long rows, so it's difficult to have "round table discussion". My apologies for those who wanted to spend more time talking to **Fr. Luc**.

There's a great chance he will be at the **GA** in Edmonton, and at the Alberta and Kobau star parties, so you may want to try and corner him there.

Great Galaxies in the Perseus Area

by Scott Alexander

This month I thought we would look at a few open clusters and a few galaxies. The first open cluster to look for is in Perseus. This is an easy one to find, being close to a few bright stars. The cluster is called **NGC 1245**. It is magnitude 8.4, which is easy to see in a 6 or 8-inch telescope. This open cluster is also visible in 10x50 binoculars. The chart to find this open cluster is in **Uranometria 2000**, chart 63. I could not find any listing in the **1996 Observer's Handbook**.

Membership Info

Membership in the Royal Astronomical Society of Canada and the Saskatoon Centre is open to anyone and has many benefits.

Below are the prices for memberships. Should you require additional information please contact **Rick Huziak** at 665-3392.

Regular membership (21 & up).....	\$40.00
Youth Membership (21 & under).....	\$22.50
Club Newsletter (12 issues).....	\$10.00
Observer's Handbook.....	\$18.95

Note: Lifetime memberships are available on request for \$900.00

The next clusters to look for are called **NGC 869 (h)** and **NGC 884 (chi) Perseus**. These two beautiful clusters are very easy to find, even with a pair of 7x35 binoculars or anything bigger. This is, of course, the famed "Double Cluster". The RA and Decl. of these clusters are 02h19.0m +57deg10m for **NGC 869**, and 02h22.4m +57deg10m for **NGC 884**.

The magnitudes are 6.1 and 5.3 respectively, though this is a bit deceiving as both are visible to the unaided eye from a dark sky site. Both clusters have red and blue stars in them, which makes them very pretty.

The next objects to try for are 3 galaxies next to **M34** in **Perseus**. The first is **NGC 1023** which is an elliptical galaxy of type SB(rs)O. Position is 0240.4 +3904. Magnitude is 9.3. This galaxy has an extremely bright nucleus which will help ID this as a galaxy. There is also a diffuse bar on top and on either side of the center of the galaxy. Next, look at **NGC 1003**. Position is 0239.3 +4052. Magnitude is 11.4. Type is SA(s)cd III. The galaxy is visible in a 6- to 8-inch telescope under a dark sky. The galaxy also has 5 companions within 5 arc-minutes, but don't look for these galaxies with anything less than a 10-inch scope, as they range from 14.5 to 15.7 magnitude. Information on these galaxies can be found on **Uranometria chart #62**. The last object to try for is the galaxy called **NGC 1058**. Position is 0243.5 +3721. Magnitude is 11.2. Type is SA(rc)c III. The galaxy has a bright center and much dimmer arms around it. The galaxy is almost as wide as it is long, so this should be a nice one to look at with a 6- or 8-inch telescope under a dark sky. Good Luck and Clear Skies!!!

How To....Decode RA and Decl in the Sky

by Richard Huziak

Many newcomers to astronomy might

be a bit confused by the coordinate system of the sky. But in reality, it really isn't that hard. The sky is marked off in a grid system, the same as the Earth's globe is. The only real difference is that we call longitude (the distance east and west) "Right Ascension or RA", and the latitude (the distance north and south) "Declination or Dec or Decl".

Just as the earthly location of 106 degrees 43 minutes W longitude and 52 degrees 08 minutes N latitude puts you somewhere in **Saskatoon**, RA 02h39.3m +40 degrees 52 minutes puts you at **NGC 1003** in **Perseus**. (See **Scott Alexander's article**). Whereas longitude is measured in degrees west or east of **Greenwich**, RA is always measured in degrees east of the 0-hour line in the sky (somewhere in **Pegasus**), and instead of being divided into 360 degrees, RA is divided into 24 hours. This is actually quite handy, as if you wait one hour, the sky 'turns' by 1 hour in RA! Thus it makes sense that the sky turns in 24 hours, or one day.

