R E G U L U S

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

JULY, AUGUST, 1985

THE 1985 GENERAL ASSEMBLY OF THE R.A.S.C.
A MEMORABLE EVENT IN EDMONTON, ALBERTA

On the Canada Day weekend this year the astronomers of the R.A.S.C. gathered for their big annual event in the capital of Alberta and once again participated in a memorable weekend of varied activities. From all parts of the country, both amateurs and professionals came together at the University of Aolberta to renew acquaintances and share four days of meetings, lectures, and other activities.

All of the events were very smoothly run and well organized - a fine tribute to the members of the planning committees and their long hours of work over the past year. On Friday, June 28th, there was a wine-and-cheese reception with an informal series of slide shows and a hilarious song contest. Afterward the weather and ever-present twilight cooperated enough to allow us to do some observing with a fine Tinsley Cassegrain telescope on the roof of the Physics Building. The next day was given to the Papers Sessions, the judging of the entries in the Display Competition, and a lavish banquet at the new Convention Centre in downtown Edmonton. The gala occasion was marked by the presentation of the Service Award of the Society to Cam Fahrner of the Calgary Centre and an illustrated talk on meteorites by Dr. Folinsbee of the University of Alberta. On Sunday we were awed by the marvellous new facility called The Edmonton Space Sciences Centre where we saw a presentation in both the planetarium, the finest of its kind in Canada, if not the world, and in the Imax Theatre, where the huge screen gave an unforgettable spectacle in its presentation of a film devoted to the history of the Grand Canyon. The Annual Meeting of the Society followed in the afternoon and in the evening there was a pleasantly relaxing tour of the historic old Fort Edmonton Park where we could see what the city was like at various periods as it changed from a fur-trading post of a century and half ago to the small town of the turn of the century and later into the growing city of the 1920's. On Monday, the Canada Day holiday, many of the astronomers toured the West Edmonton Mall, now famous as the largest shopping complex in the world, but actually a facility that combines shopping with entertainment attractions such as a large zoo, a Disneyland-like amusement park, an NHL rink, and even more to come in the next phase which will have an underwater park with wildlife visited by tourists in one of the four submarines to be available!

Attendance by our Centre at this year's General Assembly was respectable with four of our members being present. Excellent papers were given by our vice-president, David Levy, who reported on his comet discovery and by Hein Van Asperen who described how one may determine the latitude of observed sunspots. Our congratulations also go to Hein who was a winner in the Display Competition with his Solar Observing project.

From all those who attended the General Assembly, a hearty vote of gratitude should be expressed to Tony Whyte, Doug and Joan Hube, Howard Gibbons, Bob Carson and all the Edmonton Centre members of the organizing committees for a

very successful "G.A. '85". We will long remember it as a very interesting and pleasant event.

STEPHEN WILLIAM HAWKING, C.B.E., F.R.S.

[EDITOR'S NOTE: The following is the citation, read by our National President at the Annual Meeting last month, for the newly elected Honorary Member of our Society, Dr. Stephen Hawking of Cambridge University. This citation was prepared by Dr. John R. Percy, former President of the R.A.S.C..]

British astrophysicist, Stephen Hawking, was born in 1942, and received his university education at Oxford (B.A.) and Cambridge (Ph.D.). His rapid rise through the academic ranks at Cambridge culminated in 1979 when he was appointed to the coveted Lucasian Professorship of Mathematics.

For two decades, he has been a world leader in the study of some of the most fundamental problems in physics and astronomy, notably the nature of gravity, its relation to other forces and to quantum and particle physics, and its application to cosmology. His studies of the ultimate results of gravitational collapse -- singularities or black holes -- have excited particular interest. He is the author of dozens of scientific papers, and is an author or editor of several books: The Large Scale Structure of Space-Time (1973), General Relativity: An Einstein Centenary Survey (1979), Superspace and Supergravity (1981), and The Very Early Universe (1983).

He has received many honours, including the Eddington Medal of the Royal Astronomical Society (1975), The Pius XI Gold Medal of the Pontifical Academy of Sciences (1975), the Dannie Heinneman Prize of the American Physical Society and the American Institute of Physics (1976), the William Hopkins Prize of the Cambridge Philosophical Society (1976), the Maxwell Medal of the Institute of Physics (1976), the Hughes Medal of the Royal Society (1976), the Albert Einstein Award (1978), the Albert Einstein Medal of the Albert Einstein Society, Berne, (1979), and the Franklin Medal of the Franklin Institute (1981). He was appointed Commander of the Order of the British Empire in 1982. He holds honorary degrees from several universities, including Oxford, Chicago, and Princeton.

