NATIONAL NEWSLETTER

February, 1978

Supplement to the JOURNAL OF THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

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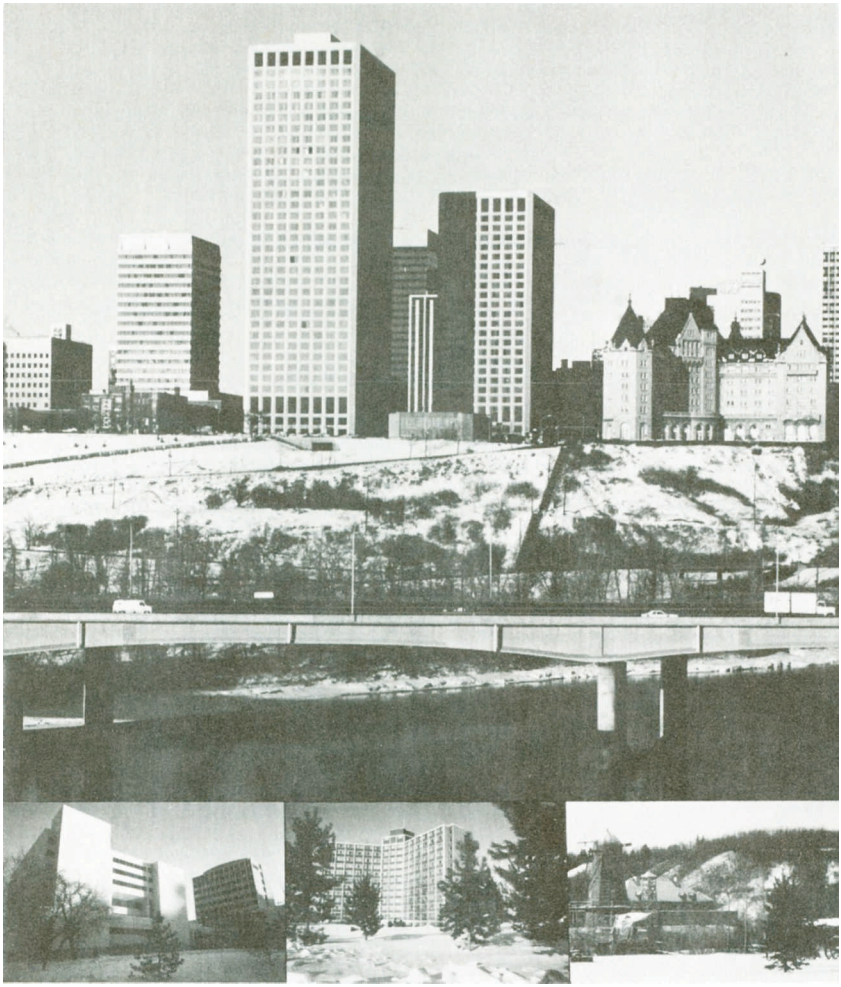

Edmonton, site of this year's convention, presents many attractions as shown in these scenes supplied by Paul Deans, Western Editor of the NATIONAL NEWSLETTER. Further details and registration forms are included in the inside pages.

NATIONAL NEWSLETTER

February, 1978

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Deadline is two months prior to the month of issue.

Editorial

It had been my original thought to head this up AVE ATQUE VALE in vaguely recalled Latin from long-gone school days, but then I reflected that Harlan is not really saying farewell, merely withdrawing from the front rank, so you see his name still listed amongst the editorial team members above.

It goes without saying that there would be no Royal Astronomical Society of Canada if it were not for members like Harlan, whose devotion and service make its existence a reality. That he is still available to give his experienced advice is a considerable support to those of us who must try to carry on the high standard he set for the *NATIONAL NEWSLETTER*. This is a formidable task which I approach with considerable trepidation. However, with your kind tolerance we will hope the next few months will not be such as to cause him pain.

Miss Ruth Northcott remarked, at a National Council meeting, that an editor can publish only what he receives. That was said of the *JOURNAL* but it applies with equal force to the *NATIONAL NEWSLETTER*. It can be whatever the membership chooses to make it. Your editorial staff are your servants, and we shall welcome comment, even criticism, and be happy to implement any suggestions, that we may all enjoy the benefits of belonging to a national organization of the stature of the Royal Astronomical Society of Canada.

There is one aspect of our new way of presenting the *NATIONAL NEWSLETTER* which requires comment; the fact that it is separated from the rest of the *JOURNAL* must not create an impression that there is a philosophical division between the amateur and the professional members of our organization. What difference there is in this way is solely in the depth to which we can pursue our interest. Each activity tends to develop its own language of communication, and thoughts are most easily transferred by each of us in our own medium. However it behooves us who are amateurs to remember that most of the detail of procedure, equipment, reference literature, comes from those so gifted as to formulate these in orderly form for us to explore. We must still delve into the more detailed aspects of our hobby contained in the pages of the *JOURNAL* itself, or we stand in danger of limiting our horizons, even perhaps thinking that we see the horizon, forgetting that the limit of the visible horizon depends even in good seeing upon the height of eye of the observer.