Declination on the other hand is still marked off in degrees above and below (north or south) of the celestial equator, which corresponds to the earth's equator projected out onto space for 0 degrees, and Polaris (more or less) for 90 degrees N. If not otherwise stated, RA and Decl are always given relative to the year 2000. This gives everyone a common baseline of where the object really is, and you can plot it or find it on a star chart such as **Sky Atlas 2000** or **Uranometria 2000**.

The reason for reference to the location at the year 2000 is because the Earth "precesses", or wobbles around a bit, causing the exact location of the stars (or the plane of the sky) to shift around noticeably over a relatively short time of 25 years or so.

Locations given in other epochs are written such as 0312.5 + 1226 (1950), if the coordinate system used is the

standard for the year 1950. The location of an object is generally written as "0312.5 +1237, which means "03 hours 12.5 minutes PA, 12 degrees 37 minutes N declination". This is usually sufficient to locate most objects, but some objects that need very precise locations also have the "seconds" component of the position added, such as 123718.3 +123718, (adding 18.3 seconds to the PA and 18 seconds to the decl), though notations of this nature are rare. Sometimes catalogs will show the position also written as 03h12.5m +12d37m, or 03h12m.5 +12o 37' or other slightly modified ways. There are all the same!

Just to make things complicated, it seems that the "Big Guy" had a bad day when he designed the other parts of the universe. For some reason, the ecliptic is tilted by 23.5 degrees to the 'normal' plane of the sky, so the planets travel in wonky orbits above and below the celestial plane. Sometimes solar system observers (and spacecraft orbit scientists) give coordinates in "ecliptic (heliocentric) PA and Decl". Also, people studying the Milky Way usually express their coordinate systems in "Galactic coordinates".

Thus planetary nebulae in the PK-catalog (see **Uranometria 2000**) are named after their galactic coordinates, strongly tilted to the celestial equator. PK planetaries are called names like **PK36 -1.1**, which indicates a galactic RA and decl of RA 36 degrees (1 hr), -1.1 degrees from the galactic reference point - the center of the Milky Way in **Sagittarius**!

Enough of this! There is a real practical use for the RA and declination. You can use it to find objects quickly using the setting circles on your scope!. All you have to do is have scope (very) accurately aligned to the north pole (**Polaris**). You locate a bright star of known location. Say you find a star at RA 1236.5 +1218. You center the star in the scope, then set your RA circle to the same hour angle as the star (12h36.5

degrees).

If you have a clock drive running, you will not have to reset this circle for the rest of the night. To find an object located at 1336.5 + 1826, you just move the scope until your setting circles read this location, look in the eyepiece, and "voila!", there is your object, providing of course that it is bright enough to be seen! This sure makes things easy to find for those of you who deplore star-hopping! You will notice that you simply offset the scope by exactly 1 hour in RA and by 6 degrees 8 minutes in declination. How much simpler could it be? If you do not have a clock drive, you will have to reset the circle to the known bright star after every observation. Offsetting a known distance is a very useful technique.

For example, daylight objects such as planets and bright stars can be located if you know the exact PA and dec of the moon which is usually easy to locate during the day. You can find the PA and dec of the moon on particular days either in **Sky and Telescope** or from the **Observer's Handbook**. The PA and declinations of any object in the sky are also found in any standard star catalog or handbook

RASC Journals for Sale

by Rick Huziak

Past-member Doug Miller has donated about 3 or 4 years worth of past Journals from about the years 1984 through 1988 to the Centre. If you'd like to acquire these past issues (new members?), they are yours for a *small* donation to "Telescope Fund". Just call me to make an offer at 665-3392 or 933-1676. I'll even deliver them FOC within the city if you actually make a donation.

*Due Came and Went
1 Centon Ago Guys!!!!*

March, and we still don't have all our 'established' members signed up for this year! How about cutting the cheque as soon as you see this article and sending into the mailbox: RASC Saskatoon Centre, PO Box 317, RPO University, Saskatoon, SK, S7N 4j8. We value all of our members, and we'd love to keep you on the mailing list. Forty bucks, please!