His accomplishments are even more remarkable because they have been made despite the fact that he has been seriously afflicted for many years by amyotrophic lateral sclerosis. His thoughts on the nature of space and time, and on the origin and evolution of the universe, must rank among the supreme achievements of the human intellect. This genius, in the face of adversity, is an inspiration to scientist and layman alike.

BOOK REVIEW

A Field Guide To The Stars And Planets, Second Edition, by Donald H. Menzel and Jay M. Pasachoff. Pages 473; 11 cm. x 18 cm. Houghton Mifflin Company, Boston, 1983. Price U.S. $17.95 (clothbound) and $12.95 (paperbound).

There are many observing guides and star atlases available in the world today

but there are surely very few combined observing guides and star atlases that contain such an enormous wealth of formation as the second and completely revised edition of **A Field Guide To The Stars And Planets.** Sponsored by the National Wildlife Federation and published as one of the noted Peterson Field Guide Series, this sturdy and compact book is designed as a campers', hikers', and travellers' companion and is intended to contain everything those people would need to identify the objects of the night sky from anywhere on earth and to observe them with a small or medium-sized instrument, whether binoculars or telescope. Actually, this guide will find itself used in a multitude of different ways by many types of amateur astronomers -- both observers who treck into the wiilderness to practise their craft and non-observers who stay securely in their armchairs surrounded by astronomical literature and the results of the observations of many generations.

Originally written by the late Donald H. Menzel and published in 1964, the text has been completely revised for the second edition, and a collection of over seventy-five sky maps and star charts has been included. In listing the vast number of features, both those carried over from the original edition and those added by Jay Pasachoff, who completed the revision, one is bound to think of the Greek word "**thesaurus**" - "a storehouse" - the reference tool to which one turns when he needs a collection of synonyms or related words. This guide is a veritable storehouse of the latest information on objects within and beyond the solar system, and one to which astronomers, beginning or advanced, can turn with confidence for a cornucopia of information.

For the beginner, the first two chapters, A First Look at the Sky and A Tour of the Sky, provide an excellent introduction to what the novice should expect to see in the sky. He is then introduced to the series of monthly sky maps which is the first of two systems of maps that form the heart of the book. These sky maps showing stars to magnitude 4.5 are suitable for observers in almost any location on earth because of their multiple horizon lines. Each month has not one circular map as is frequently the case, but a set of four maps for northern hemisphere observers - a pair of semicircular maps of the sky to the north and another of the sky as it appears to the south - with one member of each pair showing the constellation outlines and the other with only the stars, the Milky Way outline, and the very brightest of the nebulae and clusters; for the Southern Hemisphere observer only the pair with the constellation outlines is given. This makes a grand total of 72 monthly sky maps and they are clearly labelled with the proper times to show that the maps of a later month are to be used as observations continue late into the evening.

Now having seen hundreds of stars and many of the constellations, the observer is given, in the next two chapters, a very brief outline(Chapter 4) of stellar evolution and types of stars and then a summary (Chapter 5) of the history of the various figures seen, or rather imagined, in the sky and an outline of their connections to the various mythological stories of antiquity, a very fascinating section for those interested in the lore of the constellations. Immediately after the next chapter, which is on double and variable stars with accompanying maps of four popular variables, there is the other major "atlas section" of the book, the Atlas Charts of the entire sky. The source used is the finest popular atlas available, Tirion's SkyAtlas 2000.0, with a few modifications. All stars brighter than magnitude 7.5 are shown, whereas 8.1 was the limiting magnitude of the original. There are 52 charts with each one showing about half of the sky area on the charts of the source atlas. The equatorial region, for example, consists of 12 charts (#21 to 32) covering two hours of right ascension each and twenty degrees of declination on either side of the equator, and there is an inserted map for the very densely packed region

of galaxies in the Virgo Cluster. Unlike SkyAtlas 2000.0, the charts have lines drawn in to connect the brightest stars in each constellation; another major difference is that stars that have a Bayer designation are given it alone and not their Flamsteed numbers as well; Messier objects are given that designation alone and not the additional NGC number as was the case with the SkyAtlas. All the hundreds of variable stars named on the original are designated and a few errors detected on the original have been corrected. If any complaint can be offered it might be about the fact that only a few stars are given their Flamsteed numbers; as a result in certain areas of the sky there are many relatively bright stars left unnamed. The fact that users will have to turn pages very frequently in referring to close areas of the sky is unavoidable when maps of the scale of SkyAtlas are reproduced in a book of this size.