With these few words I ask your indulgence as I learn the role recently relinquished by one far more fitted to fill it, Harlan Creighton.

Nominations for RASC Officers 1978–1979

The By-Laws of the Society provide for a Nominating Committee composed of the three surviving immediate Past Presidents, whose duty it is to prepare a slate of candidates for the offices of the Society.

At the General Assembly in May we must elect the following officers: President, 1st Vice-President, 2nd Vice-President, and Secretary. Normally, there is a progression through these offices: the 2nd Vice-President becomes 1st Vice-President; the 1st Vice-President becomes President. However this progression is not dictated by the Constitution, and alternative nominations may be made for any of these offices.

The Nominating Committee are bringing forward the following names to fill these positions outlined above:

President; Dr. John Percy
1st Vice-President; Dr. Ian Halliday
2nd Vice-President; Mr. Franklin Loehde
Secretary; Mr. Norman Green

As well, the By-Laws provide that "any five members of the Society, in good standing, may nominate additional candidates for any office, provided that such nomination, accompanied by a letter of acceptance from the nominee shall be received by the Secretary of the Society not less than sixty days before the date of the annual meeting".

If any member wishes to make suggestions in this regard he should contact the Committee Chairman, Dr. J. D. Fernie, c/o the National Office, 124 Merton Street, Toronto, Ontario, M45 2Z2.

It would be appreciated if such nominations, (together with a short resume) were submitted no later than March 1, 1978, in order to allow for the printing and mailing of ballots.

Full details pertaining to nominations are outlined in By-Law 1, Article 11(a), as published in the June, 1969 *JOURNAL* pages 155–168.

J. F. Heard FUND

As reported in these columns in October last by Dr. A. H. Batten, National President, a decision on National Council was to set up a fund in memory of Dr. J. F. Heard, former President and National Treasurer of our Society. Dr. Heard, as those of us who met him at General Assemblies will readily testify, was an indefatigable worker in the interests of the Society. After consultation with representatives of David Dunlap Observatory and members of Dr. Heard's family, it was decided to reprint in the *JOURNAL* a number of the anecdotal accounts of well-known astronomers that Dr. Heard wrote over the years in the *David Dunlap Doings*. Council feels that these articles deserve a wider audience and a more permanent home than they have so far received. Eventually they will be bound together in a single reprint, and thus form a permanent memorial. Money collected in the fund, which is remaining open for a year, will be used to pay for the printing. Donations, which will be deductible for income-tax purposes, should be sent to the National Treasurer, at 124 Merton Street, Toronto, Ontario, M4S 2Z2. Cheques should be made payable to the Royal Astronomical Society of Canada and marked "J. F. Heard Fund". An official receipt will be issued.

Hubble

by Dr. J. Donald Fernie
Past President, R.A.S.C.

Fame, they say, is a fleeting thing. What is interesting about it, though, is the varying rapidity with which it flees. There are those for whom it endures across centuries, while for others, even the living-legend-in-his-own-time sort of people, fame may abandon them at the grave. It is as much a caprice of history as it is a consequence of their work. I often think of Otto Struve in this regard. When I was a graduate student in the States in the mid-fifties, he was revered as an almost godlike figure of infallibility. Scion of a famous astronomical family, author of an endless stream of papers for the *Ap.J.*, his views were sought on all things astronomical. Many a technical argument was clinched by statements beginning "Well Struve

finds that....” Today, scarcely a decade after his death, he is forgotten to a degree that most students now are not even sure how to pronounce his name. (A sure-fire way of horrifying Jack Heard was to speak of ‘Stroov’.) One for whom Fame was a far less fickle mistress was Edwin Powell Hubble.

The young Hubble, I imagine, was the sort of guy who could easily stir black jealousy in the hearts of his fellow students. Great intellectual prowess was combined with astonishing good looks, commanding physical presence, and outstanding athletic attainments – someone you damn well couldn’t beat at anything!

He was born in Marshfield, Missouri, in 1889, but spent much of his early childhood in Kentucky, where his father was a small-town lawyer. Later the father went into the insurance business in Chicago, and here, in high school, Edwin won a scholarship to the University of Chicago. It proved a decisive move, because he there encountered the great George Ellery Hale, who inspired in him a love of astronomy. Hubble graduated with a B.S. in mathematics and astronomy, and was then faced with what must surely have been a unique choice. On the one hand he had won a Rhodes Scholarship to continue his post-graduate education at Oxford. On the other, the 6 foot 2 inch, 200+ lbs young man had gained such a reputation as a boxer that a Chicago sports promoter made a serious offer to train him towards contesting the world heavyweight championship.

