NATIONAL NEWSLETTER

December, 1983

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Dr. Peter Millman cuts the final third of the red ribbon across the front door of the Society's new Head Office while Past President Dr. Helen Hogg and current President Franklin Loehde look on.
– photo by I. McGregor

NATIONAL NEWSLETTER

December, 1983

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The Star of Bethlehem: Some Historical Considerations

by Anthony A. Barrett
Vancouver Centre

The Star of Bethlehem is a topic of perennial interest on which astronomers are invariably asked to give their opinion as Christmas approaches. This note is not intended to offer a definitive solution to the problem, but to suggest some thoughts on the historical evidence that might be of use, if not in solving, then at least in discussing the event.

If we knew the extact date of the Star's appearance we would, of course, be in a very good position to determine its nature. The first logical step might be to try to decide the date of the nativity; but, as will be shown, theories about the chronology of Christ's birth should not be used either to prove or to disprove the exact time of the star's appearance. The traditional date of the nativity is 1 A.D. (and we should never, under any circumstances, speak of the absurd "0 B.C."), which was based on the erratic computations of the monk Dionysius the Small several centuries later. We have two ancient authorities. Matthew (2.16), in attributing to Herod the massacre of all children two years and younger places the birth, by inference, not later than 6 B.C., two years before Herod's death in 4 B.C. Luke (2.1–2) connects the birth with the census taken when Quirinius was governor of Syria, that is, in 6 A.D. Now these dates are not only contradictory, but also contain inherent problems. Christ's crucifixion took place during a period when Pontius Pilate was procurator of Judaea, when Caiaphas was High Priest and when the Passover fell on a Friday, Nisian 14 (computed on the basis of the full moon), that is, between 28 and 35 A.D., the widest range that meets all three conditions. Now Luke (3.23), tells us that when Christ began his ministry he was about thirty years old, so that even if his ministry was much shorter than is traditionally assumed (some scholars make it four years), Luke's 6 A.D. would still be too late for Christ's birth. Also, if Luke is correct, that the birth of Christ occurred during a census of the

Roman empire, then Matthew's testimony is invalid. While Herod was alive Judaea was not a Roman province but an independent kingdom that issued its own laws and minted its own coinage. Herod's policy would, admittedly, have been expected to conform to the general will of the Roman emperor Augustus, but legally and constitutionally the Romans had no formal say in Judaea's internal matters and a Roman census could not have been been held there while Herod was alive. The census, then, must belong to the period after Herod's death, when Judaea was taken over as a Roman province. Scholars have long tried to reconcile these discrepancies, but without much success. The simple truth is surely that the writers of the synoptic gospels, not surprisingly, did not know the exact date of the nativity. They probably had a fair idea of the date of the crucifixion, and knew that Christ was a youngish man when he died and so must have been born near the end of the First Century B.C. Anything more precise than that was probably no more than intelligent speculation. Thus if a modern authority claims that, for instance, 6 B.C. is the most likely date for the nativity on the basis of the historical evidence , we should concede that he might be right, but also bear in mind that the evidence is so uncertain that on it alone we should not rule out as a candidate for the Star an astronomical event that occurred at a different date.

How reasonable is Matthew's account of the Star? There are two extreme views. It can be noted that it was not uncommon in the ancient world when describing an event that later proved to be highly significant (the birth of Alexander the Great, for example), to claim after the fact that the event was prophesied by dramatic omens. According to this argument, Matthew's account would be viewed as a fabrication, intended to reinforce the notion of Christ's divinity. The very opposite position, is that the Star is a genuinely supernatural phenomenon, guided to Bethlehem by divine will. It is not my place to rule either suggestion invalid, but each would, of course, make any further historical or scientific discussion pointless. To me, the most reasonable explanation falls in between, that there was an astronomical event noted during the *general* period when Christ was born and that later tradition associated that event with the precise time of the nativity. The astronomical phenomenon might not in fact have been considered remarkable when it occurred, but its later association with the story of Christ has endowed it with the mystique and wonder familiar to us today.

