REGULUS

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

JULY, AUGUST, 1983

AN EDITORIAL: CONCERNS ABOUT COSTS

In spite of general acceptance and some outright praise for our centre's newsletter with its new format, the cost of its production and mailing has been a matter of considerable concern to us recently. Our centre, a small but active group which needs a frequent newsletter because of the many miles which separate us, is feeling what almost all other centres are currently experiencing: - that the cost of producing and mailing a newsletter in the way in which it should be done is putting a severe strain on the financial resources of the centre.

Few of us need to be reminded of how the cost of everything, especially postage has increased. I have on file copies of our newsletter or its predecessor from less than a decade ago which were mailed to me at less than one-tenth the cost of mailing our last issue to some of our members. (Yes, the issues of late 1973 and early 1974 came with 6¢ stamps: a postal official demanded 64¢ to send some copies of our latest newsletter.) Membership fees have not increased tenfold over the same period; in fact, they have not even doubled.

Regrettably some centres have had to adopt rather drastic measures in the face of such costs. At least one centre is mailing monthly newsletters two at a time. In such situations, the centre's news is no longer "news" when it is read by some members. One centre has indicated that it cannot and will not publish a newsletter more than four times a year. A quarterly publication, in my opinion, almost ceases to be a newsletter. Was there not a saying at one time about things being "as stale as day-old newspaper" or its news? Reading in late August about someone's observing program of last March is less than many an astronomer's idea of excitement. The editorial in the most recent issue of one centre's newsletter indicated that it could no longer publish at all and would cease doing so for an indefinite period of time.

Your editor has considered several alternatives in the face of our rising costs. None of them is desireable but one of them may have to be adopted before long. A quarterly newsletter, a very short bi-monthly edition, an increase in the annual fees, or a return to a format which is inexpensive but less pleasant to read -- these are some of the things which have been suggested. In the meantime, we will try to listen to the wishes of our readers and ask them to complete the survey at the end of this issue. If as many of you as possible would do this, we would be better able to face the burden of increased cost with a realization of the wishes and opinions of our members -- those for whom the newsletter exists in the first place.

THE ISLAMIC LUNAR CALENDAR (PART I) by DAVID STOKES

(Editor's Note: One of the very fine papers presented at the Quebec General Assembly of the R.A.S.C. this year was by our member, David Stokes, who has been asked by the Quebec Centre to submit it for publication in their bulletin. I am very happy to receive a copy for publication in these pages and hope that this paper will eventually appear in the Journal of the R.A.S.C. Unfortunately it will have to be serialized over the next two or three issues of our newsletters.)

(Note: All of the footnotes will appear at the end of the text.)

THE ISLAMIC LUNAR CALENDAR - PART I

inna indat-tashshura indo Allahi ashna-ashara shaharan

.....the number of months, in the sight of Allah, is twelve months.....[1]

This revelation in the Arabic Qur'an established the new, Islamic calendar for the reckoning of time, and put an end to the practice of intercalating extra months. The rule until then had been to add a thirteenth month each 3rd, 6th, and 8th year of an eight year period to keep the solar and lunar calendars in synchrony. The purpose of this paper is to examine the theoretical basis for a lunar calendar and to review the Islamic calendar currently in use.

First, it is instructive to calculate the theoretical requirements for a perpetual lunar calendar taking the mean value of the synodic month as exactly 29.530589 days, or 29d 12h 44m 2.9s. A period of 12 months then corresponds to 354.367068 days, so that at the end of the first yera there is a residue of 0.367068 days. At the end of the second year the calendar error has accumulated to twice this amount,or 0.734136 days. An extra day is then added and the error is reduced to 0.734136 -1.0 =-0.265864, with the negative sign indicating the adjusted calendar is now in advance. A computer program was written to signal the 'leap' years in which the calendar error exceeded 0.5 days, and to determine the residual error at the end of each year. The results are summarized in Table 1.

TABLE ONE

A CYCLE OF 30 ISLAMIC LUNAR YEARS (theoretical)

YEAR	TOTAL DAYS	RESIDUAL ERROR	YEAR	TOTAL DAYS	RESIDUAL ERROR
1	354	+.367068	15	5316	-.493980
2	709	-.265864	16	5670	-.126912
3	1063	+.101204	17	6024	+.240156
4	1417	+.468272	18	6379	-.392776
5	1772	-.164660	19	6733	-.025708
6	2126	+.202408	20	7087	+.341350
7	2481	-.430524	21	7442	-.291572
8	2835	-.063456	22	7796	+.075496
9	3189	+.303612	23	8150	+.442564
10	3544	-.329320	24	8505	-.190368
11	3898	+.037748	25	8859	+.176700
12	4252	+.404816	26	9214	-.456232
13	4607	-.228116	27	9568	-.089164
14	4961	+.138952	28	9922	+.277904
15	5316	-.493980	29	10277	-.355028
16	5670	-.126912	30	10631	+.012040

