



R E G U L U S

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

NOVEMBER, DECEMBER 1983

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IMPORTANT NEWS FLASH

VERY FAINT COMET INDEPENDENTLY DISCOVERED BY DAVID LEVY

The newsletter was well along in the process of being composed, but late on the night of November 30th, I received a telephone call which pushed all other items into second place. The call was from David Levy, an amateur astronomer from whom we have become accustomed to receive reports of significant accomplishments, but this one was, without doubt, the most outstanding observation of his many years of scanning the skies.

On the night of November 29th-30th, David made an independent discovery of a very faint comet, in fact, one that could be ranked among the very faintest ever discovered visually by an amateur astronomer. Taking advantage of the clear Arizona skies, which during this past November have been more stormy and cloudy than usual, David began his observing session at about 7:00 p.m. M.S.T., scanning the western and southern skies with Jupiter, the magnificent new 16" telescope that has become the flagship of his comet-hunting fleet.

During the session he observed a planetary nebula of tenth magnitude and a galaxy of ninth magnitude, both of which he had not seen before. Then in the north-west corner of the constellation Aquarius, very close to its border with Capricornus, he noticed a very faint, hazy object that seemed to be neither a nebula nor a galaxy. At once it seemed that it just might be an extremely faint comet. Its position was noted very carefully. The observing clock was stopped; its reading was 1 hour and seven minutes. The time was 8:15 p.m., M. S. T. (10:15 p.m. E.S.T. or 3:15 U.T. of November 30th). He continued sweeping the sky and observing in other areas. Then he returned to the object in the north-west corner of Aquarius. Within an hour its motion was confirmed definitely. A careful check of three atlases (the Skalnate Pleso, Tirion's Sky Atlas 2000, and the SAO Atlas) showed no galaxy, nebula, or faint cluster of stars in the region of the newly discovered object. It simply must be a comet.

What remained was to record its position, magnitude, and direction of motion as precisely as possible and report the discovery to the Central Bureau for Astronomical Telegrams. A very exciting observing session was concluded with all of that being done. The position was Right Ascension 21hours 01minute and Declination  $-3^\circ$  (for epoch 1950), and the direction of movement was north of north-north-west; the visual magnitude was a faint 12.5.

The words of the assistant to the director at the Central Bureau were both heartening and slightly disappointing. David's observations of the comet would be extremely useful; they would not be used in the naming of the comet (Comet Levy is still undiscovered), but would be recorded in the I.A.U. Circular announcing it, and would, in addition, be very valuable in establishing its path across the sky for the previously known data had predicted a path that was considerably in error. Who, then, would receive credit for first spotting this heavenly visitor to our region of the solar system? The answer is the same one as is given for hundreds of objects in the sky over the past year: it was first seen by IRAS (Infrared Astronomical Satellite) the infra-red telescope in space, and the discovery was made shortly before November 21st when it ceased operation because it had exhausted its supply of fluid helium that was serving as a coolant and enabling it

to operate. The comet had subsequently also been seen, probably photographically, by an astronomer named Hartley. Consequently it was being named after IRAS and Hartley, but unlike the most spectacular comet seen so far in 1983, IRAS-Araki-Allcock, the one that dominated the western sky for several evenings in May, this one would not have a three-fold name ending with a well-known amateur. Comet IRAS-Hartley-Levy would not be the name used, but reasons might well be given for why that should be the name.

As we congratulate David on this important achievement, we know that he can take great satisfaction in an obvious fact: he and his telescope can discover very faint celestial objects and the day is likely nearer than ever when a comet will bear his name alone.

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THE 1983 BANQUET AND ANNUAL MEETING

With our 1983 Banquet and Annual Meeting behind us, we have many reasons to look forward with considerable anticipation to our activities in 1984. Our optimism can grow from realizing the number of members who once again are offering to serve the Kingston Centre with dedication and enthusiasm.

The Annual Banquet held at Aunt Lucy's Restaurant on November 25th was a very enjoyable occasion, even though there were fewer astronomers in attendance than in the previous two years--a fact, probably accounted for by the unpleasant weather that seems to have turned up on most of our meeting dates recently. (Your editor may be excused for adding, parenthetically, that the previous meeting at which we entertained our past president, Angelika and her husband, at the same restaurant, was one that was accompanied by weather and driving conditions perhaps the worst he has ever seen. He survived them for who would want to miss an occasion like that?) It is such events as our banquets that make our organization more than just a group of people who meet twice a month. The trend toward having such occasions more often than just annually is a very healthy and helpful one for our centre.