What, then, does Matthew tell us about the Star? There are two basic items of information, (a) that it was a single heavenly body and (b) that it was imagined to move at a rate discernable by observers below (2.9: 'and the star which they had seen at its rising went ahead of them'). It has become fashionable of late to explain the star as a planetary conjunction. But a conjunction seems to conflict with both features just mentioned. For instance, during the triple conjunction of Jupiter and Saturn in 7 B.C. (a favourite candidate) at their very closest the planets maintained an angular separation of about 1°. This can perhaps best be visualised if we remember that the moon's disc is about half a degree across and that Saturn and Jupiter could never have come closer than the equivalent distance of two full moons. Also, since their course would have been predictable, they could hardly be thought of as acting as guide for the *magi*. A nova has also been suggested, but while it would shine as a single body, it would not move across the sky. This leaves the possibility of a comet. Greek and Roman sources make no mention of a comet during the general period in question, but this is hardly surprising, since their notices of comet observations are sketchy and haphazard. We are obliged, therefore, to turn to ancient China, where records were kept systematically over a long period of time. Objects described as comets are in fact noted in the Chinese records for 5 B.C. and 4 B.C., although some scholars have suggested that they are *novae*. The subject of Chinese astronomy might seem remote and unapproachable, but we should resist the temptation to accept what we might regard as expert opinion simply on trust. The two phenomena in question are items 63 and 64 in the catalogue of Ho Peng Yoke (*Vistas in Astronomy* 5 (1962) 127–225). No. 63 is a *hui* comet that appeared between March 10 and April 7, 5 B.C. for 70 days in Capricorn; no. 64 is a *po* comet that appeared in 4 B.C. near Altair in Aquila. Both of these *might* have been novae, but if so we must assume that the Chinese astronomers made two successive errors. Also, a *hui* comet, or "broom star," is one that sends its tail in one direction so that it resembles a broom, while a *po* sends out its rays evenly in all directions (viewed "head on," in crude terms). A possible confusion between a *po* (no. 64) and a nova is not too difficult to understand, but a similar confusion over a *hui* (no. 63) seems much less likely. Thus the weight of the Chinese evidence supports at least one comet appearance during the general period. It might also be noted that Aquila and Capricornus are adjacent constellations, and that the appearance of two different comets in the same broad area of the sky in successive years might account for the tradition hinted at by Matthew (2.10) that the Star disappeared for a time, to reappear later.

If I seem to lean heavily in favour of a comet, that is because the ancient evidence seems to point so strongly in that direction. It remains to point out that the converse of the principle stated above now holds true. If we opt for a comet of 5 B.C., or a conjunction of 7 B.C., or whatever, this tells us nothing about the *precise* date of the nativity.

Department of Classics
University of British Columbia

Reviewer's Comments: Comets, however, were always thought to be omens of calamity or of natural disaster such as fire or flood – even as portents of death or war – never of a royal birth. Across North America, most planetariums which present special "Star of Bethlehem" shows concentrate on the triple conjunction of Jupiter and Saturn in B.C. 7 as the best astronomical explanation fitting the information available.

Notes of Interest

The Astronomical Society of the Pacific has added yet another educational tape set to its inventory. The set of two casette tapes titled "Tapes of the Night Sky" provides four 25-minute tours of the night sky, one for each season. The tapes come in a kit which includes a printed transcript and four seasonal star maps. The tape set is available at U.S. $16.95 from the ASP., Tapes Department, 1290-24th Ave., San Francisco, California 94122.

The Exhibition Centre of Novegro, Italy will be the site of Astron 84 and Subter 84, exhibitions of equipment and data-gathering and processing techniques for astronomy and earth sciences respectively. These annual programmes also include demonstrations, debates and research meetings. Information on these exhibits, which run from 17 to 19 February 1984, can be obtained from the organisers, Comis Lombardia, 20123 Milano, Italy – Via Boccaccio, 7.

At the September meeting of National Council, National Recorder Leo Enright was appointed R.A.S.C. Astronomy Day Co-ordinator. Leo is well known in the Society for his activity in astronomical public education, and will co-ordinate the Astronomy Day activities of R.A.S.C. centres with programmes of the Astronomical League in the U.S., and of overseas organizations. May 5 has been designated as the 1984 International Astronomy Day.

Congratulations to Jack Newton of Victoria Centre on the publication of his latest book, *The Cambridge Deep Sky Album*. Co-authored with fellow Victoria Centre member Philip Teece, the *Album* presents 90 colour and 46 black and white photographs of deep sky objects taken through Jack's 40-cm telescope and cold camera. Details of the equipment and techniques used are included. This latest addition to the prestigious Cambridge University Press series of astronomy books is priced at approximately $20.00, and will be available at your local bookstore soon.