Subsequent chapters, all full of helpful hints, are devoted to observing the sun, moon, planets, comets, and asteroids. The eight moon maps are superb and are likely to be "discovered " by some very experienced observers; far more craters are named on them than on most maps readily available to amateurs. To assist in planning a night's observing, there are "hourglass" diagrams, called Graphic Timetables, which show times of rising and setting for the planets between the now and the end of 1989; such information is also given in similar diagrams for frequently observed double and variable stars, open and globular clusters, and galaxies and nebulae. Near the middle of the book, there is a selection of stunning photographs taken by both amateurs and professionals - galaxies, planets, and eclipses. At the end, over 50 pages are devoted to appendices, charts, and reference lists. The bibliography is more than adequate and up-to-date in all its information, except in the listing of the address of the R.A.S.C. on pages 458 and 460.

This Field Guide is recommended to all amateur astronomers as a book which combines a compendium of reliable information and a very portable star atlas; it is bound to be popular for many years.

Day By Day: Timely Reflections On The Calendar

by David M. Stokes

[EDITOR'S NOTE: Having long been fascinated by timekeeping, the calendar, and its various reforms throughout history, I am pleased to have received a concise article on the calendar which was stimulated by a recent magazine article on computers. This will be the first of several article on the topic and they should be particularly helpful to members who own a personal computer. We sincerely thank our president, Mr. David Stokes, for contributing this series to our newsletter.]

The July 1985 Sky and Telescope carried a short article by R.S. Harrington of the U.S. Naval Observatory on a perpetual Gregorian Calendar. His 25-line Basic program calculates and displays the calendar for any month of the year. Really neat, very simple....or is it? Taking the program apart, I found out very little about how Harrington had written it; so, for more insight on the fundamentals of converting dates and reckoning time periods, I delved a bit deeper. I would like to share the results with you; so, let's begin with the Julian Day number.

By convention, the Julian Day begins at Greenwich noon when most astronomers

are soundly asleep, and thus it avoids the date change at midnight, when, of course, they are very hard work. Every day is numbered sequentially and parts of the day are expressed as a decimal fraction, e.g. 6p.m., or 1800h is .25 and midnight is .5. In that invaluable source of all astronomical data, the Observer's Handbook, you will find Julian Dates for the months all end in .5, indicating the Julian Day number at Greenwich midnight (Oh U.T.).

This Julian Day number has no relation to the Julian Calendar that was inaugurated at the time of Julius Caesar around 46 B.C. and assumed its final form around 8 C.E. (Christian Era). Julius's calendar was incorporated on the advice of the Alexandrian astronomer, Sosigenes. In the Julian Day numbering system, named after its originator, the scholar, Julius Scaliger (1484 - 1558), the zero point is set far back in time to anti-date any significant historical events in astronomy and was chosen to coincide with some other time cycles. The chosen date was NOON on 4713 B.C. January 01. This date is expressed in the Julian proleptic calendar i.e. the calendar date that would be obtained by backward extrapolation of Julius's calendar.

Now Julius Caesar's calendar reform served very well to date affairs for many years, based on a mean calendar year of 365.25 days exactly. Unfortunately this number is slightly too large by the equivalent of 11m 14s per year, which is indeed a negligible amount in any one year but accumulates to an error of more than three days in 400 years. Thus, by the year 1600 C.E. the calendar error would have exceeded more than +12 days, making the vernal equinox appear to occur about March 11. Clearly, calendar reform was in order and advisors to Pope Gregory XIII recommended that 10 days be dropped from the calendar "so that the day next after 1582 October 4 be designated 1582 October 15." This restored the spring equinox to March 21 on the civil calendar. Furthermore, to prevent this accumulation of error it was decreed that centurial years not exactly divisible by 400 were not to include an inter-calary day. So, the year 1600 was a leap year but 1700, 1800, 1900, and 2100 are not leap years. Since in ancient Rome the earliest calendar began with the month of March, it was logical for the extra day of the Julian calendar to be added at the end of February; it was, in fact, added by a repetition of the fifth day before the end of that month.