Although Hubble chose Oxford, he never lost interest in athletics. He, of course, won an Oxford blue in boxing and while in Europe fought an exhibition match against Georges Carpentier, the world light-heavyweight champion. He won a second blue in track and field, and a third in rowing. Not all his sports interests were that strenuous, however, for he also developed a great interest in dry-fly fishing, and in later life gained a high reputation in that field. All in all, he thoroughly enjoyed life in England, adopting the English academic’s tweedy-look and pipe-smoking habits, and ever after maintaining Oxford slang and a touch of Oxford accent in his speech – something that forever irritated a fellow-Missourian, Harlow Shapley.

Academically, though, he now turned from science. Having looked at typical final exam papers in Oxford’s mathematics, he decided to take a degree in law instead. This was accomplished in 1912, and there followed a year of practising law back in Kentucky. It was enough to convince Hubble that he had made a mistake, for by 1914 he was enrolled as a graduate student at the University of Chicago’s Yerkes Observatory. He developed a thesis on the classification of nebulae that so impressed Hale, now at Mt. Wilson, that on the day Hubble received his Ph.D. in 1917, Hale telegraphed him an offer of a staff position at Mt. Wilson. The reply was immediate: “Regret cannot accept your invitation. Am off to war.”

There is a photograph of Hubble at this point in his life, standing in paradeground poise showing immense pride in his uniform, alongside his sister in a nurse’s uniform. So it was back to Europe, but this time to the horrors of trench warfare in France. Hubble rose to the rank of major, and was also wounded in the war.

But Hale’s offer remained open, and with the war over, Hubble moved out to start his life’s work in California. His fame there, of course, would steadily rise, and Hollywood was delighted to find that brilliant scientists could also be astonishingly handsome. Hubble was frequently called upon to pose for pictures with the film stars of the day, and doubtless more than one male star must have wondered if he was doing the right thing. There is a picture of Hubble with Raymond Navarro that is not at all to Navarro’s advantage!

Fame was to come through a continuation of Hubble’s work on nebulae. In the early twenties astronomy was in an uproar over the true nature of the spiral nebulae. On the one hand there was considerable evidence to suggest that they are individual Milky Way systems, and that the universe therefore is immensely bigger than had ever been thought previously. On the other hand, there seemed to be evidence also that they are much smaller systems belonging to our own galaxy. The evidence had been debated endlessly, but without resolution. Now it would be Hubble who would make the crucial observations that settled the argument in favour of the individual galaxy theory. This he did in 1923,yet it would not be until New Year’s Day of 1925 that an official announcement was made.

The reason for the delay was straightforward. Just down the hall from Hubble’s office was the office of Adriaan van Maanen who was not only considerably senior to Hubble but who just happened to hold the major evidence favouring the contrary theory. Publication of Hubble’s new work would be almost tantamount to calling van Maanen s evidence a fabrication (van Maanen’s work has never been satisfactorily explained) The diffident Hubble delayed.

News of Hubble’s results began to leak out to a few top American astronomers, much to their excitement, and there was even a brief report published in the *New York Times* in

November of 1924. Finally, matters reached a head at the AAAS meeting in late-December of that year. Although Hubble was not present, his friends Joel Stebbins and Henry Norris Russell were, and made up their minds that Hubble's results should be presented – particularly since there was to be a $1000 prize awarded the best paper at the meeting. Stebbins later wrote to Hubble:

> On the first evening of the meeting, I happened to take dinner with Russell who had arrived rather late, and one of the first things that he enquired about was whether you had sent any contribution. On my answering no, he then said, "Well, he is an ass. With a perfectly good thousand dollars available he refuses to take it." These remarks led to some discussion, and afterwards in a group in the hotel lobby we drafted a telegram urging you to send by night letter the principal results which Russell and Shapley could make up into a paper. After this message was drafted, Russell and I started to go over to the telegraph office to send it, but on the way we stopped at the desk and put it on a regular blank. Just as we were leaving, Russell's eye caught beyond him on the floor a large envelope addressed to himself, and at the same time I spied your name in the upper left corner. The clerk gave us the material, and we walked back to the group in the lobby saying that we had got quick service, and that the paper was on hand.
>
> At the close of the meeting, the Council of the Society elected your paper as the one to be recommended for the prize.

It was Russell who read the paper on Hubble's behalf on January 1, 1925. As Allan Sandage later put it, an era of enlightenment in cosmology had begun.