Comet watchers may be interested in a new 34-page handbook of 21 geocentric ephemerides for short period comets in 1984. Most of these objects are within reach of amateur telescopes. The privately produced handbook *Comet Predictions for 1984* is priced at $4.00 in the U.S. and $5.00 elsewhere, postage paid. For information and orders, write Charles L. Townsend, 3521 San Juan Ave., Oxnard, California 93033.

Nominations for Honorary Membership

In August 1983, the R.A.S.C. joined the world astronomical community in mourning the loss of one of its giants of the twentieth century, Dr. Bart J. Bok. A former director of the Steward Observatory and

Mt. Stromlo and Siding Spring Observatory, Dr. Bok was a familiar figure on recent solar eclipse expeditions, and an Honorary Member of this Society.

The Bylaws of the R.A.S.C. allow for the conferment of Honorary Membership by the Council in recognition of noteworthy contributions to astronomy. There is a maximum of fifteen such members allowed at one time.

The National Council has decided to ask the assistance of all members in the selection of a new Honorary Member. Members are invited to submit written nominations including statements citing the merits of the nominees to the Chairman, Standing Committee on Honorary Membership, The Royal Astronomical Society of Canada, 136 Dupont Street, Toronto, Ontario M5R 1V2. It is hoped that the selection may be made in time for announcement at the General Assembly in Hamilton in 1984.

George Abell
1926–1983

George Abell, Professor of Astronomy at the University of California at Los Angeles, died in early October. He was a well known observational cosmologist and author of several books on astronomy. His textbook *Exploration of the Universe* is widely used in undergraduate astronomy courses, and *The Realm of the Universe* was released the week before his death. The Abell *Catalogue of Clusters* is a standard observational reference. As an observer, educator, administrator and popularizer of astronomy, he will be missed by the world astronomical community.

Japanese Variable Star Observations in 1982

by Osao Shigehisa
Kanagawa Japan

In Japan visual observations of variable stars are collected by the Japan Astronomical Study Association (J.A.S.A.). In a recent bulletin of the J.A.S.A., observations for 1982 were summarized. Twenty-eight observers contributed 20,371 estimates, bringing the total number of variable star observations recorded by J.A.S.A. to 566,608. Bad weather in July limited the number of estimates that month to only 400. Hiroaki Narumi of Ehime, Shikoku led the J.A.S.A. observers with 7,723 estimates logged in 1982. His closest competitor, Sukehiro Fujino of Shizuoka, contributed 2,121.

Minoru Honda of Okayama discovered two novae. Nova Aquilae 1982 was first seen on 28 January at sixth magnitude. It faded from magnitude 8.4 in February to 12.5 mag. in March. After a rise to 12th magnitude in April and May, it slowly faded from view, and was last observed at 13.4 mag. in June. Nova Sagittariae 1982 was discovered at ninth magnitude on 4 October. It reached maximum brightness of 8.5 mag. in mid-October, and slowly declined to 10.9 mag. Before observations ceased in November, it was seen to brighten once to magnitude 9.1.

The variable star RS Ophiuchi gradually brightened beginning in April to reach a maximum of magnitude 10.3 between September and November. It then remained steady until year's end.

The variable PU Vulpeculae showed no remarkable changes in 1982 but did fluctuate in brightness between magnitudes 8.4 and 8.8.

Eight maxima of the U Geminorum type star SS Cygni were observed while two maxima of U Geminorum itself were seen. Also logged were eight maxima of X Leonis, four of SS Aurigae, six of PU Pegasi, four of YZ Cancri, and four of CZ Orionis.

Three R Coronae Borealis type stars faded in 1982. R. Coronae Borealis itself had shown little change from 1977 to 1982 but in late August began to fade. It reached a minimum of magnitude 7 in mid-September before recovering its normal brightness in October. RY Sagittarii faded once in 1981

and again in May 1982, reaching below magnitude 13 in June. It began to brighten in July and returned to magnitude 8.5 by October. SU Tauri declined rapidly from magnitude 9.9 in October to below magnitude 14.5 in November.

Epsilon Aurigae began its first decline since the eclipse of 1955–1957. Usually seen at magnitude 3.2, it dimmed to 3.4 mag. in August as partial eclipse began, and had faded to magnitude 3.7 by December.

A peculiar variable was discovered near M42 (the Orion Nebula) by Matsuo Sugano in December, but no details were given. Estimates for about 300 long-period and semi-regular variable stars were also reported.