The Annual Meeting which followed gave an indication of the strength and vigour of our group. The members of the executive were more than willing to serve and represent the interests of the centre, and the three constitutional amendments show that we can make constructive organizational changes when they are necessary.

The list of Executive Officers for 1984 is as follows:

Honorary President:	Dr. A. V. Douglas
Past President:	Terry Hicks
President:	Martyn McConnell
Vice-President:	David Levy
Secretary:	Sue Sorensen
Treasurer:	John Hansen
Librarian:	David Stokes
Newsletter Editor:	Leo Enright
National Council Rep:	Terry Hicks
Alternate Rep.:	Martyn McConnell

In addition, Mark and Sue Sorensen will join in as Production Staff of the newsletter; for their efforts in this area the centre has been, and continues to be, greatly indebted.

All our members extend a warm vote of thanks to Terry Hicks who has been a tremendous president in 1983. We also thank Gerald Schieven who was our Secretary and National Council Rep., and who did an excellent job in both capacities, but could not continue because his post-graduate studies in astronomy have taken him from Queen's to the University of Massachusetts.

Martyn McConnell, our new president, has, by his interest and dedication to amateur astronomy won the respect of our group since he became a member two years ago. A very active observer and astrophotographer and owner of an 8" Schmidt-Cassegrain telescope, Martyn lives in Bath and is employed by Correctional Services-Canada in Millhaven. He has been fortunate in having a working schedule that has allowed him to attend the General Assembly in Quebec and to use his equipment in frequent and productive observing sessions. We all extend our very best wishes to our new president.

The first of the constitutional amendments approved at the meeting recognizes the current need for an increase in the centre's fee structure. Effective immediately, there will be a \$5.00 surcharge for Ordinary Members and a \$3.00 surcharge for Youth Members. (The Adult membership rate for 1984, for all those who pay after November 25, 1983, is, therefore, \$25.00). The second amendment clearly defined the Executive Council of the Centre as being made up of the President, Vice-President, Secretary, Treasurer, National Council Representative, and Newsletter Editor. The third one makes it possible for the Centre to extend an Associate membership to a spouse, a child under 18, or a parent of any current member of the Centre; as usual, the person must pay a required fee and be elected to membership.

The discussions regarding the constitutional amendments were positive and constructive; they showed that though the document may be old and sometimes they tend to be forgotten, our constitution, through its revisions, focusses our attention on what we can, and should, be doing, as a centre.

The Annual Meeting was only one important event of 1983. In the future as we look back on the year we will likely recall such things as the General Assembly in Quebec City or the successful Astronomy Day in May, but there have been many other memorable happenings also. 1984, with our new executive, promises to be just as good, or maybe better than ever, for the Kingston Centre.

THE SKY SEARCH PROGRAM - THIRD STAGE

Our Sky Search Program which was undertaken last April has served to introduce many of our members to the large number of celestial objects that can be found in one small area of the sky. We hope that this will continue as we begin the third stage of the program—made necessary by the fact that some areas chosen in the late summer and early fall are now too low in the evening sky for proper observation.

As will be seen from the following chart quite a few areas are still available for any members who wish to join, and perhaps by the time of the next meeting there will be as many chosen as there were for the first and second stages of the program.

Anyone who wishes to read about the objectives of the program or the areas available in the other two stages should refer to our May-June newsletter, pages 6 to 9 and the September-October issue, pages 3 and 4.

Sky Search Program Chart - Third Stage  
(Late Fall and Winter Skies)

<u>Number</u>	<u>Position</u>	<u>Name of Participant</u>	
	R.A. (1950)	Dec. (1950)	
1	II <sup>h</sup> - III <sup>h</sup>	0° - -10°	<u>Mark Sorensen</u>
2	III - IV	0° - -10	_____
3	IV - V	0° - -10	_____