In the Julian calendar, every year that is exactly divisible by 4 without remaider is a "leap year" and and extra day is inserted, as mentioned. Now in a cycle of 400 years there are 100 such "leap years". After the Gregorian reform there are three centurial years in a 400 year cycle that are not "leap years"; so, in 400 years we have only 97 leap years. Thus after a lapse of 400 years the number of days that has passed is (400 x 365 + 97 =) 146097. This yields a civil year of 146097 / 400 = 365.2425 mean solar days.

By observation, the mean tropical year (the average interval between two consecutive passages of the sun through the vernal equinox) is 365.2422 days. Our calendar error is thus 365.2425 -365.2422 = 0.0003 days. This error will accumulate to only 3 hours in a 400 years cycle; the next correction will be due about 3000 years from now. The Gregorian Calendar was, then, a very neat piece of work that will keep the solar calendar in step with the seasons.

To convert between the Julian and Gregorian calendar systems we now see that a 10-day discontinuity in 1582 October (later in less progressive countries) has to be alLowed for, and we must not allow a "leap year" in 1700, 1800, 1900, 2100, and so on; in addition, we have to account for years before 1 C.E.. In times past this has been the sport of chronologists, but today it can be done in a flash on the personal computer. This brings me back to the first question: how do these ingenious people like Meeus and Barrington work out a fool-proof algorithm? In the next installment of this overview of our calendar I will review three short programs to convert any date to its corresponding Julian Day

number and the inverse of this. One such program consists of a single 80-character line.

Dated Julian Day 2446266.25

A LETTER FROM WARREN MORRISON

[EDITOR'S NOTE: I am very pleased to have received a letter from our member who resides near Peterborough, Mr. Warren Morrison, and to hear about his discovery of the outburst of the recurring nova, RS Ophiuchi.]

R.R. 1,
Cavan, Ont.,
July 6, 1985.

Dear Leo,

First of all I would like to inform you that I have a new address:

R.R. 1,
Cavan, Ont.
LOA 1C0
(Phone 705 - 939-6129)

I now live on a farm a few miles southwest of Peterborough. The sky is much darker here than where I used to live, and although I have been here only a couple of weeks, it looks as if I'll be able to make many more observations than before.

In Regulus for May-June, you referred to the recent outburst of RS Oph. I have been monitoring the field of this star since 1974, and for ten years I found it to be slowly varying between magnitude 10 and 12 approximately. In January the field emerges from the solar glare into the morning sky, and on January 5, I inspected the field, not finding RS Oph, although a 9.8 neighbour was seen in the twilight. There followed a long period of cloudy weather. Hence, I was not able to examine this region again until shortly after 6 a.m. on January 26. I was very surprised to see it shining brightly at magnitude 6.8. I assumed with all the cloudy weather that I had missed the maximum of light by several days and that it was now declining in brightness. However, to be on the safe side, I phoned Janet Mattei of the AAVSO later that morning. This was the first she had heard of the outburst.

The next morning was cloudy, but before dawn on January 28, I easily observed the star at magnitude 5.2 with binoculars. It steadily faded thereafter, being 7.0 on February 3, 8.8 on March 3, and 10.3 on April 9. It was still slowly fading last week, being at magnitude 12.2 on June 25. Had RS Oph been in the evening sky at the time of outburst, many observers probably would have reported it. However, rising shortly before the sun on a winter's morning, the star was relatively neglected by amateurs.

Another recurrent nova is T Pyxidis. Although at declination -32°, the field can be viewed from Southern Ontario from October to May. Since it was at maximum in 1890, 1902, 1920, 1944, and 1966-67, it may again be due for an

outburst. Perhaps somebody from Canada who inspects this region regularly will be the first to detect it. Its coordinates are: R.A.: 9h 02.6m, Dec.: -32° 11' (Epoch 1950.0).

I was not able to observe Comet Levy-Rudenko after January 29, largely because of light pollution at my former home in Peterborough. I've seen Comet Giacobini-Zinner a couple of times from my new home, but it is still quite faint, and hard to see in the rich star fields of the summer Milky Way. I'm looking forward to Halley, as we all are, and I hope to catch my first glimpse of it in mid-August. I purchased a 17 1/2" Dobsonian Odyssey-2 reflector last fall, but haven't been able to use it much yet. I plan to have a permanent outdoor shelter for it built within the next few weeks.