Instruments used for these observations included one 40-cm reflector, 3 in the 25 to 30-cm aperture range, and 8 20-cm reflectors.

Prior to World War II the late Shigeru Kanda collected amateur variable star estimates for the Astronomical Society of Japan. He established the J.A.S.A. in 1945 and began issuing annual reports of variable star observations at that time. Today, Dr Masaaki Huruhata, former Director of Tokyo Astronomical Observatory, co-ordinates observations of the peculiar stars HL Canis Majoris and CI Cygni as well as recently discovered variables.

A number of J.A.S.A. members are also members of the A.A.V.S.O., BAA., and R.A.S.C. Correspondence for the J.A.S.A. and its members can be sent to its head office:

Japan Astronomical Study Association
c/o National Science Museum
Ueno Park, Taito-ku
Tokyo, Japan 110.

Report of the September National Council Meeting

by Leo Enright
National Recorder

The National Council of the R.A.S.C. met on Saturday, September 24th, 1983 in the Library of the Society's new headquarters at 136 Dupont Street, Toronto. Our National President, Mr. Franklin Loehde, presided and thirteen centres of the Society were represented.

The agenda included reports from the officers and several of the standing committees as well as several significant announcements and decisions. Mr. Loehde reported that the Financial Strategies Committee recommended that the Society would be best served if its several different funds were amalgamated into a single endowment fund – with the exception of the Ruth Northcott Memorial Fund, which operates under a separate trusteeship. Council approved in principle the creation of such a single fund, although details of its nature and operation remain to be worked out and legal counsel will be sought regarding the implications of its administration and disposition. Approval was given to a request made at last May's Council Meeting for a grant to the Windsor Centre under the Special Projects Fund, and Council also approved in principle a request to continue its support of the Quebec Centre's annual publication of the *Almanaque Graphique*.

On behalf of the Property Committee, its chairman, Mr. Broughton, reported that finally completing the procedures to purchase the building housing the Society's new headquarters at 136 Dupont Street had been a task fraught with numerous problems and unforeseen expenses, stemming from the former owner's attempt to hinder the completion of the transaction, despite his signed agreement to sell. All members of Council were relieved that the difficulties listed by Mr. Broughton were over and thankful to him and his committee for an enormous effort made on behalf of the Society.

Dr. Halliday reported that the Awards Committee had received nominations for two of the Society's certificates and approval was given to the awarding of seventeen Membership Certificates and three Messier Certificates.

Dr. Chou reported that the current volume of the *National Newsletter* was costing less per page than had been predicted and Dr. Bishop reported that the 1984 edition of the *Observer's Handbook* had gone to press on July 20th and was expected to be out by October 10th – certainly two items of welcome news for members of National Council.

Approval was given for three applications under the Speaker's Exchange Program. Council also named Mr. Enright to be Astronomy Day Coordinator and as such he will work with counterparts in the Astronomical League and other organizations to promote the concept of International Astronomy Day (which is on May 5th in 1984 .) A decision was also made on the number of back issues of the *Journal* that were to remain on file in the National Office.

Mr. Ashenhurst of the Hamilton Centre reported on the work done by his centre and the Niagara Centre to host the forthcoming General Assembly from June 29th to July 2nd, 1984.

After the meeting there was a brief ribbon-cutting ceremony to open the new headquarters with the honours being done by Mr. Loehde and two past presidents of the Society, Dr. Peter Millman (currently the Honorary President) and Dr. Helen Hogg. All present enjoyed refreshments and a good meal arranged by the "Housewarming Committee" which had been working under its chairman, Mr. Randy Attwood.

Fuller details of the items discussed at the meeting may be found in the minutes of the meeting which have been mailed to Centre Presidents and National Council representatives. Financial reports from the Treasurer and the Property Committee, as well as the list of the winners of the certificates, are attached as appendices to the minutes.

In all it was a pleasant experience to have our first Council Meeting in the new headquarters.

The Best of the NGC's

by Steven Morris
Calgary Centre

Deep-sky observing does not begin and end with the Messier catalogue, though it sometimes seems that way. To correct that impression, the *Observer's Handbook* publishes a list of "The Finest NGC Objects", arranged according to season. Last April Don Norris and I decided to use the Wilson Coulee Observatory to attempt the sixteen objects listed for the winter sky. As the skies darkened, we started by observing Venus, the Crab nebula, the double-star Castor and the ever magnificent Orion nebula. By then it was dark enough to attempt some lesser-known objects.

