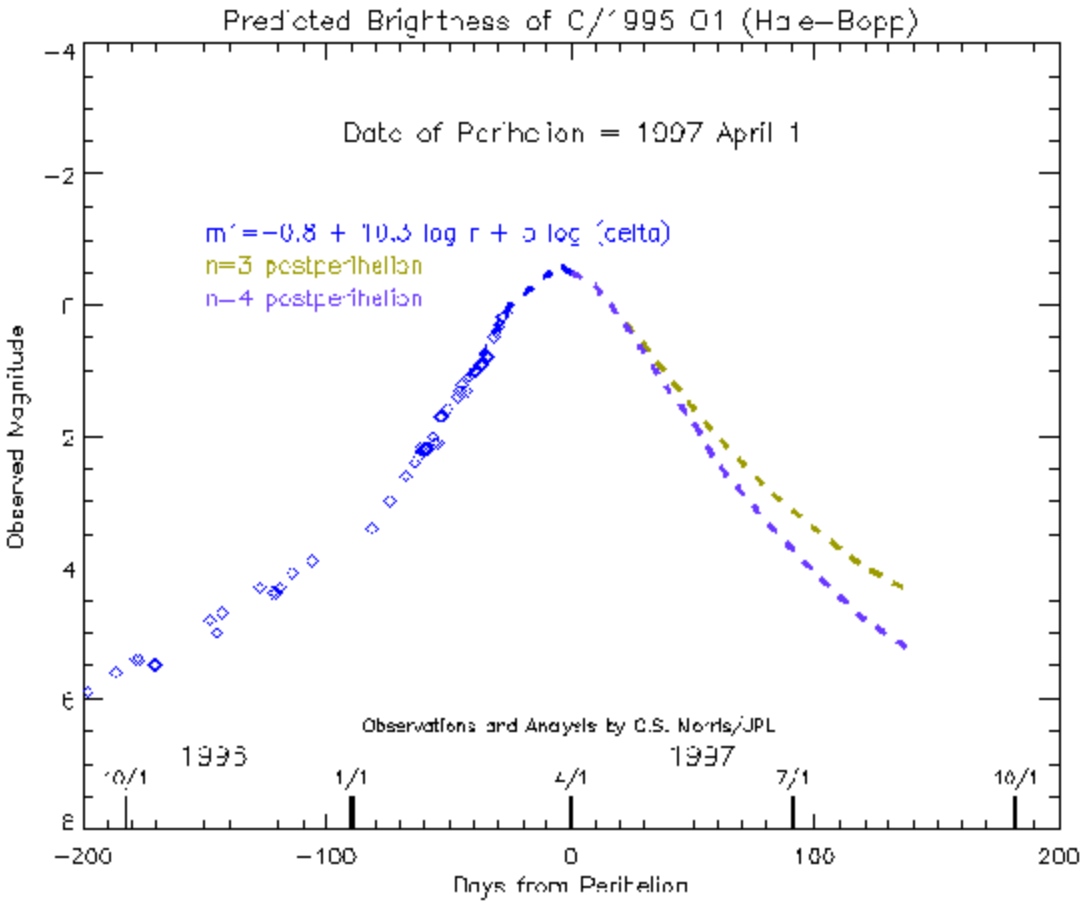
# Regulus

Newsletter of the RASC Kingston Centre Issue 97-02
March/April 1997

## Light Curve of Comet Hale-Bopp




Since the comet is easily visible to the naked eye when you look to the north, I've added this instead... from the web site *http://encke.jpl.nasa.gov/*

**General Concepts**

The first step in obtaining a light curve of a comet is to obtain a series of estimates of the comet's brightness, the integrated brightness of the comet's head or coma. For relatively bright comets like Hale-Bopp, these estimates are typically made by (amateur) visual observers, who compare the comet's head to defocused stars of known brightness. The stars are defocused because the comet's head has size whereas, the stars are points of light. An observer defocuses the stars until they match the size of the comet's head. Then the relative brightness of the comet is determined by comparing the comet's brightness with the defocused comparison stars. The result is a magnitude estimate of the comet, the observed magnitude. [The brightness of stars is also expressed in magnitudes. The smaller the magnitude, the brighter the object. The brightest star in the sky, Sirius, is magnitude -1.5. Polaris, the pole star is about magnitude 2. Jupiter is about -2, and the faintest stars that can typically be seen with the naked eye (in very dark skies away from the city) are roughly magnitude 6-7. In contrast, the full Moon is about magnitude -13 and the Sun is approximately -26! A one magnitude change amounts to a factor of 2.5 in brightness. A five magnitude change is a factor of 100 in brightness.