<u>Number</u>	<u>Position</u>			<u>Dec. (1950)</u>	<u>Name of Participant</u>
	<u>R.A. (1950)</u>				
4	II	-	III	0° - +10°	<u>Leo Enright</u>
5	III	-	IV	0° - +10°	<u>Martyn McConnell</u>
6	IV	-	V	0° - +10°	<u>Hugh Thompson</u>
7	II	-	III	10° - 20°	_____
8	III	-	IV	10° - 20°	<u>Daphne Lowden</u>
9	IV	-	V	10° - 20° (Hyades)	<u>Terry Hicks</u>
10	II	-	III	20° - 30°	_____
11	III	-	IV	20° - 30° (Pleiades)	<u>Karen Gventer</u>
12	IV	-	V	20° - 30°	_____
13	II	-	III	30° - 40°	_____
14	III	-	IV	30° - 40°	_____
15	IV	-	V	30° - 40°	_____
16	II	-	III	40° - 50°	_____
17	III	-	IV	40° - 50°	_____
18	IV	-	V	40° - 50°	_____
19	II	-	III	50° - 60°	_____
20	III	-	IV	50° - 60°	_____
21	0	-	I	40° - 50°	<u>David Levy</u>

Any member who wishes is invited to choose an area not already taken and to give a report of his observations at a future meeting.

ANOTHER LETTER FROM SOUTH OF THE BORDER

In early November I received a very interesting letter and seven carefully typed and very detailed file cards of observations from Gus Johnson, our very dedicated member in Swanton, Maryland. These observation reports will join the hundreds of others that we have received from him and which we retain as a very valued part of our library. Here is part of his letter:

RD 2, Box 67  
 Swanton, MD 21561  
 Oct. 20, 1983

Dear Mr. Enright,

Last Friday was Open House at Allegheny Observatory, near Pittsburgh, Pa. I went up, taking my new 2-in.f/12 and the 1.6-in.f/7.5, to set up on the observatory lawn to relieve the pressure upon the three large telescopes inside, as did a number of other of the Pittsburgh amateurs, having a 6-in. reflector, 12½-in., 13.1-in., a C-8 and a 4-in. equatorial Unitron. There were so many of the public attending that the lines were long and I ended up looking through only the 30-in. refractor.

In spite of the near-quarter moon and city skies, my 2-in. at 50x showed M57; so it would have been a fine sight in the 30-in. even though the seeing was poor, but unimaginatively, it was set on the moon, and at a very low power. The 4½-mile craterlet in Ptolemaeus, Lyot, was easily seen, but some distance away is an elongated craterlet, which was barely visible, while out-side with 100x my 2-in. showed that elongated craterlet better. M15 was being shown in the 13-in. refractor, but the line was too long for me. I don't know what was being watched in the 31-in. reflector, for the door was bolted against my entering. But observing on the lawn was enjoyable. A good many were impressed with how well things appeared in my tiny 2-in. at 50x. A friend with his 12½-in. f/6 had his new 2-in. O.D. University Optics 32mm Konig and it gave very impressive views about 65° wide. Every now and then a low jet airliner went over, reminding me of those views of space ships in Star Wars. The planes were lighted up underneath; when regular observing is under-way at the observatory those planes must be intolerable, as they try to get in at the Pittsburgh airport. The plane might miss the narrow field of view of the telescope, but even in my 2-in. as the exhaust drifted by, the seeing went terrible. I can see how a frustrated astronomer might well hope the next instrument bought is of high calibre and less quiet than the usual astronomical types. "Mad Astronomer Shooting Down Air-liners" would sell a lot of newspapers, but probably would not generate favorable public sympathy, I'm afraid.

Well, September was one of my best for estimates for the AAVSO, slightly exceeding my previous best month, and October has been good. On numerous nights of both months I have seen the Veil Nebulae.

The autumn colors are past their peak, but still the woods are very fine. Many buses of lowland tourists came up last weekend to enjoy the leaves. Outlying areas have had frost several times, but where I live proximity to the lake keeps it warmer. The lake was 58° F. yesterday.