Hubble would go on to even greater work: the classification of galaxies, and the discovery of the universe's expansion – the first useful data on which to base theoretical cosmology.

Perhaps ironically in one of such athletic attainments, it was a heart ailment that brought Hubble's life to a close. He died suddenly of a coronary thrombosis in September, 1953, while preparing for a four night run at Palomar. If fame has not deserted his name, it is not least because he deserved it. Nick Mayall said of him: "It is tempting to think that Hubble may have been to the observable region of the universe what the Herschels were to the Milky Way, and what Galileo was to the solar system."

Amateur Radio Astronomy
Part I

K. F. Tapping
Ottawa

INTRODUCTION

Radio Astronomy is one of the areas of Astronomy which has been largely ignored by amateurs. This is possibly because of the apparent complexity of the associated hardware and the lack of amateur oriented information on how to go about it. It is, of course, impossible to give a complete picture in a brief article, and for more information the reader is referred to the publications mentioned at the end of the discussion. As yet (October, 1977) the author has encountered no useful textbooks on amateur radio astronomy, but the books and papers given should between them give much of the information needed by the prospective amateur.

By way of illustration, various observational results are shown in the article. Unless otherwise stated, these were obtained by the author using his own instruments.

Most of the information that we have concerning the universe beyond the earth has been obtained via observations made at ground-based observatories of extra-terrestrial electromagnetic waves. The spectrum of these waves covers a broad range of wavelengths from gamma rays, with wavelengths of a fraction of an Angstrom unit (10^{-10} metres), to long radio waves, having wavelengths of hundreds of metres. Most of this radiation is reflected or absorbed by the earth's atmosphere. The only radiation reaching the ground consists of two

ranges of wavelengths. One of these is the so-called "visible light region" of the spectrum, covering the wavelength range 4.10^{-7}m. to 8.10^{-7}m. The other wavelength range covers approximately 10^{-2}m. to about 20 m. These waves fall in the radio region of the spectrum and may be observed by means of radio telescopes.

Electro-magnetic waves occur in discrete packets called Quanta, the energy of which are inversely proportional to their wavelengths. For this reason, a quantum of light radiation has much more energy than a quantum of radio waves. Since this energy has to be found when the quantum is generated, production of radio quanta is possible in environments containing a lower energy density than those producing optical quanta. Therefore, radio emissions are possible from regions of space which are quite dark optically. Of course, in regions of high excitation which are producing light or x-rays, radio quanta may still be generated.

Interstellar space contains a considerable quantity of gas and dust, which causes absorption and scattering of the light passing through it – so much that many areas of the milky way and other galaxies are not observable by optical telescope. However, most of these clouds are transparent to radio waves, making otherwise hidden regions such as the centre of our galaxy visible by means of radio telescopes. For these reasons observations at radio wavelengths make available a completely different view of the universe; a view which may be enjoyed by amateurs as well as by professionals. This view is very dependent upon the observing wavelength. At wavelengths longer than about 1 metre the milky way is very bright, with a maximum lying in the direction of the centre of our galaxy. Superimposed upon the galactic continuum are numbers of point radio sources, almost all of which are beyond the view of all but the largest optical telescopes. The sun is extremely variable, remaining very faint for weeks or months and occasionally increasing its radio brightness by a factor of up to a million in a few seconds, and remaining at a high but fluctuating level for periods varying from seconds to days. At wavelengths shorter than a metre or so, the milky way continuum becomes fainter until at wavelengths of a few centimetres or less quite a large telescope is required to see it at all. The character of the solar emissions also changes. The steady, or quiet, component of the solar emission gets brighter and the storms and bursts become rarer and fainter. At wavelengths in the region of 10 centimetres the sun is a slowly varying star, with the radio brightness following the number of active areas on the disc.

So far, the types of emission discussed have been broad-band in character; that is, the nature of the radio emissions varies only slowly as the observing wavelength is changed. There are also a number of radio spectral lines which have been observed, however the only one which is reasonably easily accessible by amateurs is the Hydrogen Line at a wavelength of 21 cm. This line is produced by an electron spin inversion in the atoms of neutral hydrogen which make up a considerable fraction of the interstellar gas. This emission has been used to map the concentrations of hydrogen gas in our galaxy and some other galaxies. By studying the doppler shift and line broadening it has been possible to measure the motion of the emitting clouds. However, hydrogen line work is for the advanced amateur who has the room for large directional antennas and will not be discussed here.

RADIO TELESCOPES

The radio telescope is the basic tool of radio astronomy. In essence this instrument measures the intensity of the radio emissions, at the wavelength of operation, of the area of sky "seen" by the antenna system. For this reason, the term "radiometer" is more appropriate as the instrument is more akin to the optical photometer rather than the optical telescope.