A comet's brightness variation with respect to its distance from the Sun is often represented by a "power-law" formula:
observed magnitude = absolute magnitude + 5 log (delta) + 2.5 n log (r)
where delta is the Earth-comet (geocentric) distance in astronomical units (AU), r is the Sun-comet (heliocentric) distance in AU and n is the "power-law exponent." One AU is equal to the Earth-Sun distance - about 93 million miles or 150 million kilometers.

# The Centre

The Newsletter of the Kingston Centre of the Royal Astronomical Society of Canada

**Newsletter Submission Info:**
Deadline is the Friday before regular meetings in odd numbered months. The preferred method is EMAIL, then disk, lastly paper (I hate retyping... too many mistakes happen). email: ***kell@cliff.path.queensu.ca***
Fax: 1-613-545-2907 (with cover page to Kevin Kell)
Post: Box 2033 Kingston Ontario K7L5J8 Canada
ascii or most major word processors (WP6.1 for windows preferred) via email or 3.5" DOS floppy disk

Our Web page can be found at:
***http:/www1.kingston.net/~rasc***

**Officers and Executive Council**

| | |
|---|---|
| President: | Peggy Torney |
| Vice President: | Christine Kulyk |
| Secretary: | Laura Gagne |
| Treasurer: | Kim Hay |
| Editor: | Kevin Kell |
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| Alternate Rep: | Susan Gagnon |
| Librarian: | Jim Towgood |
| Honorary President: | David Levy |

To Send email to all members of the Kingston Executive, address it to: ***rascexec@cliff.path.queensu.ca***

**Committee Chairs**

| | | |
|---|---|---|
| Astronomy Day: | Cathy Hall | 613-xxx-xxxx |
| Education: | Kim Hay | 613-xxx-xxxx |
| Publicity: | Christine Kulyk | 613-xxx-xxxx |
| Observing: | Peggy Torney | 613-xxx-xxxx |
| Light Pollution: | John Baker | |
| GA: | Peggy Torney | 613-xxx-xxxx |

**Centre Location**: RASC - Kingston Centre, PO Box 1793, Kingston, Ontario K7L 5J6 Canada
Approx Lat: 44.5 Long 75.4 (until I get out the Topo Map)

# Upcoming Meetings

**Friday 1997 March 14** Steve Manders, RASC Kingston Centre, "Convection Currents in the Sun"
**Friday 1997 April 11** Dr. Jayanne English Postponed until July... This meeting TBA
**Friday 1997 May 09** Cathy Hall & Walter McDonald & Doug Clapp, RASC Kingston & Ottawa Centres, "Star Hill Inn Expedition"
**Friday 1997 June 13** GA Prep Meeting
**1997 June 28 - July 01** General Assembly
**Friday 1997 July 11** Post GA Stress Blowout; Kevin Kell, RASC Kingston Centre, "Reports from Mars" and Dr. Jayanne English of Queen's Physics Dept., is a postdoctoral fellow in astronomy. Her talk will be on "Visualization in Astronomy"--the many different tools and techniques that astronomers now have for visualizing astronomical concepts.

**Friday 1997 August 08** TBA
**Friday 1997 September 12** Member's Night
**Friday 1997 October 10** Annual Elections
**Friday 1997 Nov 14** TBA
**Friday 1997 December 12** Annual Holiday Dinner & Awards


Regular Meetings of the Kingston Centre are held on the 2nd Friday of each month (unless noted otherwise) at 20:00 local time in **Room B-201, Mackintosh-Corry Hall** at Queen's University (parking available off Union Street at Frontenac).