The first object on the list was the planetary nebula NGC 2392 (the Clown-Face nebula), which appeared as a bright circle with a very obvious central star. The popularity of the Ring Nebula in Lyra has obscured the fact that there are many other interesting planetaries, and we observed three others that night. NGC 2438 was the most interesting as it is in the open cluster M46 and is thus easily spotted. Despite its large size and low surface brightness, NGC 2022 in Orion was a small but bright disk, and NGC 2440 was spotted at high magnification with averted vision, only ten degrees off the horizon.

Emission nebulae are a greater challenge but they come in greater variety. By the time we got around to NGC 1788 it was too low to see, and was the only object on the list we didn't find. The best-known emission nebula of all is the Orion nebula, but few observers bother with NGC 1973, which we found to consist of large and easily-seen strands of nebulosity about one degree away. NGC 1931 was nothing more than a small and faint blur close to M38 and M39. Hubble's Variable Nebula (NGC 2261) was a faint haze around a bright star, and we just caught NGC 2359 as it was setting, so it appeared only as a very small and faint patch.

Open clusters are much more interesting. NGC 1907 was found at the edge of M38 and in appearance was a small carbon copy of its massive neighbour. We found NGC 2158 even more peculiar, as it is seen inside M35 as a small, faint cluster of many stars, and seems at first as nothing more than a condensed area of the larger cluster. NGC 2244 is the central star cluster of the Rosette Nebula and is large and easily seen, even though the Rosette is a difficult challenge to the observer. NGC 2194 and NGC 2539 both appeared to us as faint in surface brightness but well resolved as condensed powders of stars.

The last two entries in the list of winter objects were galaxies in Camelopardalis. NGC 2655 was clearly seen, although faint and small. NGC 2403 was much larger with a very obvious nucleus, and a slight suggestion of structure.

In three hours Don Norris and I had found more than a dozen interesting but neglected objects, aided

by accurate co-ordinates and setting circles. A new harvest of objects is coming into the autumn sky, and I strongly suggest that any members looking for new ground to break should attempt the suggestions listed in this section of the handbook.

Reprinted from *Starseeker*

Kingston Centre Deep Sky Programme

by Leo Enright
Kingston Centre

Last spring, I presented to the members of the Kingston Centre a proposal for a Nova and Comet Search Program by which means a large percentage of our members could become more familiar with certain areas of the sky. If an observer can become well acquainted with a special part of the sky that he can call his own, then he can improve his observing techniques and be more aware of the many objects that are "there in the heavens just waiting to be observed."

Here, in more specific detail, is what each participant should try to do. First they should remember that the aim of the program is to have each person become very familiar with a 10° by 15° area of the sky, so that (just possibly!) he or she could detect a nova or comet in that area. Within each area, the observer should become well acquainted with the positions and magnitudes of all stars in the designated area down to the limiting magnitude, if possible, of the instruments they use. No one is excluded because of the size of the optical aid he owns. Reports of anything unusual in the selected area would be given at each Centre meeting. These should include any suspected novae or comets, changes in magnitudes of the variable stars in the area, asteroids in the area, even artificial satellites detected moving in the area, and the reports should reflect a gradual degree of increasing familiarization with the region of the sky. Members at first may become familiar with stars to 7th or 8th magnitude. Later they may even become knowledgeable regarding the many stars to 12th or 13th magnitude, to such an extent that they could detect an asteroid within the area.

To initiate the program, I preselected and numbered twenty areas of the sky 10° by 15° (or 10 degrees in Declination by 1 hour in right Ascension) making sure that the areas were easily visible in the evening sky at that time and for the following couple of months. Those who chose to participate selected an area by number and then located it on a star map. It is intended that as each one's area becomes more difficult to observe in the evening sky (and this will happen for all the southernmost of the areas, but not so quickly for the northernmost regions) he will choose another area and over the course of a year have about three areas to observe, but as seasonal observing allows, he is to return to his areas of first choice. It is hoped that, at least for the first few years, each person will have only about three areas in total to observe. This should be possible since some of the regions are well within the Circumpolar Constellations.

The area should be monitored every clear night, if possible. Here are the things that should be recorded in each of the regions: the number of stars of each observable magnitude, the variable stars (names, type, magnitude range if known, and magnitude at which observed), the double and multiple stars, planets, asteroids, comets, special named stars, historically important stars, and Messier, Hershel, and N.G.C. objects, if any, in the area.