A simple radiometer is shown in Figure 1. Basically it consists of three units; an antenna which collects the radio waves and converts them to minute electrical currents in a cable, a receiver which amplifies these currents by a very large factor (about 10^{12}) and converts them into a slowly varying output voltage, and finally some kind of output recorder. A paper chart recorder is commonly used.

Because radio waves are much longer than light waves, the radiometer antenna – which is the radio analogue of the objective of the optical telescope – will tend to have a much lower resolving power than its optical counterpart. The angular resolution of an aperture receiving radiation (the objective) is given by:–

$$\text{Resolving power in degrees} \cong 57\lambda/d$$

where λ is the operating wavelength and d the diameter – or equivalent dimension – of the aperture. Thus it can be seen that in order to have the same resolving power as a three inch (objective) optical telescope, a radio telescope, operating at a wavelength of 1 meter, would

need an antenna approximately 80 miles across. A 10 meter diameter antenna, operated at a wavelength of one meter would have a resolving power or beamwidth of about 6°. A typical amateur antenna would have a beamwidth in the range of 10 to 30°. One should, however, not be put off by this as even with such small antennas, much useful work may be done.

With a beamwidth of 10° or greater, the ability to measure the variation of radio brightness over the sky is restricted. It is, however, possible to map the mily way radiation (the galactic radio continuum) and to tentatively detect the increases in radiation when the antenna is pointed towards the more powerful discrete sources. Therefore most amateur work consists of intensity measurements and observations of time-variations of radio emissions rather than mapping. This is very rewarding, particularly in the case of extremely variable radio sources such as the Sun and Jupiter.

In order to measure the radio brightness of a source, it is necessary that the source under examination be at least 5 times brighter than any of the other sources in the area of sky seen by the antenna. For example, the sources which are observable with small instruments (Cassiopeia A, Cygnus A, Taurus A and Virgo A) are all more than 30° apart. Therefore quite modest antenna systems such as Yagi antennas would be adequate. Moving sources such as Jupiter and the Sun will be discussed separately. Modern electronics are such that good results can be obtained with very modest antenna systems. However, the use of a single antenna generates certain problems which will be discussed later.

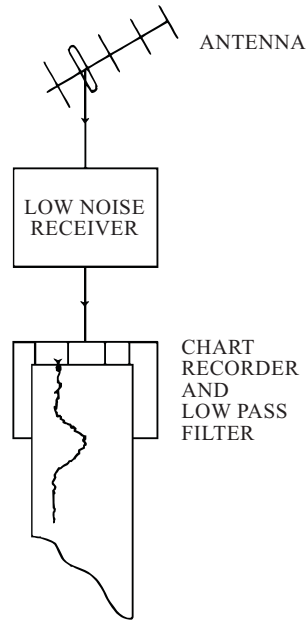


Figure 1. Block diagram of a simple "total power" radiometer.

Editor's Note: This article will be continued in succeeding issues of the National Newsletter, and in the coming parts Ken Tapping gives details of progressively more sophisticated systems, with samples of the results each produces. It is hoped that the series will stimulate builders in many centres to develop systems of their own. If you do so, please send details to the NNL so that you share your interest with those in other centres. In this way we may develop a national network of amateur radio telescopes.

La société d'astronomie de Montréal

Promotion aux Galeries d'Anjou. Les 16–17 et 18 octobre, la SAM tenait une rencontre populaire. Plusieurs instruments étaient en montre, à la grande satisfaction du public. Il y avait aussi projection de diapositives, exposition de posters et un comptoir de vente.

Selon "Le Québec Astronomique" de la SAM, édition de décembre 1977, le bâtiment de l'observatoire du Mt Mégantic devrait être complété pour Noël et le télescope serait installé d'ici le printemps. Ceci est un projet conjoint des universités de Montréal et Laval (Québec).

Parlant d'observatoire, celui de la SAM à St-Valérien ressemble maintenant à un silo, avec son dôme. Les travaux sont interrompus pour l'hiver et reprendront au printemps en fonction du budget et de la main-d'œuvre volontaire disponible.

Ceux qui aiment jongler avec les mathématiques apprécieront l'exposé signé "Raymond Auclair", lequel s'interroge sur l'orbite de Ia Lune qui serait unique dans notre système solaire. Réf.: Le Québec Astronomique de septembre, novembre et décembre 1977.

Centre de Québec

La souscription pour un terrain d'observation se continue. Au 13 décembre, 28 membres, 2 abonnés et 1 corporation ont souscrit $655. Nous encourageons les membres à en parler aux amis de l'astronomie, cette souscription se continue.