The idea of the Sky Search Reports is a good idea to help observers appreciate how much even a small chunk of sky can contain, especially for those not in the AAVSO. In the AAVSO our "b" charts provide a good means of checking for strange objects, at least in the immediate vicinity of the variable star, perhaps one half to 3/4° all around. If we take the time we have available 3x3° to scan. Often there are omissions or an occasional star not marked of the proper brightness, which we can correct on the chart, after several observations give some evidence of the discrepancy being a chart error, not a change actually in the sky. With clear nights usually too few, I find that I do not check the full chart, so may have missed potential discoveries. Many months ago I picked three areas that I hoped to scan with such a program as the Sky Search in mind: 0h - 2h 50-60° N, 6h-7h 0- 12°S and 21-23h 50-60°N. I have charts of these areas in a folder to below mag. 9. On one tripod I have three instruments of low power and wide field that could provide the means, if I just take the time. If only binoculars did not give a crick in the neck when used high up! But short refractors that can use 1¼-in. O.D. Amici prisms can give fields of view 2-3° across. The Edmund 3-in.

f/6 reflector and the Astroscan are both ideal for comfortable Sky Search work. On either one a 20mm Erfle gives 22x and at least 3° of actual field and are rather affordable. It makes it possible for a beginner to jump right into a program that offers the possibility for a notable discovery without first having years of developing his or her skills; of course, after scanning selected areas, he or she should work on learning the sky. Another possible incentive could be offering "credits" for the scans performed. I will offer some suggestions, but you may modify or reject them as you prefer. The average binocular has about a 7° field. Using it to scan an equatorial region 1hr in R.A. and 10° in dec. say 15° = 1 hr. so 15 x 10 = 150 divided by 7 x 7 = 49 or 3 credits. Up around CAS the crowding of R.A. lines reduces the actual area covered to half, so credits could be modified accordingly. With an Astroscan's 3° x 3° = 9° an equatorial block of sky 150/9 = apx. 17. The larger instruments would take longer to scan the many more stars. Perhaps since the basic instrument one must least have is about a 6 x 30 or 7 x 35 with about 7° field, an equatorial hr. of R.A. x 10° dec. could equal 1 basic credit.. Let us go on another "tack". Due to star distribution, Milky Way blocks of sky could count for twice the credits of a non-Milky Way area. Monthly Sky Search reports could be sent to the centre giving area, date and apx. time and to what magnitude the observer feels it is safe.

Scans to faint magnitudes are much more time-consuming than using 7 x 35's if the same areas are covered. A scan to mag. 10 involves 23 times more stars than a scan to mag. 7! So how to award credits? We want to be fair. Let an equatorial block of 1 hr (15°) x 10° dec. in the Skalnate Pleso mag. 7.0 be equal to 1 credit. to mag. 8 of the Tirion Atlas could equal two. Bookkeeping at the centre should not be made burdensome, but report forms should permit the observer to tally up basic credit equivalents, rounding off numbers at times, such as the number of stars at each fainter magnitude could be rounded to 3 times more. So a basic 15° x 10° scan to mag. 7 could equal 1 credit; if to mag. 9, then 3 x 3 or 9 credits. To cover all that sky to mag. 11 would come to apx. 80 credits.

Clear skies, Gus Johnson.

P.S. With the coming of the October full moon I hoped to watch its rising to see migrating birds cross its face, but adverse weather prevented it. This is an interesting pursuit, and not only at migration time. With larger instruments the moon has to be farther out-of-focus if the birds are to show sharply. Around 40x works nicely. An off-axis 2-in. to 3-in. diaphragm can be placed in front of a large telescope to reduce the light and extend the depth of focus.

Gus Johnson.

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#### WHAT WAS HAPPENING IN OUR CENTRE TEN YEARS AGO

It is occasionally interesting to glance back through our records and files and recall what was happening in our centre a number of years ago. In fact, quite a number of intriguing things come to light--quite aside from the discovery of the fact that all the newsletters of a decade ago, arrived safe and sound with a six-cent stamp. We seem to possess very few records from more than ten years ago,