Victoria School Star Party March 14th or 15th

by Erich Kesser

On Thursday March 14th or Friday March 15th (the alternate day in case of cloud), we will be holding what may be our biggest school Star Party so far this year. At least four active amateur astronomers, including the R.A.S.C.'s president and v.p., have children who are attending Victoria School. The Principal and several members of the teaching staff have also indicated strong interest. Our Star Party will mark the end of a week of student and an evening of parent use of the Board's "Astrolab" portable planetarium, so this will be an excellent time for you to help introduce students and their parents to our passion. Please call Erich at 374-4264 or Rick at 665-3392 for further information on how you can help.

Impromptu Observing

by Erich Kesser

If it's a clear night, and the moon is not too full, why not call a few people and come out and observe. Boxing Day happened to be the first clear night (in several senses) in a while, so several of us got together for such a session at the Rystrom Site.

Winston Quan was gracious enough to once again provide us with the opportunity to look through his excellent 17.5" reflector, which he set up and took down in a manner of minutes with the help of Garth Abram.

Rick Huziak brought his inimitable 4.25" plumber's nightmare and also treated us to views through Eetook. Jim Wood and I used binoculars and went from scope to scope, feasting our eyes. It was an enjoyable occasion for all concerned, and the skies were so good that one intrepid fanatic (guess who!) was there to greet the dawn. Don't miss what could be a memorable night of stargazing just because it isn't a scheduled observing session. If it's a nice night, or promises to be one, call the RASC number so we can get a group together to go out under the stars!

New Mount for the Club's C5

by Erich Kesser

Winston Quan did much of the thinking and all the cutting to turn my vague idea for a suitcase mount to allow me to take the club's C5 to the Winter Star Party into a reality. Gluing and screwing the alt-azimuth mount in the style of John Dobson together produced an instrument suitable for the acutely vertically challenged. The addition of a disk formerly used under a grand piano and hardware store legs resulted in a highly portable and easy to use instrument which saw first light at 2:30 AM E.S.T.

On 13 February at 240 latitude on the Omega Centauri star cluster. Winston

wanted the mount to become club property, and I concur. It works especially when used like a Questar on a picnic or a sturdy table, but is much easier to use. Sign it out and give it a try!

Hubble offers first Surface View of Pluto

from the Star Phoenix

WASHINGTON (AP) - The first surface photos of Pluto show the distant planet has icy polar caps, just like Earth, with clusters of dark spots and bright features.

Pluto is a frozen world now 29 times farther from the sun than is the Earth. Pluto resembles a soccer ball in the fuzzy pictures taken by the Hubble space telescope and released on Thursday by NASA.

Bright patches of white are probably caused by nitrogen that has frozen in extreme temperatures and snowed onto the surface, said astronomer Alan Stern of the Southwest Research Institute in Boulder, Colo.

"We can see from the images that Pluto is the most variegated, contrasty object in the outer solar system," said Stern. The images reinforce the belief by astronomers that Pluto is one of the strangest of the nine planets orbiting the sun, he said.

"It is like an icy little dwarf on the outskirts of the solar system," said Anne Kinney of the Space Telescope Institute in Baltimore.

The planet is about two-thirds the size of the Earth's moon and is so far from the sun that sunlight on its surface is about as intense as moonlight is on Earth.

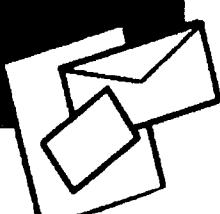
Pluto takes 248 years to orbit the sun and during all but 20 those years it is the farthest out of all the planets. It crossed inside the orbit of Neptune in 1979 and in 1999 will again move out to resume its most-distant place.

Minutes of the Executive Meeting

Present: ED Kennedy, Richard Huziak, Scott Alexander, Sandy Ferguson, Al Hartridge, Jim Young, Merlyn Melby, Brian Friesen, Gordon Sarty, Fr. Lucian Kemble.

1. Meeting called to order at 7.05 p.m.
2. Temporary Membership. There are now three temporary members. No Membership Coordinator yet.
3. Rick Huziak is lecturing at the MVA March 10. Volunteers are needed to help
4. Astronomy Day will be April 20. It will be held in Lawson Heights Mall. StarNight to follow at the Mewassin land dump.