It is evident from Table 1 that at the end of a 30 year period the residual error will amount to less than 18 minutes (0.01204 days). If the computation is carried beyond 30 years, carrying forward the residual error, the pattern of 'leap' years is repeated only as far as the 57th year. Thus an almost perfect calendar would be obtained for a 30 year cycle equivalent to 10631 days, with a regular

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succession of 'leap' years obtained by adding one day at the end of years 2, 5, 7, 10, 13, 15, 18, 21, 24, 26, and 29 to make years with 355 days each; the common years 1, 3, 4, 6, etc., each having 354 days. The days in each month could alternate as shown in Table 2.

TABLE TWO

THE LUNAR MONTHS OF THE ISLAMIC YEAR

	NAME	DAYS	TOTAL	REMARKS
1	MUHARRAM	30	30	
2	SAFAR	29	59	
3	RABI'AL-AWWAL 30	89		or RABI' I
4	RABI'AL-THAAN_II	29	118	or RABI' II
5	JUMAADA-L-AWWL	30	148	or JUNAADA I
6	JUMAADA-L AAKHIRA	29	177	or JUMAADA II
7	RAJAB	30	207	
8	SHA'BAAN	29	236	
9	RAMADAAN	30	266	month of fasting
10	SHAWWAAL	29	295	
11	DHU-L GA'DA	30	325	
12	DHU-L HIJJA	29 or 30	354 or 355	month of pilgrimmage in 'leap' years

European chronologists have adopted this scheme in the past in order to create Tables of equivalent dates for the Islamic and Christian eras[2], but these cannot be accurate, as we shall see.

That residual error we have ignored in adopting a 30-year cycle of exactly 10631 days will accumulate to more than half a day after 1264 years have elapsed. Then, if one extra days is added the theoretical lunar calendar requires no further adjustment for nearly 2500 years!

(To be continued in next issue of Regulus)

A LETTER FROM OUR PAST PRESIDENT

All the members of our centre will be delighted to learn that out past president Angelika Hackett and her husband, Bob, are doing well in their new home in Edmonton. Here is her recent letter to us.

Edmonton, Alta.
July 2, 1983

Dear Leo:

What an amazing newsletter! I was so happy to receive Regulus (May, June issue) with all the news from the Kingston Centre; I had been wondering what everyone was up to these past weeks. I really like the new format -- there is even a letterhead! Absolutely marvellous, and I can't believe its length! Congratulations to everyone for such an amazing effort, including all the work for Astronomy Day and all the meetings!

When I next visit Ontario, I will definitely make a point to visit Kingston and drop in on a meeting. Maybe in late fall or early winter (having escaped the hayfever country, I have no intention to go back until well after the first major frost!), if there are some seat-sales on planes. I really miss you all, and I would love to meet the new members, especially Karen and Hugh, who obviously have the enthusiasm it takes to get young people involved! I was most interested in what was reprinted of

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their handout, and spent a long time reading page after page of Regulus. And what an interesting schedule for the summer! Do say hello to David Levy for me; I don't know if he is already in Kingston, or won't arrive until later.

My Journal and National Newsletter arrived a little while ago, and I'm so glad that your articles on David's marathon and the quadruple star are reprinted in it!

At the Edmonton Centre's meeting of May 9 we found out about the recent discovery of Comet Iras-Araki-Alcock, and the next day Bob and I drove to the planetarium, where a number of telescopes and binoculars were set up. We got a look at our first comet! A bit fuzzy, and not really very spectacular, however, due to the city lights. Public star nights are really popular here, and many people came out to that one as well.

In the meantime we have returned from another wonderful trip tot he west coast and the Queen Charlotte Islands. What wild country up there! From there to Prince Rupert we had one of the roughest ferry crossings ever, and many people were seasick. It was very stormy the whole time, but nevertheless interesting and exciting. We were amazed at all the wildlife we encountered on Graham Island, the northern one. Many Sitka deer, even one with a young one, seals in the coves, looking at us across the waves, as we prepared a picnic on the beach, eagles and other magnificent birds, and, of course, a gigantic bear, wobbling int he direction of the local dump. We didn't realize that only 6000 people live on the Queen Charlottes! We stayed on the east coast with friends who are building a house there.

Bob is in Urbana, Illinois, for 2 weeks, at yet another conference. I'm still job hunting. For now I've started a volunteer job at the Edmonton Cross-cultural Learner Centre, which is very interesting, as they deal with all sorts of global issues, and Central America, so that I have the opportunity to keep up some Spanish. In the fall there may be a part-time job opening up, so perhaps I can get my foot in the door this way!