# From The Editor

Whew! What a month. The new membership list (current as of late Feb) shows us at 134 entries. Looks like most of you were able to find your way through the new membership system OK. This issue will contain a membership list, to allow you to contact others and interact.

# From The Prez

Nothing this issue... maybe next!

# From The Secretary

Minutes from the last meeting have been received but lack of space in the issue has bumped them to the next issue.

# From The Treasurer

Nothing new this month. Contact Kim if you are having any problems with the UTP membership system.

# Astronomy Day

by Cathy Hall

On Saturday April 12th, Canadian astronomers will be joining with colleagues around the world to celebrate International Astronomy Day.

This will be the 21st year in which this event has been celebrated in Canada. It has always been a special time to share with the public our interest in space and the stars.

Kingston will be hosting an all-day display at the Cataraqui Mall - with telescopes, displays on easels, table displays, information handouts, and lots of members to talk to the public, and answer questions.

For those interested in helping out, please contact me at 613-xxx-xxxx, or by e-mail at *[xxx]* We are interested in telescopes and bright, colourful displays that can be seen from a distance. Specialized items, such as sky globes and models, are always popular with children! If you have astronomical drawings or photos that you've done, bring them along! If you just want to stop by and chat with the public for an hour or so, that's great too! Astronomical attire is encouraged!

The display will be at Cataraqui Mall, same as last year. Larger items must be brought in through the service entrance on the lower level. Setup time for telescopes and displays will be from 8.00 a.m. to 9.00 a.m.. The mall opens at 9.30 a.m. and the display will be on all day, until 6.00 p.m..

Details of an observing session afterwards - weather permitting - will be a joint session with the Queen's Astronomy on Kingston Field (just south of Grant Hall). If you are planning to help out, or contribute material, please let me know as soon as you can. We encourage as many as possible to participate! Astronomy Day is always a lot of fun - and a great opportunity to spread the word about our R.A.S.C. Kingston Centre activities!

# National News

Date sent: Tue, 04 Mar 1997 10:45:45 -0400
From: Peter Jedicke <jedicke@zeus.fanshawec.on.ca> (by way of "David J. Lane" <dlane@ap.stmarys.ca>)
Subject: RASC Centres: RASC List: Summary of Motions Presented at National Council 97 03 01

Motions of National Council at the meeting held 1997 03 01 in London, Ontario.
Note: the following is presented merely to foster discussion and communication within the Society. This list of the motions considered at the meeting of National Council is completely unofficial and is the responsibility of the National Recorder. For official purposes, wait for the completed minutes in a few days.

**MOTION 97101**
It was moved by Mr. Lane and seconded by Mr. Ulrich that the minutes of the meeting of Council of 1996 10 26 be accepted.
The motion was CARRIED.

**MOTION 97102**
It was moved by Ms. Hay and seconded by Mr. McCausland to accept the list of new unattached members as circulated.
The motion was CARRIED.

**MOTION 97103**
It was moved by Mr. Attwood and seconded by Mr. May that Messier Certificates be awarded to Denis Boucher (Edmonton), Kenneth Davy (Toronto), Richard Huziak (Saskatoon), Gord Sarty (Saskatoon) Mark Viol (Toronto), and that an NGC Certificates be awarded to Denis Boucher (Edmonton).
The motion was CARRIED.

**MOTION 97104**
It was moved by Dr. Gupta and seconded by Mr. Attwood that with a maximum term of 5 years.
The motion was CARRIED.

**MOTION 97105**
It was moved by the Committee that the accounting procedure for life membership fees be modified so as to annually add to the accumulated fees the amount of interest (calculated according to the current average rate of return on the Society's investments)

earned by these fees.
The motion was CARRIED.

**MOTION 97106**
It was moved by the Committee that a motion be presented to the annual meeting to change the life membership fee by reducing the life membership fee to 20 times the annual membership fee.
The motion was CARRIED.

**MOTION 97107**
It was moved by the Committee that MOTION 92208 of Council, stating that "it is the policy of National Council that the annual budget prepared by the Finance Committee under Article 7:09:2(a) of By-Law Number One shall not forecast a deficit," be repealed.
**MOTION 97107** was amended to read that MOTION 92208 of Council, stating that "it is the policy of National Council that the annual budget prepared by the Finance Committee under Article 7:09:2(a) of By-Law Number One shall not forecast a deficit," not apply to the 1997 budget.
MOTION 97107 was CARRIED as amended.