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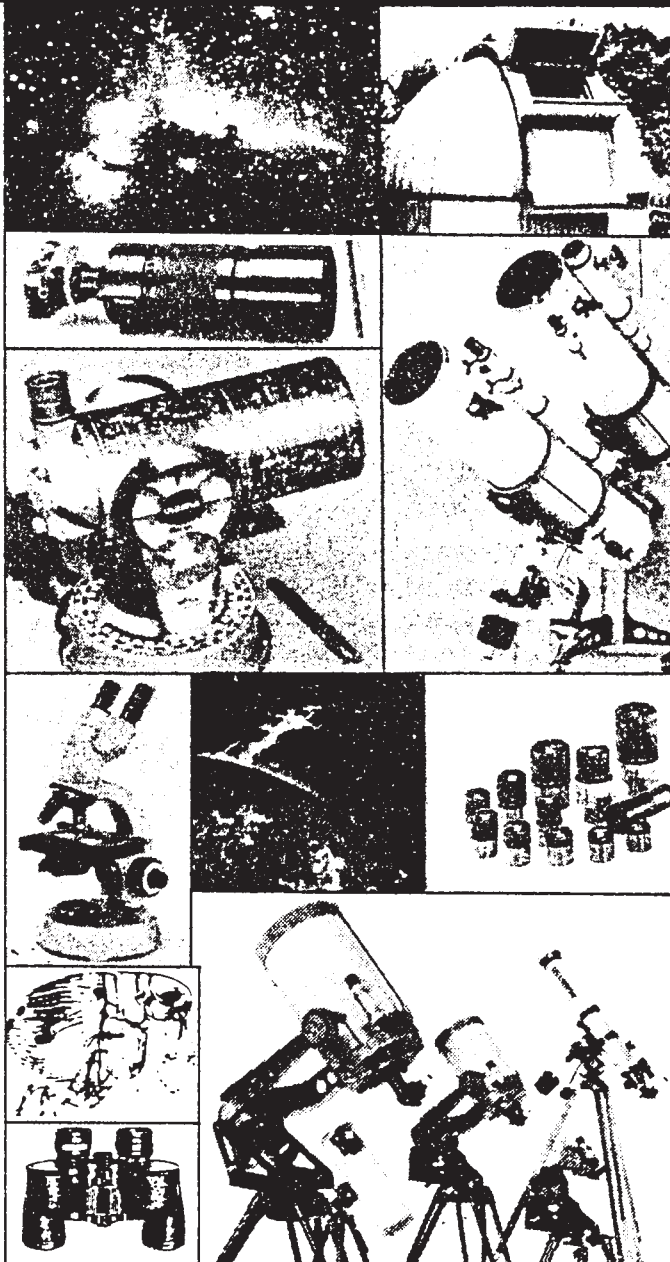
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perhaps as a result of a "housecleaning of the files" that took place a few years ago. However, I have a file of newsletters beginning with the ones of November, 1973, and they have given me the following pieces of information.

Yes, there were two newsletters in November of 1973, one announcing the upcoming meeting on Tuesday, the thirteenth, and the second one, to announce the meeting of Tuesday, the twenty-seventh.

At the first of the two meetings, Dr. W. Y. Chau gave an interesting talk on "Black Holes". (I still have the notes I took!)

At the second meeting a film called "The Crab Nebula" was shown. In those days the meetings started at 8:30 p.m. and the place was Ellis Hall, Room 323.

The Observers Group was using a site west of Kingston on Airport Road. Their observation reports in late 1973 centred around three or four main events. One member had observed Comet Kohoutek on November 17th and was planning for future observations of this famous comet. Others were invited to join him. Earlier, on November 10th, about ten members made early morning observations of the transit of Mercury; it was an event that was already in progress at the time of sunrise. It was observed until the time of final contact at 8:18 a.m. There were also plans for observing a partial solar eclipse on December 24th.

Looking forward to events of January 1974, I discovered that on the eleventh day of that month, the president of our centre, Paul Brown (at that time a Queen's student but still a member of our centre) and the secretary, Geoffrey Wight, visited the McLaughlin Planetarium for a show as guests of the Toronto Centre and were invited by Harlan Creighton, president of the Toronto Centre, to a special dinner at Hart House. The planetarium show was entitled "The Comet Connection" - dealing with comets in general and Kohoutek in particular.

Certainly many changes have taken place since November and December 1973; yet there is always the eternal fascination with transits, comets, and eclipses.

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THE ISLAMIC LUNAR CALENDAR (PART III) BY DAVID STOKES

(Editor's Note: This is the third and final part of a paper presented by David Stokes at the Quebec General Assembly in May. Unfortunately, it had to be serialized; the first part appeared in the July-August issue of Regulus, and the second one was in the last issue. All of the footnotes appear at the end of this section.)

The beginning of the Islamic era dates from 622 July 16. It is instructive to compute the time of new-moon closest to this date to see whether in fact this is possible, since of course the new era must have been dated from observation of the new-moon. Accordingly this computation was run on the computer, using the method of Meeus, and using the same equations as those used to compute the times of new moon for 1983. The program was paused to check that, for example, there was an eclipse in 1234 March 17, and to ensure that rounding errors were not accumulating too fast.