Following is the list of the twenty designated areas in the first round of selection, their positions and the constellations in which they are found.

Designated Area Number	Area R.A.	Dec.	Constellation
1	X^{hr} –XI^{hr}	0° –10°	Leo and Sextans
2	XI –XII	0 –10	Leo and Virgo
3	XII –XIII	0 –10	Virgo
4	XIII –XIV	0 –10	Virgo and Bootes
5	X –XI	10 –20	Leo
6	XI –XII	10 –20	Leo and Virgo
7	XIII –XIV	10 –20	Virgo, Coma Berenices & Bootes
8	X –XI	20 –30	Leo, Leo Minor
9	XI –XII	20 –30	Leo, Ursa Major
10	XIII –XIV	20 –30	Coma Berenices, Bootes
11	X –XI	30 –40	Leo Minor, Ursa Major
12	XI –XII	30 –40	Ursa Major
13	XII –XIII	30 –40	Canes Venatici
14	XIII –XIV	30 –40	Canes Venatici
15	X –XI	40 –50	Ursa Major
16	XI –XII	40 –50	Ursa Major
17	XII –XIII	40 –50	Canes Venatici
18	XIII –XIV	40 –50	Canes Venatici
19	X –XI	50 –60	Ursa Major
20	XI –XII	50 –60	Ursa Major

It may be noted that some of the sky areas include small sections of constellations not listed in the "Constellations" column. That column is simply intended to mention one or two of the constellations in the selected area of the sky.

It is hoped that this program will enable observers to become more acquainted with an area of the nighttime sky and, by learning about the stars and the deep-sky objects in that area, to become better amateur astronomers.

Reprinted from *Regulus*

Revisionist's Corner

There is little joy associated with final exams be it in writing them or marking them but there is the occasional chuckle. A few are recorded below, anonymously.

– "One of the reasons Aristotelianism lasted so long in astronomy was that during Aristotle's lifetime (450–300 BC) the Catholic Church was so strong ..."
– "Aristotle viewed the circle as the perfect square"
– Q: Explain why the northern hemisphere is warm in summer at a time when the Earth is farthest from the Sun.
  A: "The van Allen Baelt attracts the light and heat and due to the path around the earth it has the ability to concentrate heat on the 'poles' of the earth."
– "It is believed that Ursa Major and Ursa Minor were once binary stars"
– "Since Population II stars are old, they are unstable so to maintain stability, they stay close together to form cohesiveness"

Reprinted from *David Dunlap Doings*

Space Telescope

by Muriel Enock

Victoria Centre

Oberth envisioned a space telescope in 1923. Lyman Spitzer suggested it in 1947. And in the early 1960s , it was recommended as a project soon after NASA was formed. A detailed study of a 3 m Large Space Telescope in 1971 was followed by preliminary design work between 1972 and 1977 as funds became available. The European Space Agency has a 15% share, providing the solar array and also operational and staff support.

ST will be operational for two decades – when it finally flies – with regular servicing by the space shuttle. Its eight-segment mirror is surrounded by eight dedicated cameras, and its scientific instruments can be replaced by newer models as these become available. The 2.4 m f/24 Ritchey-Chrétien Cassegrain mirror is accurate to 1/60 wavelength at 632.8 nm with greater than 85% reflection efficiency at this wavelength and more than 70% at 121.6 nm. It will therefore cover observations from the far infrared to the far ultraviolet, with its 14 arcmin field of view.

A Tracking and Data Relay Satellite System will be used to communicate observations to Goddard Space Telscope Science Institute. STSI will be responsible for operations, for collection, analysis and distribution of data and for research and its distribution. A European Coordinating Facility will ensure that European astronomers can make full use of the extraordinary capabilities of ST. Orbiting at 600 km above Earth, ST will be above our atmosphere and can effectively see 14 billion light years into space with ten times the power of the Palomar 5 m telescope.