**MOTION 97108**
It was moved by the Committee that the 1997 budget as given in the report of the finance committee be approved.
The motion was CARRIED.

**MOTION 97109**
It was moved by Dr. Garrison and seconded by Mr. Whitman that thanks and congratulations be expressed to Dr. Bishop for his continuing efforts.
The motion was CARRIED.

**MOTION 97110**
It was moved by Dr. Turner and seconded by Mr. McCausland Chilton Prize for Heather Cameron.
The motion was CARRIED.

**MOTION 97111**
It was moved by Mr. Attwood and seconded by Mr. Ascroft that the Awards Committee proceed with the development of the Beginners, Intermediate and Senior Observing Awards. At the next meeting a detailed description of the requirements for each award will be presented. As well, a complete description of the process for achieving the awards will be detailed.
The motion was WITHDRAWN.

**MOTION 97112**
It was moved by Mr. Watson and seconded by Mr. Lane that Bylaw #1 be amended to repeal Article 6.16, to renumber Articles 6.17 to 6.20 and to delete reference to the Bulletin Editor in Article 7.15.

**MOTION 97113**
It was moved by Mr. Lane and seconded by Mr. St. George to amend MOTION 97112 to also change Article 7.15 to permit up to four additionl members to the Publications Committee.
**MOTION 97113** to amend MOTION 97112 was CARRIED as special resolution of Council.
MOTION 97113, as amended, was CARRIED as special resolution of Council.

**MOTION 97114**
It was moved by Mr. Jedicke and seconded by Mr. Ulrich that Mr. Raymond Auclair be appointed to the position of National Secretary, effective immediately, for the remainder of the current term.
The motion was CARRIED.

**MOTION 97115**
It was moved by the Committee that Dr. Jack Locke be appointed as Honorary President of the Society.

**MOTION 97116**
It was moved by Mr. Watson and seconded by Mr. Whitman to table MOTION 97115.
MOTION 97116 to table MOTION 97115 was CARRIED.

**MOTION 97117**
It was moved by Dr. Turner and seconded by Dr. Garrison that Honorary Membership in the Society be conferred on Dr. David Crawford.
The motion was CARRIED.

**MOTION 97118**
It was moved by Mr. Lane and seconded by Mr. Noesgaard that Council accept the invitation of the Victoria Centre, subject to completion of a proposal of received before the next meeting of Council.
The motion was CARRIED.

**MOTION 97119**
It was moved by Mr. Watson and seconded by Dr. Garrison that Council approve in principle that the 1999 General Assembly be held in Toronto, jointly with the Astronomical Society of the Pacific.
The motion was CARRIED.

**MOTION 97120**
It was moved by Ms. Hay and seconded by Mr. McCausland that a General Assembly startup loan be given in advance to any Centre hosting a General Assembly the following year, that the loan be paid back in full after the General Assembly, when that Centre's accounting for the GA has been completed, and that this policy take effect after the 1997 General Assembly.

**MOTION 97121**
It was moved by Mr. Watson and seconded by Mr. Attwood to amend MOTION 97120 to amend the General Assembly Guidelines to mention that any Centre hosting a General Assembly the following may apply for a General Assembly startup loan through the

Treasurer and the Finance Committee.
The motion to amend MOTION 07120 was CARRIED.
MOTION 97120 was CARRIED as amended.

**MOTION 97122**

It was moved by Mr. Ascroft that the meeting be adjourned.
The motion was CARRIED at 16h24.

# General Assembly News

The Schedule is Set, the registration is set. We have mailed out registration packages to all who have requested them and will distribute them at the March meeting.