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5.General Meeting for May 20 falls on Victoria Day. We will change date of the meeting to May 13.

6.Regina is planning a Cypress Hills Starnight in July. May conflict with our July Public Starnight.

7.General Assembly in Edmonton. Gordon and Rick may organize a display. We could organize a car pool for those wishing to attend the meeting.

8.Observers Group. There hasn't been any activity for a while. Next dates are: Mar.22, April 12, May 17.

9.Newsletter - Garry has found a 0-cost printer.

10. Sky and Telescope: Moved by Jim Young and seconded by Scott Alexander and carried that we renew the club subscription.

11.Contribution: The center will make a contribution to D. Hube towards a gift for Rosemary. Ed suggests we talk to D. Hube before we send anything . It might be a good idea to get all centers to contribute to one fund.

12. Contribution: Rick suggests we reimburse Fr.Kemble for some of his expenses. We will give \$35.00 toward this.

13.National Council News: the fate of Astronomy Canada may be decided at the Mar.23rd meeting. Rick would like to speak to this and would like to attend the meeting if he can get a good price on a ticket and partial remuneration. Gordon thinks the readership will be more important than the format to professionals who are interested in publishing. U of T may handle membership fees in future. They are well set up to do this.

Minutes of the General Meeting

Minutes of general meeting Feb.19,1996.

1.Call to order at 8.05.

2.Telescope Project progress report. Bill

gave a short report saying that he plans to give a detailed report along with a slide presentation in the near future.

3.Temp. membership list is down to three. There is still no Membership Coordinator.

4.OG meetings:next dates are Mar22, Apr 12, May 17.

5.GA project and Centre attendance- see minutes of executive for Feb.19.

6.Simon Newcomb Award submissions are due March 21,1996. This award is given by the National Office for writing about astronomy to a non professional.

7.Progam: a wonderful talk given to the group by Fr. Lucian Kemble. We thank him for imparting some of his knowledge and experince to us.

Facts about the Planet Mars

downloaded from the Internet by Garry Brett

Mars is the fourth planet from the Sun and the seventh largest: distance from Sun: 227,940,000 km (1.52 AU) diameter: 6,794 km , mass: 6.4219e23 kg Mars (Greek: Ares) is the god of War. The planet probably got this name due to its red color. Mars is sometimes referred to as the Red Planet. (An interesting side note: the Roman god Mars was a god of agriculture before becoming associated with the Greek Ares; those in favor of colonizing and terraforming Mars may prefer this symbolism.) The name of the month March derives from Mars. Mars has been known since prehistoric times. It is still a favorite of science fiction writers as the most favorable place in the Solar System (other than Earth!) for human habitation. But the famous "canals" "seen" by Lowell and others were, unfortunately, just as imaginary as Barsoomian princesses.

The first spacecraft to visit Mars

was Mariner 4 in 1965. Several others followed including the two Viking landers in 1976. Mars's orbit is significantly elliptical. One result of this is a temperature variation of about 30 C at the subsolar point. Overall, the Viking landers found that Martian temperatures vary from 150 K (-220 F) to 295 K (70 F). Though Mars is much smaller than Earth, its surface area is about the same as the land surface area of Earth.

Except for Earth, Mars has the most highly varied and interesting terrain of any of the terrestrial planets, some of it quite spectacular:

Olympus Mons: the largest mountain in the Solar System rising 24 km (78,000 ft.) above the surrounding plain. Its base is more than 500 km in diameter and is rimmed by a cliff 6 km (20,000 ft) high .

Tharsis: a huge bulge on the Martian surface that is about 4000 km across and 10 km high.

Valles Marineris: a system of canyons 4000 km long and from 2 to 7 km deep

Hellas Planitia: an impact crater in the southern hemisphere over 6 km deep and 2000 km in diameter . Much of the surface is very old and cratered), but there are also much younger rift valleys, ridges, hills and plains.

The southern hemisphere of Mars is predominantly ancient cratered highlands somewhat similar to the Moon. In contrast, most of the northern hemisphere consists of plains which are much younger, lower in elevation and have a much more complex history. An abrupt elevation change of several kilometers occurs at the boundary.