The main ST cameras are: (1) the Wide Field and Planetary Camera, operating at f/12.9 or f/30, has a detector 800 × 800 pixels, and is sensitive to radiation from 115.0 to 1100 nm, accurate to about 1%; there are also filters for colour information; low noise will enable visual magnitude more than 28 to be achieved; (2) the Faint Object Camera, from the ESA detects from 120 to 500 nm, and will record individual photons with its very high angular resolution – 0.007 arcsec in very narrow fields; it also has filters, dispersing elements, polarimeters and an occulting disk; (3) a Faint Object Spectrograph gives medium resolution from 10^2 to 10^3 times, with concave gratings for short wavelengths or a prism for long wavelengths, covering 115 to 800 nm; it is a very sensitive instrument, with polarization and time variability of 10 ms; (4) the High Resolution Spectrograph observes from 110 to 320 nm with highest resolution of 0.05 A, one of the finest in all astronomy; concave gratings are used with Digicon detectors (as the Faint Object Spectrograph also has); it will be 100 times better than the IUE; (5) the High-Speed Photometer/Polarimeter is for high time resolution studies of sources over a wide band of wavelengths, 120 to 700 nm, over intervals greater than 10 ms for the brightest sources; there are filters for broadband spectroscopy, with apertures 0.1 to 2.8 arcsec; the detectors are magnetically focussed image dissectors; polarimetry can be carried out in the near UV. This instrument can be used to study such things as time variability of optical counterparts of some collapsed objects, eg, stellar-mass black holes or neutron stars; it will be used to establish photometric standards and time variability for a number of stellar objects.

Space Telescope will make observations which are unfeasible from the ground, some of which will concern the distance scale and age of the universe, galaxies with larger redshifts and clusters of galaxies for cosmic evolution, and centres of active galactic nuclei and quasars to study the physics of these central regions and the tremendous energies there. In the Milky Way, there will be studies of the populations of the corona, physical conditions and chemical composition of the interstellar medium, of stellar winds and the outer stellar atmospheres, planetary nebulae, supernova remnants, all of which studies can be extended into the ultraviolet. The birth of binary systems and their evolution, and the evolution of globular clusters, will be extensively studied in the infrared as improved instruments become available.

Astrometry will be improved ten times, and a search for planetary systems of other stars will be made. ST will make it possible to link observations in optical, radio and dynamical reference frames. Nearer home, planetary atmospheres can be studied, and high resolution studies of comets including ultraviolet observations made possible. Solar system astrometry will be especially improved.

There will be observations of faint optical counterparts of radio and high energy objects; indeed, perhaps Dave Crampton's black hole, LMC X-3, can be more certainly identified if the visible primary star of that binary system can be hooked and more data gleaned.

Reprinted from *Skynews Victoria*

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Mascon '83

by Joan Badger
Saskatoon Centre

Torrential rains and enormous mosquitoes greeted members of the Saskatoon Centre R.A.S.C. when they travelled to Riding Mountain National Park in Manitoba to participate in Mascon '83.

Pat Nelson, Walter Fernets, John Greer and Joan Badger set off on Friday, July 1 to have a dry(!) run in preparation for a trip to the Hamilton General Assembly in 1984. Pat and Walter rode motorcycles through the rain and bugs with accompanying mishaps along the way. John and Joan followed in a truck, riding in relative comfort, ready to provide assistance and encouragement to the hardy twosome. Upon arrival at R.M.N.P., the travellers set up camp at Lake Katherine, after making contact with Guy Westcott from the Winnipeg Centre, R.A.S.C. Stargazing was out of the question, as it was cloudy, so a film program concerning aurora was shown to a group of interested campers at the Outdoor Theatre. However, skies cleared up at 1:30 a.m. Saskatoon time and the Andromeda galaxy was easily visible, if you knew where to look!

Rain on Saturday made solar viewing impossible but again, films were shown – this time at Wasagaming Interpretive Centre in the townsite of Clear Lake.

The Evening program at Lake Katherine was cancelled so John and Joan joined Guy and Don Heatherington at a local watering hole and caught up on R.A.S.C. news and views.

Sunday dawned clear and sunny! Out came Winnipeg Centre's Celestron 14 and hydrogen-alpha filter. Solar prominences were quite visible and very spectacular to one who had not viewed them previously.

The C-14 fitted with a solar filter also showed nice groupings of sun spots. Also set up for solar viewing were the C-8 of a member from the Winnipeg Centre, and John Greer's C-90 which showed a solar flare at one point in time.

Over 500 persons viewed the sun through these telescopes on Sunday. Clouds again moved in and rain washed out any more chance of viewing celestial objects.

After a rain-soaked supper at campsite A-1, Guy and Don headed back to Winnipeg with the C-14 ensconced in the back of Guy's (thankfully large) car.