With the 1997 GA being hosted by the Kingston Centre this year, not to far off, we are having several fund raisers to help out. Everyone has been very supportive, and I hope that it will continue. Below are the following winners so far in our Special Draws: **December 13, 1996**- 1st Prize - Christmas Basket - Susan Gagnon 2nd Prize-1997 Calendar by Terence Dickenson- Susan Gagnon
**February 14, 1997** -1st Prize - A Messier Telescope Companion by Roger Fell- Susan Faris -2nd Prize- Philips Star Chart Poster Epoch 2000 -Laura Gagne
We are also holding 50/50 draws at every meeting , winners so far: **January** 10.1997 - Dr. Judith Irwin; February **14, 1997** - Susan Gagnon

**Upcoming events:** Another draw will be coming up for the April 11, 1997 meeting. First Prize- A mounted Poster of Star Clouds and dust in the Milky Way, donated by Kevin Kell, and our Second Prize will be a photo (5 x 7) of Comet Hyakutake taken by Leo Enright, donated by Christine Kulyk. Tickets are 3 for $1.00 or 50 cents each. If out of town Kingston members are interested in tickets, please let Kim Hay know at *[xxx]t*

In May we will be holding a Garage Sale. If anyone has any items they want to get rid of during their spring cleaning keep us in mind. Contact either *[xxx]* or *[xxx]* More details to follow.
Respectfully Submitted, Kim Hay, Treasurer, Kingston Centre & GA Committee

# BBS News

Not much this month... however a reminder that if you do not have internet access, call one of these BBS's to access the RASC national Email list, which is actively gated into a fidonet echo carried on these sites.

The following Kingston BBS's are RASC support boards:
✷Observatory East (Mark Kaye) FidoNet 1:249/109 2400-28800 bps 8N1V.34
✷ StarStream (Kevin Kell) FidoNet 1:249/112 14400-28800 bps 8N1V.34
✷ Moonlight Cascade (Kim Hay) FidoNet 1:249/133 2400-28800 bps 8N1V.FC

# Submissions from the Members

**Meteor Watching submitted by Kim Hay**

For the past several months, I have belonged to a group called the North American Meteor Network, or NAMN for short. Though I have not been actively participating in the watch for meteors as much as some of the other members, I find it a very fascinating branch of Astronomy. With the permission from Mark Davis, NAMN Co-ordinator, I would like to present the 1997 Major and Minor Meteor Showers. I hope that these charts will help everyone who always wants to know where that "shooting star" came from.

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NAMN 1997 Meteor Shower Calendar
North American Meteor Network
1997 Meteor Shower Calendar Major Shower Highlights
For more information contact Mark Davis
*MeteorObs@Charleston.Net*
"Printed with permission from Mark Davis"

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A challenging year with the Lyrids, Orionids, Leonids and Geminids all hampered by poor moon conditions.

What follows is the calendar of NAMN target showers for 1997. In general, these are the best showers to observe using visual techniques. Some showers, severely hampered by moonlight in 1997, have been included to give the observer a complete picture of 1997 possibilities.

I would like to thank Wayne Hally who is responsible for compiling the 1997 edition. -Mark Davis NAMN Coordinator

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**QUADRANTIDS:**
Peak near sunrise on January 3rd. 40% lit moon rises just after 1 AM. Rate exceeds 20/Hr for 24 hours, near 100/Hr for only 12. Visible from January 1st to 5th.

**LYRIDS:**
Peak on April 21/22 obscured by a full moon this year. 12 hour high rate is centered before midnight this year.

**ETA AQUARIDS:**

One of the best Southern Hemisphere showers, where rates exceed 20/hr for 10 days, peaking at 60/hr near the 5th of May. Due to low declination, fewer members are visible in North America. This year's new moon provides an opportunity to see more of these Comet Halley particles than usual, and contribute valuable data on low elevation radiants. Highest rates from May 2nd to 8th after midnight.

**PERSEIDS:**
Visible from mid July to the end of August, the Perseids peak on August 11/12. The moon sets around midnight, so a long night of viewing can be planned. 1995 data indicates enhancement from Comet Swift-Tuttle's 1992 return is keeping rates well over 100 per hour in outbursts earlier than the traditional peak.

**SOUTHERN DELTA AQUARIDS:**
The most active of 4 radiants in Aquarius in late July and early August. Peak is on Aug 27/28, some moon free hours are after midnight until moonrise.