Un atelier de polissage de miroir est maintenant disponible. Sous la direction de Louis Bellavance, à date 14 membres ont manifesté l'intention d'utiliser ce nouveau service. Le Centre de Québec remercie tous les professeurs d'astronomie du département de physique de l'Université Laval pour leur appui à ce projet. Entre autres le Dr Eloi Bolduc qui a effectué toutes les démarches pour obtenir un local, et le Dr Albéric Boivin qui a offert l'utilisation de sa machine à dégrossir les miroirs.

L'Almanach Graphique 1978 est disponible. Le grand format (26″ x 42″) coûte $3. alors que le format régulier (11″ x 17″) est gratuit pour tous ceux qui en font la demande. Cette année, chaque almanach sera accompagné d'un supplément: i.e. une carte montrant la position des principaux corps célestes au cours de l'année. Il y a aussi publication des Ephémérides. Ces dernières ont un tirage limité (300 copies environ). Elles sont distribuées aux membres du Centre de Québec. De même, tous les autres centres qui échangementleurs publications avec celui de Québec recevront une copie de cette publication. Prière d'adresser les commandes à: Centre de Québec de la SRAC, C.P. 9396, Ste-Foy, Québec, G1V 4B5.

Science Fair

by Dr. A. H. Batten
Victoria Centre

The 1977 Canada-Wide Science Fair was held at Victoria, B.C. in May. Our President, Dr. A. H. Batten acted as judge for the Society and presented the Society's award (a certificate and a $50 prize to be spent on books) at the closing banquet.

There were four entries concerned with astronomy and which therefore qualified for consideration. All were of high standard, but the entry by Dominique Voyer of Saguenay Lac St. Jean was outstanding. His exhibit, entitled "Phenomènes Metéoriques" displayed his work on the detection of meteors by their effect on FM radio transmission. By keeping his radio tuned to a Montreal FM station that broadcasts 24 hours a day, and whose signal is not normally receivable in his home town, Dominique was able to detect meteors whenever their ionized trains reflected a signal to his receiver. He had taken care to distinguish between genuine meteor echoes and terrestrial interference, and had studied both the diurnal and annual variations in the number of meteors.

A refreshing feature of his work was that it obviously was not done just to make a science-fair project, but had been undertaken for its intrinsic interest. Dominique also won a special Bell-Northern award, and a bronze medal in his division. Congratulations!

The 1978 RASC Observing and Display Competition

General Assembly, May 19–22, 1978
Edmonton, Alberta

CATEGORIES AND COMMENTS

1. **Best Centre Display:** A Centre display need not contain only examples of astrophotography or observing records and techniques, but can feature reports on Centre activities such as observatory construction, star parties, public education programs, etc. Displays will be judged not only on the excellence of the Centre activities featured in the display, but also on the quality of the layout and presentation. Self-supporting backboards will be provided for setting up display cards, photos, etc.

However, in lieu of static display boards, a prepared audio-visual presentation may be entered as a Centre "display" as long as it truly represents the Centre activities. Please be sure to let us know of projectors, type of tape machine, dissolve units or other A-V requirements on your entry form. Time will be available during the Assembly for the presentation of slide shows and the like.

2. **Best Group Observing Project:** Last year the Toronto General Assembly featured a photographic star atlas category, a project that worked well as a group activity. This year our "Group" category is open to any observing or photographic activity, but it must be an observing project, not a construction project, nor a project done from data acquired from secondary sources (i.e. you must make the observations yourself – you cannot rely on Palomar Sky Survey plates or other readily available materials for your data).

Perhaps this year we may see a "*Photographic Star Atlas, Vol. 2*", or another meteor observing project, perhaps a satellite tracking project, planetary observing program, maybe a comet hunting report – the possibilities are endless! Use your imagination and surprise us all! Don't be afraid to enter this category even if your group observing program produces negative results (i.e. no new comets discovered). Remember, positive results are not as important as the quality and comprehensiveness of the methods employed.

3. **Best Photometric Project:** The photometric estimates may be accomplished visually, photographically, or electronically, but must be from first-hand observations performed by the entrant. The entries in this category might consist of variable star measurements, asteroid light curves, observations of the moons of Jupiter and Saturn, lunar occultations – in other words, anything that fluctuates in light intensity measured in whatever standard or original technique you wish.

4. **Best Special Purpose Instrument or Best Observing Or Reducing Technique:** This category could include reports on the construction and use of auxiliary instrumentation such as photometers, spectroheliosccopes, even exotic special-purpose telescopes. Perhaps we could ask for display of the finished product as well? This category also includes reports of novel darkroom techniques, data reduction methods and associated hardware such as blink comparators, densitometers, etc.