Temperatures dropped overnight so upon arising on Monday, the Saskatoon crew expected to find snow outside. However, it was rain again which made for another damp dreary trip for the two bikers on their homeward trek, accompanied by John and Joan, again comfortably ensconced in the truck.

All four agree that it was an enjoyable if wet gathering and are looking forward to the next MASCON tentatively set for Labour Day 1984, when hopefully the weather will be more predictable and provide clearer skies and darker nights for stargazing.

Many thanks to Guy Westcott and the staff of Riding Mountain National Park for making our stay so enjoyable. Let's do it again!

Reprinted from *Saskatoon Skies*

Exhibit Details for 1984 General Assembly in Hamilton

This is the list of exhibit classes for next year. Entries may or may not be based on observations, at the choice of the participants. All observational techniques can be used: visual, photographic, photometric , etc ... .

1 Solar
2 Lunar
3 Comets, asteroid
4 Planetary
5 Deep space
6 Atmospheric phenomena
7 Variable stars
8 Radioastronomy
9 Equipment and/or techniques
10 Centre Group Display or Individual
11 History of Canadian Astronomy
12 Open

Rules

1 Any member in good standing (or group of members) may enter. If a group wins, there will be only one prize for the group.
2 All work must be done with amateur equipment.
3 Entries must be presented for the first time and must have been done within the last two years.
4 Individuals may enter up to a maximum of three categories, with only one entry per category.

The judges may decide to withhold awarding a prize in any category if they consider the calibre of the entry does not warrant an award. Further, it is hoped to have a Grand Prize for the outstanding entry in the exhibit.

Entrants will not be required to appear in person, although this is desirable, but they will be required to make their own arrangements regarding shipment and return of the entry after the exhibit.

Start working right now and participate!

Détails du concours pour l'assemblée générale de 1984 à Hamilton

Voici la liste des classes de travaux qui pourront être présentés à ce concours. Les entrées pourront être basées ou non sur l'observation, au choix des participants. Les diverses techniques d'observation: visuelles, photographiques, photométriques, etc ... , seront acceptées.

1 Soleil
2 Lune
3 Comètes, astéroides
4 Planètes
5 Objets lointains (Deep Sky)
6 Phénomènes atmosphériques
7 Les étoiles variables
8 La radio-astronomie
9 Équipement et/ou procédure
10 Exposition d'un centre ou groupe ou individuel
11 Histoire sur l'Astronomie Canadienne
12 Libre

Règlements

1 Peut s'inscrire, tout membre en règle (ou groupe de membres) de l'une des Sociétés participantes. Dans le cas d'un groupe, il y aura seulement un prix remis pour tout le groupe.
2 Tout travail doit être fait avec de l'équipement d'amateur.
3 Les travaux présentés doivent être originaux, c'est-à-dire être présentés pourla premiere fois et avoir été complétés au cours des deux dernières années.
4 Un individu peut participer à un maximum de trois catégories, avec seulement une entrée par catégorie.

Les juges décerneront les prix dans les différentes categories, à leur discrétion. Par exemple, ils peuvent omettre la distribution du prix pertinent à une catégorie, s'il n'y a pas d'entrée valable. Aussi, on espère avoir un Grand Prix pour souligner une contribution exceptionnelle.

Les participants ne seront pas tenus d'assister en personne, bien que ce soit préférable; mais ils devront faire leur propre arrangement concernant la livraison aller/retour de leur matériel.

Commencez à vous préparer dès maintenant et participer!

Notice of 1984 General Assembly

Come and help the Hamilton Centre celebrate their 75th anniversary and at the same time commence your summer vacation. The General Assembly will be held at McMaster University, Hamilton, Ontario from June 29, 1984 to July 2, 1984. All conference and accommodation facilities are within 300 feet of each other and there will be no great treks to get from one activity to the next. So put this on your calendar and come join us for a good time!

Assemblée Générale de 1984

Nous vous attendons au Centre de Hamilton pour y célebrer le 75^{e} anniversaire de ce denier. Profitez de l'occasion pour y commencer vos vacances d'été. L'assemblée générale se tiendra à l'Université McMaster, Hamilton, Ontario, du 29 juin au 2 juillet 1984. Les salles de conférences et les lieux d'hébergement se trouvent dans un rayon de 300 pieds les uns des autres, et il ne sera pas long de passer d'une activité à l'autre. Notez bien ces dates dans votre agenda et venez vous joindre à nous pour passer un moment agréable.