The reason for this global dichotomy is unknown (some speculate that it is due to a very large impact shortly after Mars's accretion). The interior of Mars is known only inference from data about the surface

and the bulk statistics of the planet. The most likely scenario is a dense core about 1700 km in radius, a molten rocky mantle somewhat denser than the Earth's and a thin crust. The lack of a global magnetic field indicates that Mars's core is probably solid. Mars's relatively low density compared to the other terrestrial planets indicates that its core probably contains a relatively large fraction of sulfur in addition to iron (iron and iron sulfide).

Like Mercury and the Moon, Mars appears to lack active plate tectonics; there is no evidence of horizontal motion of the surface such as the folded mountains so common on Earth. With no lateral plate motion, hot-spots under the crust stay in a fixed position relative to the surface.

This, along with the lower surface gravity, may account for the Tharis bulge and its enormous volcanoes. There is very clear evidence of erosion in many places on Mars including large floods and small river systems.

At some time in the past there was early water on the surface. There may have been large lakes or even oceans. But it seems that this occurred only briefly and very long ago; the age of the erosion channels is estimated at about nearly 4 billion years. (Valles Marineris was NOT created by running water. It was formed by the stretching and cracking of the crust associated with the creation of the Tharsis bulge.) Early in its history, Mars was much more like Earth. As with Earth almost all of its carbon dioxide was used up to form carbonate rocks. But lacking the Earth's plate tectonics, Mars is unable to recycle any of this carbon dioxide back into its atmosphere and so cannot sustain a significant greenhouse effect. The surface of Mars is therefore much colder than the Earth would be at that distance from the Sun.

Mars has a very thin atmosphere composed mostly of the tiny amount of maining carbon dioxide (5.3%) plus nitrogen (2.7%), argon (1.6%) and

traces of oxygen (0.15%) and water (0.03%). The average pressure on the surface of Mars is only about 7 millibars (less than 1% of Earth's), but it varies greatly with altitude from almost 9 millibars in the deepest basins to about 1 millibar at the top of Olympus Mons. But it is thick enough to support very strong winds and vast dust storms that on occasion engulf the entire planet for months. Although its atmosphere is mostly carbon dioxide (like Venus's), the greenhouse effect on Mars is strong enough to raise the surface temperature by only 5 degrees (K).

Mars has permanent ice caps at both poles (picture 7) composed mostly of solid carbon dioxide ("dry ice"). The ice caps exhibit a layered structure with alternating layers of ice with varying concentrations of dark dust. In the northern summer the carbon dioxide completely sublimes, leaving a residual layer of water ice. It's not known if a similar layer of water ice exists below the southern cap since its carbon dioxide layer never completely disappears.

The mechanism responsible for the layering is unknown but may be due to climatic changes related to long-term changes in the inclination of Mars's equator to the plane of its orbit. There may also be water ice hidden below the surface at lower latitudes. The seasonal changes in the extent of the polar caps changes the global atmospheric pressure by about 25% (as measured at the Viking lander sites).

Recent observations with the Hubble Space Telescope have revealed that the conditions during the Viking missions may not have been typical. Mars's atmosphere now seems to be both colder and dryer than measured by the Viking landers. (more details from STScI) The Viking landers (picture 16) performed experiments to determine the existence of life on Mars. The results were negative. Optimists point out that only two tiny samples were

measured and not from the most favorable locations. More experiments will be done by future missions to Mars. A small number of meteorites (the SNC meteorites) are believed to have originated on Mars.

Mars has no global magnetic field. When it is in the nighttime sky, Mars is easily visible with the naked eye. Its apparent brightness varies greatly according to its relative position to the Earth. Mike Harvey's planet finder charts show the current position of Mars (and the other planets) in the sky.

Letter from the Editor

I hope that you enjoyed this issue of the newsletter. I tried to make sure that there was lots of interesting things to read.

Latley the company that I own has become extremly busy and this has placed great demands on my time, so much so that I have to book time to see my family! It is for this reason that I must resign as newsletter editor of the Saskatoon Skies. I will put out the April & the May issue and these will be my last newsletters.I will also be dropping off the executive as the new newsletter editor will take my position.