The following categories are in two parts. In each category awards will be presented for the BEST VISUAL OBSERVATION RECORD (i.e. sketches, light curves, sunspot numbers, statistical analyses, etc.) and for the BEST PHOTOGRAPHIC RECORD. Photographs may be either prints or slides, colour or black-and-white. In photographic entries it is preferred (but not required) that the processing and printing should be carried out entirely by the entrant. All entries must be accompanied by complete descriptions of the time and place of the observations, sky conditions, equipment used, exposure and film type – in other words all pertinent data.

5. **Lunar, Planetary, Minor Planets, and Comets.**

6. **Solar**

7. **Deep-Sky** (Nebulae, Star-Clusters, Galaxies)

8. **Atmospheric Phenomena** (Aurora, Haloes, Meteors)

RULES AND REGULATIONS

1. The contest is open to all RASC members in good standing.
2. All work must have been done during the two years preceding May 1, 1978.
3. All word must be original and cannot have been entered in Toronto (1977) or Calgary (1976) competitions.
4. Exhibits may be entered in one category only.
5. An entrant may enter a maximum of three categories, and may enter only one exhibit in each category.
6. All entrants must have submitted an Official Entry Form by mail before the start of the Edmonton General Assembly. Entry forms should be available from your Centre secretary, or from Alan Dyer, c/o Queen Elizabeth Planetarium, Coronation Park, Edmonton, Alberta. Completed entry forms must be received before May 1, 1978.
7. Exhibits must be brought to the 1978 General Assembly in Edmonton, though not necessarily by the entrant, for display and judging.
8. Prizes will be considered for each category, but if no work in that category is considered outstanding, no prizes will be awarded in that Category. Displays must be of top quality to receive a first prize.

9. Group projects (either in Category #2, or in any of the other categories) will have prizes awarded on an exhibit basis. (i.e. Any prize will be shared among the contributors.)
10. Judging will be performed by respected members of the Canadian astronomical community. In judging, all relevant factors will be taken into account, including observing equipment, observing conditions, and experience of the observer(s) involved. Clarity and originality of presentation are very important.

N.B. Please tell us about any special or unusual requirements your project may require. We will do our utmost to ensure that your project is presented in the manner you wish, but if you don't tell us well beforehand, it may be difficult (or impossible) to make special accommodations for you at the last minute.

If you have any questions regarding the contest this year, plase write to:

Alan Dyer,
c/o Queen Elizabeth Planetarium,
Coronation Park,
Edmonton, Alberta.

Occultation of SAO 85009 by Pallas on May 29, 1978

On May 29, 1978, at about 5h U.T., the asteroid Pallas will occult the 10th magnitude star SAO 85009. Although the resulting brightness changes may not be apparent to the visual observer, they can be detected by photoelectric techniques, and may provide useful information on the dimensions of the asteroid. Preliminary details of this event, as provided by Gordon E. Taylor of H.M. Nautical Almanac Office, were given in the 1978 *Observer's Handbook*, page 64.

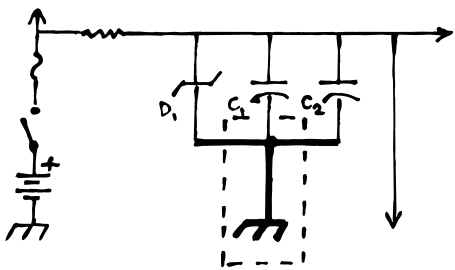
Refined predictions have now been published in I.A.U. Circular 3140, issued on November 21, 1977 by the I.A.U. Central Bureau for Astronomical Telegrams, Smithsonian Astrophysical Observatory, Cambridge, Mass. 02138. According to that circular, "the central line for the occultation ... should now pass near Portland, Maine; Ottawa, Ontario; through Lake Superior and along the U.S-Canadian border to the Pacific Ocean. Further uncertainties possibly remaining in the star position and in the Pallas ephemeris could shift the track by several hundred km, which is comparable to the track's width."

John R. Percy

Bloc de guidage a logique COS/MOS – Correction

Nous accusons réception d'une lettre de Fred Lossing, membre du Centre d'Ottawa, concernant une erreur d'omission dans un diagramme publié dans le numero de Decembre à la page L69.

Enfin que la tenson qui alimente le circuits CI_1 et CI_2 soit réglée, il faut une ligne de tirre retournent du diode Zener D_1 et le condensateurs dérivés C_1 et C_2. Le section en question de ce diagramne est corrigée comme suit.



RASC Service Award Winner – Correction

The photographs for this article published in the October 1977 issue page L49 were taken by Mr. Randolph Nugent.

La société astronomique Royale du Canada
Assemblée Générale

19–22 Mai

Emonton, Alberta

Le Centre Edmonton invite chaleureusement tous les amateurs et professionnels astronomes du Canada a une Assemblée Générale le 19 au 22 mai à l'Université de l'Alberta.