**ALPHA and DELTA AURIGIDS:**
With the new moon between these two shower's peaks, much needed data can be obtained. The Alpha Aurigid's maximum is on the night Aug 31/Sep 1; the Delta Aurigid's on Sept 8th.

**ORIONIDS:**
Comet Halley's other shower is badly affected by the gibbous moon rising before midnight on Oct 20/21.

**LEONIDS:**
The Leonid's peak of Nov 17th this year is just after full moon so observations will be limited, however 1995 featured many bright meteors so it should be fun. The bad conditions this year mean the moon will cooperate in 1998 and 1999, when a dense stream of dimmer particles may cause meteor storm rates of thousands per hour.

**GEMINIDS:**
The Geminid's peak of Dec 12/13 and 13/14 is on the full moon. Radiant rises late so observe after midnight.

**URSIDS:**
This shower, peaking on Dec 21/22 is in need of more observations. Outbursts have occurred in the past. A quarter moon will be present, but observations are recommended anyway.

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**JANUARY BOOTIDS**
Radiant: RA=226 degrees (15 hours 04 minutes), DEC=+44 degrees Observations of this radiant extend all the way back to the 1870s, but it has never been fully studied. Since 1937 there have only been a handful of visual observations, and the existence of only one photographic meteor orbit did not inspire further observations. The modern study of this stream began in 1958, when it was observed with the radio telescope at Jodrell Bank during January 11 to 25, with a peak on January 18. A radiant was determined at the time of maximum. Interestingly, eight radar stations in Russia detected enhanced meteor activity on January 15-16 of that year, but no radiant was determined. The radiant was again detected during the 1969 session of the Radio Meteor Project. The duration of activity covers the period of January 9-18, with maximum falling sometime between January 16-18 in 1997. Full moon on the 23rd will not greatly interfere with observations of the radiant which reaches the zenith at about 6:40 a.m.

**AURIGIDS**
Radiant: RA=74 degrees (4 hours 56 minutes), DEC=+42 degrees Occasionally referred to as the Alpha Aurigids. This minor meteor shower seems to have been observed quite often during the late 19th and early 20th centuries, with famous British amateur astronomer William F. Denning and other observers noting it was rich in bright fireballs; however, it is frequently ignored nowadays. It is uncertain whether this indicates activity from the radiant is waning or not. Based on only a handful of observations since 1970, hourly rates seem to reach a maximum of only 1 or 2 per hour, although the Western Australia Meteor Section found a ZHR of 7.3 during February 2-7, 1980. There is only one photographic meteor orbit available for this radiant and no radio-echo orbits, so the stream's orbit is very poorly known. The radiant's duration extends from January 31 to February 23, with maximum occurring sometime between February 4 and 10. A February 7 new moon will favour observations in 1997, with the radiant at the zenith around 8 p.m. (local time).

**XI DRACONIDS**
Radiant: RA=280 degrees (18 hours 40 minutes), DEC=+54 degrees This radiant was discovered in 1996 by six individuals in the United States and Europe, including two NAMN members. The observations were made between June 12 and 18. Research has revealed no trace of the radiant prior to 1931, but 10 visual radiants, possibly as many as 19 photographic meteor orbits, and 11 radio-echo meteor orbits since 1931. Especially notable are the three visual radiants detected during 1931 from Europe and the United States. The duration seems to extend from June 2 to 23, but despite all of the data, the maximum can not be pinpointed any better than Solar longitude 81 to 85 degrees, which will

occur within the period of June 12 to 16 in 1997. Although the radiant is circumpolar, it will pass through the zenith around midnight. The moon will be full on June 20, so morning observations around the time of maximum are favoured. This radiant desperately needs more observations.