Time is a very important factor and when you reach a point where you have to account for every hour something has to give. I have enjoyed putting out the newsletter and will give whoever you find to replace me all the help that I can.

If you are interested in becoming the editor of the Saskatoon Skies give Rick a call and let him know.Thanks.....Ed.

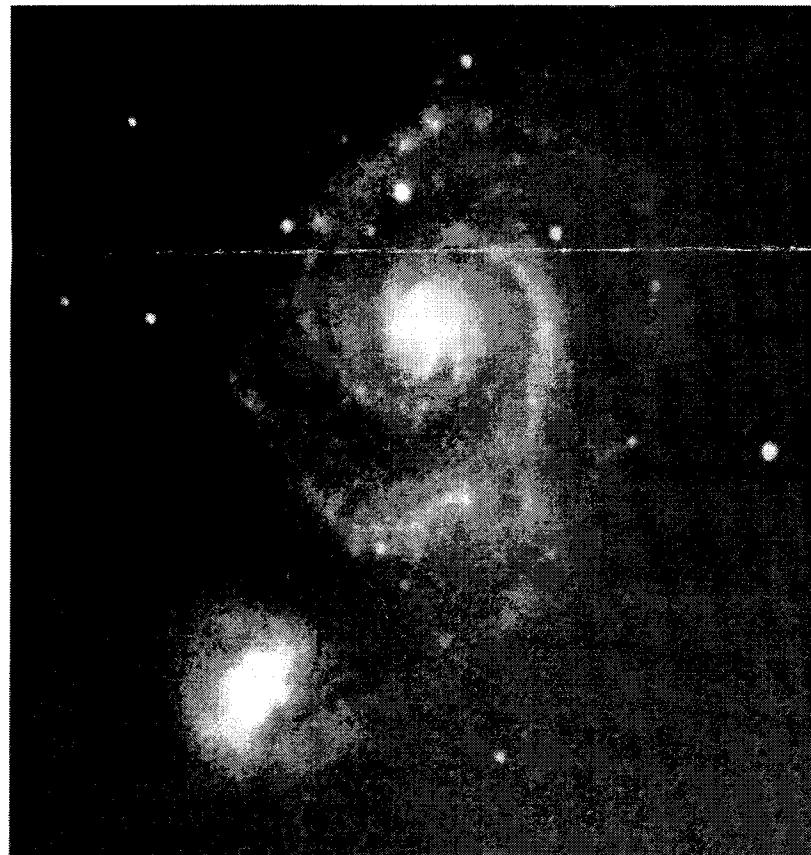
***The Deadline
for the April
Newsletter is
March 25/96***

ASTROPHOTO CORNER

MAR. 1996

RASC SASKATOON CENTER

PHOTO OF THE MONTH



THE WHIRLPOOL GALAXY M51 CANES VENATICI

This beautiful system lies about 31/2 degrees south west from Eta Ursae Major, the end star in the handle of the Big Dipper. Found by Messier in 1773 it was the first galaxy discovered to have a spiral form. M51 is an sc type spiral, it is about 35 million light years distant, 8th magnitude visually, and about 10' in apparent diameter.

It can be seen in a good pair of binoculars in a good sky but requires at least an 8 inch telescope to begin to appreciate any spiral detail. It is a fine view in my C14. This galaxy has a total mass of about 160 billion suns and a diameter of about 100,000 light years. Also note the satellite galaxy MGC 5195 with which it has probably interacted gravitationally.

TECHNIQUE:

The photograph of M51 was taken with my C14 with focal reducer to about 2700 mm.fl. Exposure was 60 mins. on hypered Tech Pan 2415. The negative was developed in D19 for 6 mins. at 70 degrees F. The negative was enlarged onto # 5 high contrast photographic paper. The finished print was scanned into my computer and received some digital manipulation to enhance the contrast slightly before laser printing it onto this paper. Reproduction for the news letter is not too bad although ones always gets what I call some digital smudging of the spiral detail which spoils the photo somewhat in my estimation and is a sure sign of photoediting.

Clear skies and good guiding ----- Al Hartridge