Edmonton, en plus d'être l'hôte des Jeux du Commonwealth pour l'année 1978, est une ville vibrante qui offre beaucoup d'activités diverses et intéressantes tel que lé théâtre, l'opera, la musique et l'art. Il y a ausse une merveilleuse et fascinante industrie pétrochemique située sur "Alberta Tarsands", le premier transport opérationnel au Canada et le beau parc la Capitale enlacée par la rivière Saskatchewan. Pas loin de la ville, il y a deux ravissants parcs nationaux qui attirent l'attention: le Parc "Jasper" et le Parc "Elk Island".

Des remparts du vieux Fort Edmonton jusqu'au luisant téléscope Cassegrain 20″ de l'Universite, le programme de l'Assemblée fournira un veritable pot-pourri des delices astronomiques. Le premier planétarium du Canada déservant le public – Le Queen Elizabeth – donnera une séance que vous ne pourrez pas oublier. A la demande du public le "Observing Competition & Display" reviendra cette année. Il va sans dire que d'autres surprises astronomiques seront présentées pour les membres de R.A.S.C. qui, viendront à l'Assemblée d'Edmonton. Ne manquez pas cette chance.

Nous présentons des débats de 10 minutes pour la Revue de la Session pour les amateurs ainsi que les professionnels. Les membres intéressés à se presenter doivent écrire à:

Dr. Douglas Hube
Department of Physics
University of Alberta
Edmonton, Alberta T6G 2J1

avec un résumé de 150 mots au plus tard le *15 avril 78*. Pour de plus amples renseignements au aujet de "Observing Competition & Display" écrire à Alan Dyer, c/o The Queen Elizabeth planetarium, Edmonton, Alberta. S'il vous plaît, faites voir l'article accompagnant les Règles sur le "Observing Competition & Display".

Les membres de R.A.S.C. doivent se rappeler que l'aide aux frais de voyage pour aller à L'Assemblée Générale est accessible du Siège National à Toronto par l'intermédiare de votre Centre Local.

Pour de plus amples renseignements au sujet de L'Assemblée à Edmonton écrivez à:

Franklin C. Loehde
11107 – 63 Street
Edmonton, Alberta
T5W4E3

R.A.S.C. General Assembly
Edmonton, May 19–22, 1978

Réponse à: Mr. Rick Newman
c/o Queen Elizabeth Planetarium
Edmonton, Alberta

Nom: .....

Adresse: .....

.....

Nombre de personnes .....

Accomodation universitaire? ..... Autre accomodation? .....

Royal Astronomical Society of Canada
General Assembly

May 19–22, 1978

Edmonton, Alberta

The Edmonton Centre extends a hearty welcome to all amateur & professional astronomers of Canada and other lands to the May 19–22 General Assembly at the University of Alberta.

Edmonton, in addition to being the host for the 1978 British Commonwealth Games, is a vibrant city offering a wide range of interesting diversions such as outstanding theatre, opera, music and art, a burgeoning and fascinating petrochemical industry centred upon the Alberta Tarsands, Canada's first operational rapid-transit and the beautiful river-entwinned Capital City Park. And nearby- the ever-entrancing Jasper and Elk Island National Parks.

From the ramparts of old Fort Edmonton to the sleekness of the University's new 20″ Cassegrain telescope the Assembly program will provide a real pot-pourri of astronomical and near astronomical delights. Canada's first public planetarium – The Queen Elizabeth – will put on a show you will not likely forget. By popular demand the Observing Competition & Display will return. Needless-to-say other astronomical surprises are being prepared for the R.A.S.C. members who venture to the Edmonton Assembly. Don't miss it!

We welcome ten-minute dissertations for the Paper Sessions from amateur and professionals alike. Members interested in presenting a paper should write to:

Dr. Douglas Hube,
Department of Physics,
University of Alberta,
Edmonton, Alberta T6G 2J1

with an abstract of 150 words no later than *April 15, 1978*.

More information about the Observing Competition & Display can be obtained from Alan Dyer, c/o The Queen Elizabeth Planetarium, Edmonton, Alberta. Please see accompanying article on the Observing Competition and Display Rules.

R.A.S.C. members are reminded that travel assistance to attend the General Assembly is available from National Headquarters in Toronto through your local Centre.

From more general information about the Assembly in Edmonton write to:

Franklin C. Loehde,
11107 – 63 Street,
Edmonton, Alberta
T5W 4E3

R.A.S.C. General Assembly
Edmonton, May 19–22, 1978

Mail to: Mr. Rick Newman
c/o Queen Elizabeth Planetarium
Edmonton, Alberta

Names(s) .....

Address: .....

.....

Number in your party .....

University Accommodation? Yes..... No.....

Other Accommodation? Yes..... No.....