Recently I bought a new camera, Pentax ME Super. I'm really excited and just learning how it works, as I've never had anything more sophisticated than a little Olympus Trip! Once I'm better at it, and get a tripod, I could even try some astrophotography! I don't have a telescope; in summer it never gets really dark here, and in winter I don't think I would stand outside at -30! Maybe one day we shall live in a more friendly climate. Greetings to everyone,

Angelika.

FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Did you know that a comet was once discovered because of an error that was made in a telegram that was sent to an astronomer? It is true. In the year 1896 a Lick Obervatory astronomer, Charles Perrine, requested from another astronomer updated information on a comet which Perrine had previously discovered. The answer came in a telegram whose words were garbled and the position was completely in error. Not realizing that the numbers were wrong, Perrine pointed his telescope at the coordinates given, and by a fantastic coincidence, an entirely different and undiscovered comet was right in the middle of his eyepiece. An amazing way to discover a comet!

REPORTS AND OTHER ITEMS

1. Our centre owes a tremendous debt of gratitude to Mr. Steve Dodson for what he did on July 3rd. On that date, Steve, who is an enthusiastic amateur

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astronomer from Sudbury, set up his amazing telescope near Odessa and gave us a chance to see and look through this fabulous instrument. His home-built 22" f-7.3 Newtonian is probably the largest portable telescope in the country and it gave us some breath-taking views of deep-sky objects like M 13 and the Ring Nebula. We are also thankful to Terry Dickinson for providing his dark-sky site for the occasion.
Great show, Steve! It was good to have the chance to meet you. Our centre is still buzzing with talk about your telescope and the work you put into it.

2. July was far different from the previous four months. It gave us over a dozen very good nights for observing, whether it was studying lunar craters, planetary features, or deep sky objects. Some of us have been impressed at how easily the movements of both Uranus and Neptune could be detected from night to night over the past month. Contrary to the statements of some writers, Neptune, though in the Milky Way, <u>can</u> be easily detected and from a dark site using 11 x 80 binoculars. I have found it interesting to watch its westward movement against the background stars just north-west of M20, the Trifid Nebula.

3. It was good to see a successful completion of the London-Kingston Centres Speaker Exchange. I thank the members of the London Centre for their hospitality at the time of their July 15th monthly meeting.

4. Our Sky Search Program which was described in the last newsletter has entered its second stage with most of those who chose an area of the sky three months ago making another choice from the available areas of the summer sky. If anyone who missed the meeting of July 22nd would like to choose an area from the summer sky or would like to join the program for the first time, he should see me as soon as possible to choose one of the areas not already selected.

5. Our sincere thanks go to the six members of our centre who acted as hosts and guides on July 16 at the Holleford Crater when seven members of the Toronto Centre arrived for a tour of the site.

6. We extend a very hearty welcome to Mr. Jim Scotti of the Lunar and Planetary Lab in Tucson on the occasion of his becoming a member of our Centre. We also congratulate him on the completion of his Messier Observation List and look forward to presenting him with the Society's Messier Certificate.

7. We apologize to Terry Lappin of Tucson for our oversight in sending her our publications, and we hope this will soon be corrected.

8. A number of objects are well worth observing or photographing over the next two months:
   (1) Venus passing into the morning sky rises to greatest brilliancy by October 1st. Let's try to see who can be the first one to spot it in the morning sky after its inferior conjunction on August 25th.
   (2) A lunar occultation of Jupiter occurs in the very early evening of September 12th. In fact, it begins before sunset, but with careful planning, good weather, and a good south-western horizon you just may be able to observe it with your telescope.
   (3) For the last week of September and first week of October, Mercury will be easily visible in the morning sky. Its greatest elongation from the sun comes on October 1st.
   (4) Jupiter and Uranus are again in conjunction on September 24th when the two planets will be less than half a degree apart in the constellation Scorpius.

9. Here is the list of our upcoming meeting dates along with some of the topics to be discussed:

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Aug. 12 - Perseid Shower Observing Plans
Aug. 26 - David Levy: My Comet Hunting Program
Sept. 9 - Sky Search Program For The Fall
Sept.23 - Jocelyn Boily: Astroslide Presentation
Oct. 14 - Sky Search Reports
Oct. 28 - Sky Search Reports
Nov. 11 - Open
Nov. 25 - Annual Dinner And Annual Meeting
Dec. 9 - Open

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

10. I would be happy to receive material for these pages. Our address is:

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CLEAR SKIES!

GOOD OBSERVING!

Leo Enright