It was found that some 17,000 moons ago the time of mean phase was Julian Day 1948437.477; the correction was +0.2946 days; and the true time of new-moon was JD 1948437.772. The data shows that there was certainly an eclipse of the sun that day, but it is not known whether this was visible in Saudi-Arabia! In a separate program, also based on Meeus, the Julian date was converted to the equivalent Julian calendar date, and found to be 622 July 14.272 (ie: 06h 53m). Now the approximate time of sunset that day in Makka was about 19:00hr local time when the age of this new crescent was then about 9.5 hours. Thus the new-

moon would not have been visible in Saudia Arabia until sunset on July 15th, which was a Thursday! This would make the first day of the first month of the first year (1 Muharram 1 AH) a Friday which is indeed a most appropriate time for the beginning of the Islamic era. And this day was in fact 622 July 16, without any ambiguity. The error in the Julian calendar had accummulated to three days at that time so by modern reckoning the date should be 622 July 19. (ie: by the Julian proleptic calendar). However, the Christian calendars of the time would have shown 622 July 16, Friday!

Footnotes:

1. The Qur'an. An English translation by Muhammad Asad.
2. Freeman-Grenville, G.S.P. The Muslim and Christian Calendars. Rex Collins Ltd., London, 1977, 2nd Edition.
3. Meeus, Jean. Astronomical Formulae for Calculators. Willman-Bell, Inc. U.S.A. 2nd. Edition, 1982.
4. Ilyas, Muhammad. Earliest visibility of the new moon 1981-85. Journal of the Royal Astronomical Society of Canada. Vol. 76, No. 6, 1982, pp. 371-381.
5. Sardar, Ziauddin. The astronomy of Ramadan. New Scientist, 24 June, 1982, pp. 854-856.
6. Observer's Handbook 1983. Editor: Roy L. Bishop. Royal Astronomical Society of Canada, 75th year of publication.

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FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Almost every amateur astronomer must surely know of the long years of searching for the "Trans-Neptunian" planet culminating in the discovery and naming of Pluto in 1930. Did you know that for many years there was a very similar search for and (yes!) even a so-called "discovery" and a naming of "the Intra-Mercurial planet"? It is indeed true! Searches for this "planet" took place throughout the latter half of the nineteenth century. A number of sightings were reported between 1859 and 1878; after the "sighting" of 1859, the French astronomer Leverrier (famous for his mathematical calculations which predicted the existence of the planet Neptune before its discovery) named the "new planet" Vulcan. There were even tables predicting the transits of Vulcan across the face of the Sun.

The transits failed to materialize. Vulcan was not observed at any of the total solar eclipses in the early years of the twentieth century. Gradually interest in Vulcan died down and almost disappeared.

(It is interesting to note that IRAS, the Infra-red Astronomical Satellite which ceased operation on November 21st, discovered a mysterious object—possibly an asteroid or a dead comet—that in its orbit passes nearer to the sun than any of the planets or any of the known asteroids. It is probably not (!) "Vulcan", but it can be a reminder of the days when there was a serious search for the "Intra-Mercurial planet".)

A LIST OF WISHES FOR 1984

If the members of the Kingston Centre were to raw up a list of wishes for the coming year, the collective requests would probably look like this:

- An Astronomy Day on May 5th that is just as successful as the one of last year with good weather for a public star night and just as many telescopes as we had last year.

- As memorable a General Assembly in Hamilton as the one we had last year in Quebec City, and that there be just as much participation by members of the Kingston Centre.

- That our new executive be as successful as the one that provided leadership for us in 1983.

- That we have clear weather for the annular solar eclipse that will be visible as a partial one from our area on Tuesday, May 15th.

- That we have a cloudless sky for the planetary occultation on the night of March 24th-25th (it has been a long, long time since a star as bright as this one (8.8 mag.) has been occulted by the planet Saturn.)

- That in 1984 the skies be clearer during the late spring and late autumn than they were in 1983.

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REPORTS AND OTHER ITEMS

1. Observing reports for the month of November are necessarily scarce because the weather was consistently dreadful. My observing log contains one entry for a night-time observation during the entire period between November 1 and December 3. The night of November 7-8th was the exception to a month of heavy cloud, snow, and freezing rain. Otherwise, there was one evening that allowed brief observations of lunar craters and a couple of days which permitted solar observations. (Sunspots seem to be very scarce lately.) Perhaps the winter months will permit what the month of November denied us. Let us hope for an imminent return to the good viewing conditions which existed during parts of the month of October.