**ARIES-TRIANGULIDS**
Radiant: RA=31 degrees (2 hours 04 minutes), DEC=+30 degrees This radiant was discovered on September 12, 1993 by three individuals in the United States and a possible fourth in Europe. The radiant appears to have a rather rich history, with 20 radiants plotted during the period of 1915 to 1967, yet no one ever recognised it as a returning radiant. In addition, a search through a database of over 39000 radio-echo meteor orbits revealed 47 likely members of this stream, so the orbit is well determined. Interestingly, independent observations were made by two individuals during 1934, 1940, and 1951. These observations, as well as the 1993 observations, could indicate the activity is periodic, with a likely period of 5.5 to 6 years. The actual name of this radiant has still not been decided upon, although it is becoming clear that there are two possible radiants: a strong one near Alpha Triangulii, and a weak one in Aries. The duration of the activity may extend from September 5 to 15, and in 1997 the probable date of maximum comes on the night of September 12. A full moon on the 16th will cause some problems, but morning observations of this radiant are possible. The radiant reaches the zenith after 2 a.m.

**OCTOBER CETIDS**
Radiant: RA=16 degrees (1 hours 04 minutes), DEC=+2 degrees Traces of this radiant are found in the visual records as early as 1916 and 1917. The orbit is very well defined using 70 meteors from both the photographic and radio-echo database, but it is still frequently ignored by observers. Both northern and southern branches are indicated, with the northern being the strongest. The duration of activity may extend from September 8 to October 30, with probable maximums coming on October 8 for the southern radiant and October 10 for the northern. The radiant may be especially important because its orbit is similar to the lost Apollo asteroid Hermes, which made a very close approach to Earth in 1937. Full moon occurs on October 16 in 1997, so observations during the period of maximum activity seem favorable with the radiant transitting around midnight.

# Comet Watch

Comets Currently Visible from
*http://encke.jpl.nasa.gov/whats_visible.html*
Last Updated: 1997 February 19

Long-Period Comets C/1995 O1 (Hale-Bopp)
Short-Period Comets 46P/Wirtanen, 81P/Wild 2, 118P/Shoemaker-Levy 4

**C/1995 O1 (Hale-Bopp)**
This super-star comet is visible in the early morning for Northern Hemisphere observers. It will remain a morning object until mid-March. For a few days it will be visible in both the morning and evening (this is already the case for high latitude observers). By the last half of March the comet will be an evening object. For High latitude (>~45 deg N) observers, the comet will become circumpolar (visible all night). It is currently m1~0.

**46P/Wirtanen**
This comet is well-placed for observation in the evening sky. observers. The comet is currently about 12th magnitude. It should brighten by a couple of magnitudes as it approaches perihelion on March 14, 1997. It will slowly drift northward into May reaching +30 degrees in mid-May.

**81P/Wild 2**
This comet is well-placed for observation most of the night, with Northern Hemisphere observers somewhat favoured. The comet is currently about magnitude 10.0 and it should brighten to m1~9.5 by the end of February 1997. The comet should remain near peak brightness and well-placed into May. Perihelion is on May 5, 1997.

**118P/Shoemaker-Levy 4**
This comet is well-placed for observation in the middle of the night. It is close to its peak brightness of 12th magnitude. It should remain visible into March 1997 as it moves slowly northward.

# Space Calendar

The Space Calendar covers space-related for the coming months. This Calendar is compiled and maintained by Ron Baalke. Please send any updates or corrections to
***baalke@kelvin.jpl.nasa.gov***
You can find this on the web at:
***http://newproducts.jpl.nasa.gov/ calendar***
At press time the JPL site was still down due to a security breach. By the time you receive this it should be back up again.

# Buy, Sell & Trade

**Wanted to Buy:** Mr. Todd Norris is in the market for a used telescope. If you have one that you're looking to sell, please contact him at 613-xxx-xxxx

**For Sale** From: [xxx]
I have a 6" Newtonian Reflector Celestron StarHopper for sale. Comes with:
Dobsonian mount, 25mm SMA Eyepiece (49x), 10mm SMA Eyepiece (122x), Telrad Star Finder, only 6 months old. Cost $844.00 new in September 1996. , Reason for sale. Purchasing a new Maksutov-Cassegrain telescope., Price is $700.00 firm. Serious inquiries only please. Derek

## 1996/97 Kingston Centre Membership List **as of 1997 March** 9th

This has been transcribed from Centre records and may not... is not 100% accurate :) Sorry for the small type but it all has to fit inside of 10 pages!

[deleted from the public edition]