Yours truly,
Warren Morrison

REPORT OF THE JUNE 1985 NATIONAL COUNCIL MEETINGS

The National Council of the R.A.S.C. held two meetings on the occasion of the 1985 General Assembly in Edmonton, Alberta. Both were held on the campus of the University of Alberta, the first on Friday, June 28, and the second on Sunday, June 30, following the 1985 Annual Meeting of the Society. At both meetings, the National President, Dr. Roy Bishop, presided and fourteen of the twenty Centres of the Society were represented.

Meeting of Friday,June 28

The essential agenda items of the first meeting included reports from all the officers and standing committees of the Society, and a number of other reports and announcements. The Secretary read letters, one from Dr. Stephen Hawking who had accepted his nomination as an Honorary Member of the Society, and one from Mr. Arthur Covington who also had accepted Council's invitation to become the Honorary President of the Society. Mr. Broughton reported that continued efforts to obtain an Ontario government grant - discontinued in 1982 after being in force for many years - had been unsuccessful, and the matter might be pursued further with the Ministry of Culture and Recreation; it was left to the discretion of Dr. Percy who was pursuing the matter. A notice was received from the Victoria Centre that its offer to allow the historic Brydon Refractor to be displayed at the National Office was being withdrawn and the famous instrument (described in the Journal of the R.A.S.C., April, 1984, page 75) would be displayed in the Victoria area where it has had a long and enduring association. A committee of four members of Council was formed in order to study the awarding of the Gold Medal of the Society.

The Treasurer, Dr. Chou, on behalf of the Budget Committee, presented a budget for the current fiscal year and explained various items of expenditure; after the inclusion of an item that would allow for a Speakers' Exhange Program costing up to $700.00, the budget was approved. The Observer's Handbook editor, Dr. Bishop, reported on the progress of the 1986 edition, and presented a proposal for a five-per cent increase in the price of the 1986 edition; it was approved by Council. As Astronomy Day Coordinator, Mr. Enright, reported on the success in many of the Centres of International Astronomy Day 1985, and

announced that next year the occasion would be marked on Saturday, April 19. Representing the Editing Committee, Dr. Batten, brought forth a motion, approved by Council, that in future appointments to editorships of the Society's publications be for a five-year period with renewals possible for terms agreeable to the editors and Council. Mr. Loehde, the Awards Committee chairman, announced that the Service Award would be presented to Mr. Cam Fahrner of the Calgary Centre and the Simon Newcomb Award to Mr. Don Trambino, an unattached member. As chairman of the Constitution Committee, an ad hoc committee formed during the previous year to examine a proposed set of model By-laws for Centres of the Society, Mr. Watson, presented an updated and revised set of model Centre By-laws, along with a report of the committee and he asked that the motion for approval be tabled until the September meeting of Council.

The president took note of the fact that Dr. Peter Millman, who had just completed his four-year term as Honorary President of the Society, had been a member of the Society for sixty years, and a vote of appreciation was extended to him for his many years of service in numerous capacities. He continues to serve as Chairman of the Historical Committee.

Meeting of Sunday, June 30

During the second meeting Council appointed its standing committees for 1985-1986. These were the Awards, Budget, Editing, Executive, Finance, Historical, Library, National Newsletter, and Property Committees.

Council approved a motion to have the Constitution Committee continue its work by examining and updating the By-laws of the Society for approval at a later date. The Computer Utilization Committee is to continue to explore possibilities for both replacing the typewriter at the Society's National Office with a modern word-processor, and secondly, providing a communication service between and among the National Office and the Centres of the Society.

During the discussion about the matter of unsold copies of the Observer's Handbook left over at some of the Centres, it was agreed that, in order to save money on postage, Centres would be allowed to return to National Office the front cover of unsold copies of the Handbook instead of the whole book.

Council approved a motion that would allow at National Office the payment of its bills on time on occasions when several of the cheque-signing authorities were unavailable for extended periods of time; the motion provided for the machanical reproduction of one of the signatures necessary on cheques and safeguards for its use were given.