2. By now you will have noticed an ad from Perceptor on the centre page of this newsletter. Please support our advertiser. As mentioned in a previous newsletter, you will find it a pleasant experience dealing with John Kidner, when you wish to purchase a telescope or any piece of astronomical equipment.

3. Since the time of the last newsletter we have been pleased to have Donna Whittaker and Daphne Lowden join our group, and we hope they will be members of our society for many years to come.

4. Here are the names of two new books that are well worth buying: (1) Nightwatch by Terence Dickinson, published by Equinox, (2) The Cambridge Deep-Sky Album by Jack Newton and Philip Teece, published by Astro-Media.

5. We thank Paul Brown and Gus Johnson whose 1984 membership fees were received some time ago, and hope our "far-distant members" have received their 1984 Observer's Handbooks by now.

6. Another Contest!! A Prize to Be Won!! Enter Soon!!

Everyone by now should have started to become aquainted with the 1984 Observer's Handbook which is bigger and better than ever before and which was available earlier in the year probably than ever before. In order to assist you in getting to know this wonderful observing aid, your editor is once again offering

a small prize to the member of the centre who can spot the most errors in the Handbook. This year there are very few, but there are a couple of misprints or very small items that could be called "errors". Entries should be sent to "Editor of Regulus" at the address given at the end of this section. The deadline is January 31st.

7. Here is another final reminder: your 1984 membership fees are now due. If you have not done so, mail them to the centre address given below with the cheque payable to the "Treasurer - Kingston Centre of the R.A.S.C. The amount is \$25.00 for Ordinary Members and \$15.50 for Youth Members (those under 18).

8. Here are a few things well worth observing or photographing over the next couple of weeks:

(1) On December 17th in the morning sky there is a very close conjunction of the planets Venus and Saturn, in fact, the closest approach of two planets in many years. By 11:00 U.T., which is 6:00 E.S.T., they are listed as being only 0°.15 or only 9' apart. That is considerably less than the apparent distance between the famous naked-eye double, Alcor and Mizar, which are about 12' apart. It will be a spectacular sight in binoculars or a telescope.

(2) On the night of December 19-20th, there will be a penumbral eclipse when the full moon, near the star 132 Tauri, enters deep into the earth's penumbra and comes quite close to the umbral cone. By the time of mid-eclipse, which occurs at 8:49 p.m., E.S.T., the southern regions of the lunar disk should be slightly darkened.

(3) On the morning of December 28th the waning crescent moon will present an interesting picture as it is seen very close to Saturn. The following morning the same thing occurs as it is very near to Venus.

(4) There are three meteor showers that we should consider observing. The Geminids, which peak on the night of December 14-15th, are sometimes an abundant shower, and may be best observed after moonset that night (which is about at 1:00 a.m.). The Ursids reach their maximum on Dec. 22-23 but the full moon may interfere with all but the brightest of them. The Quadrantids, which are often a very fine shower, reach their peak on January 3rd-4th, and since it is near new moon, this may be the best shower of all to observe.

(Incidentally, I observed one or two "early Geminids" as early as Dec. 3rd.)

9. Dr. Peter Millman has provided me with a map showing the location of Crater Beals. This lunar crater has recently been named after the late scientist who was well known in our area for the work he did in the studies and research concerning the Holleford Meteorite Crater. This first lunar crater named after a Canadian Scientist is located at 37° N, 86° E, and was formerly designated Reimann A. It is very near the limb south of Mare Humboldtianum, and not far from Crater Gauss (designated as number 115 on the Norton Star Atlas Lunar Map).

10. Our upcoming meeting dates are as follows:

December 9	<u>Topic: When Is It Possible To Observe Crater Beals?</u>
	Leo Enright.
January 13	Open
January 27	Open
February 10	Open
February 24	Open

Remember that the meetings are at 8:00 p.m., in Room 222 in Ellis Hall on University Avenue.

11. Your editor would be very happy to hear from you. The address is:

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Box 141, Station 'A',  
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Happy Holidays! Clear skies!  
Leo Enright Good Observing!