Complete details of all the items discussed at both meetings may be found in the Minutes of the meetings which have been distributed to our Centre President and National Council Representative. Mr. Van Asperen, an alternate, acted as our Kingston Centre Representative at both of the above meetings. The proposed budget, referred to above, and the report of the Journal editor may be found in the Appendices to these Minutes.

The Minutes of the 1985 Annual Meeting of the Society, are being published in the October issue of the Journal.

We all know of the easily-recognized summer constellation, Lyra, with its very bright star, Vega, which in recent times has been said to have about itself a ring of dust or particles that may be the beginnings of a primitive solar system. Probably few of us know the star by its ancient name, the Harp Star, a name that is logical for the brightest star in the constellation depicting the ancient musical instrument that was so common in the classical Mediterranean world. That name is another example of the brightest star in a constellation assuming the name (and often in ancient thought, the qualities) of the constellation-object in which it was found, just as Sirius is often called the Dog Star.

REPORTS AND OTHER ITEMS

1. Observing conditions have varied considerably with numerous cloudy nights in June followed by many good and some excellent nights in July. It has been possible during the nights of good transparency in July to see some very faint galaxies I had not seen before and, of course, to see the fine Comet Giacobini-Zinner which is becoming brighter and is moving through the constellation Cassiopeia. The planets, Uranus and Neptune, have been relatively easy to locate in 11 x 80 binoculars; the latter is in the heart of the Summer Milky Way and near M20, but is not hard to locate if the map in the Observer's Handbook is used.

2. Over the coming months the following items will be worth watching:

(i) the Perseid Meteor Shower, especially on the night of August 11-12, when the shower may be very interesting. Excellent "moon conditions" prevail. The comet associated with this shower is overdue in this part of the solar system.

(ii) the bright comet, Giacobini-Zinner, which is circumpolar now and in the constellation Cassiopeia. An ephemeris for this comet is found in the Handbook on page 131. Those who have larger telescopes may begin to try to find Halley's Comet; a map is found on page 132.

(iii) the planets Jupiter, Saturn, Uranus, and Neptune in the evening and Venus in the morning. Mercury will be a challenge in the morning sky in the latter part of August.

(iv) the mutual occultations of the satellites of Jupiter which are of special interest this year when the earth is close to being perfectly in line with the plane of the orbits of the moons of Jupiter. The following data on the Jovian satellite occultations are taken from the June issue of the Edmonton Centre's newsletter:

DATE	TIME	EVENT
July 30	6:36:36	3 ecl 2
30	7:05:36	3 occ 2
Aug 3	7:39:47	1 occ 3
Sep 6	5:46:14	1 occ 4
14	3:16:55	1 ecl 2
18	6:53:58	3 occ 2
21	3:46:17	1 occ 2
21	5:58:33	1 ecl 2
22	3:12:56	1 occ 3

25	5:00:59	3 ecl 4
26	4:57:35	3 ecl 1

The above times are U.T.. All these events are during "nighttime" hours. 1=Io; 2=Europa; 3=Ganymede; 4=Callisto. "ecl" = an eclipse; "occ" = an occultation.

Let us try to have as many observations of these events as possible. Be sure to observe Jupiter and its moons for some time before the event listed and try to determine the accuracy of the prediction if possible.

3. Your editor enjoyed the hospitality of the London Centre on July 19th when he travelled to western Ontario and gave a talk at their Centre Meeting about Zodiacal Light as the return part of the exchange which began with the talk by Peter Jedicke at our Centre on May 10th. This very enduring Speaker Exchange Program which has been going on for many years seems to be stimulating and beneficial to both centres.

4. Mark Kaye informs us of his new address: R.R.1, Inverary, Storrington Twp., K0H lX0 and the phone number is 353-2313. He invites members to use his observing site if they wish.

5. Here is our calendar of upcoming meetings:

July 26	David Levy: The Discovery of Comet 1984t
August 9	Dr. David Hanes: a topic of his choosing
August 26	Leo Enright: Observing Saturn's Satellites
Sept. 13	OPEN
Sept. 27	Leo Enright: The Recording of Observations

6. Our meetings are at 8:00 p.m. in Room 222 in Ellis Hall on University Avenue. We hope to see you there.

7. Our address is: R.A.S.C. - Kingston Centre,
Box 1793,
KINGSTON, Ont.
K7L 5J6

Clear skies!
Good observing!

Leo Enright