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Royal Astronomical  
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# BULLETIN

La Société  
Royale d'Astronomie  
du Canada

## A Research Proposal

Richard Wagner  
Ottawa Centre  
reprinted from *AstroNotes*

One of the fundamental quantities of any object in the night sky is its brightness. The integrated magnitude is a measure of the total amount of light coming from an object – as if all the visible light was coming from a star-like point source. The surface brightness is a measure of the brightness per unit area of sky and is generally given in magnitudes per square arc-minute or arc-second.

Anyone involved in observing deep-sky objects will have run across the problem of how misleading integrated magnitudes are for determining the visibility of their targets in a telescope. Two objects of the same magnitude can have radically different apparent brightnesses on the sky. This results from using the integrated magnitude, which is based on the total amount of light received from the whole extent of an object. A larger object spreads the light out over a larger area making it more difficult to see. For example, the Helix Nebula has an integrated magnitude of 6.5 but is a much more difficult object to observe than the Ring Nebula at 9.0.

The more sophisticated amateur now uses the surface brightness as a better guide. One can think of the Helix nebula as being equivalent to a group of 11.8 magnitude stars, one per square arc-minute (or one 20.7 magnitude star per square arc-second, which is closer to the actual appearance) spread over an area equal to that of the object. The magnitude per square arc-minute is generally used in the amateur circles since it yields figures in the 8 to 15 range that we are used to.

The surface brightness still has the disadvantage that it assumes that the object is uniformly bright over its whole surface. While this is a reasonable approximation for some objects, it is ridiculous for many others. For example, the galaxy M33 in Triangulum has a mean surface brightness of 13.9, which would make it very difficult to see, but in fact its central core is somewhat brighter.

A recent review of the *Third Reference Catalogue of Bright Galaxies* in *Deep Sky* magazine (Winter 91/92) indicated that a significant fraction of the galaxies listed do not have accurate integrated magnitudes, surface brightnesses or even positions available.

A CCD camera and careful work would enable an amateur astronomer to provide improved magnitudes to the professional community. Summation of pixel values over the image of an object, suitably calibrated, would yield the integrated magnitude. The same image could be used to determine the point-by-point surface brightness for the object. Some representation of the peak brightness (perhaps the mean of the brightest 10% of the pixels) might provide a better guide for the visual observer. Dimensions and, with access to a large star catalogue like the Hubble Guide Star Catalogue, very accurate positions could also be determined.

A further project to serve the amateur community would be to try and correlate some sort of formula or rule of thumb for different types of objects to be able to apply corrections to the standard surface brightness to correct for some of the deficiencies of surface brightness. For example, the calculated surface brightness (SB) might be a reasonable guide to the visibility of an E1 galaxy, while SB-0.3 might be better for an Sb galaxy and SB-0.5 for an Sc.

If anyone is interested in doing some work along these lines, I would be happy to give assistance. My address is:

1696 Teakdale Avenue  
Gloucester, Ontario  
Canada  
K1C 6M4 ☼

## The Eyes Have It

Louie Bernstein  
Montreal Centre  
reprinted from *Skyward*

The human eye responds to an incredible 31 magnitude luminosity range, from -25 for the Sun to +6 for the faintest naked-eye stars. At the threshold of vision, the retina typically responds to as few as five photons at a time, which explains why very faint stars pop in and out of view and become more visible the longer one stares. And yet, the human eye pales in comparison to the eye of the giant squid. According to the *Guinness Book of World Records*, the giant squid has the largest "optical orb" of any living animal. Its eyeball measures an incredible fifteen inches in diameter. In addition it must be very sensitive to light, being capable of seeing in the darkness of the ocean depths.

One cannot help but wonder what these magnificent creatures see as they stare upwards from the surface of the Earth's oceans at night – peering through giant eight inch pupils. Do they discern the spiral structure of the great Andromeda Galaxy? Could they perceive the stellar granularity of 47 Tucanæ, for that matter? I wonder what it would be like to see the universe through their eyes. On second thought... naaah! I think I will stick to a good old eight inch Schmidt-Cassegrain! ☼



## BULLETIN

is a publication of the Royal Astronomical Society of Canada and is distributed together with the society's Journal. It contains articles on current activities of the R.A.S.C. and its centres across Canada, as well as articles from members and non-members which are of general interest to members of the Society. Manuscripts (in English or French) should be submitted to the Editor at the address below. Inquiries about the Society should be directed to its National Office at 136 Dupont Street, Toronto, Ontario, Canada M5R 1V2.

Supplement to the *Journal*  
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## Event Horizon

### July 30 - August 3

Alberta Star Party 1992  
Kinbrook Island Provincial Park  
Contact: Murray Paulson  
11 Gladstone Crescent  
St. Albert, Alberta T8N 0W6  
(403) 459-1168

### August 28 - August 30

NOVA EAST '92  
Fundy National Park, New Brunswick  
Contact: Doug Pitcairn  
13 Ferguson Road  
Dartmouth, Nova Scotia B3J 4J8  
(902) 463-7196 (after 6:00 P.M.)

### October 17

The Vancouver Centre is planning a north-west U.S.A./southwest Canada astronomical "Gathering of the Clans". Interested individuals and clubs are encouraged to contact:  
Vancouver Centre, R.A.S.C.  
c/o H.R. MacMillan Planetarium  
1100 Chestnut Street  
Vancouver, British Columbia V6J 3J9  
phone (604) 736-4431, FAX (604) 736-5665 ☼

## Ad Astra

### Eclipse '91 Video

This 23-minute narrated video documents the R.A.S.C. expedition to Santiago, Mexico. For a VHS copy, send a cheque for \$15.00 to Dan Falk, 1591 Conrose Avenue, Halifax, N.S. B3H 4C4. Please allow four weeks for delivery. ☼

*Do you know about the Eleventh Commandment? It says, "Thou shalt not bore God, or he will destroy your universe".*

John Lilly  
*American Neurophysiologist/Spiritualist (1984)*

## Letters to the Editor

### Canadian Asteroids - A Mistake!

In the December issue of the *Journal*, I ventured to publish an article about asteroids with a Canadian connection. The danger of writing an article of that nature is that there is sure to be someone out there who will go through it with a toothcomb checking every detail, and sure enough, Kim Innanen, of asteroid fame (number 3497), found a mistake in the numbering of one of the asteroids in the article. He did not tell me what the mistake was, leaving me to find it myself, and I don't mind admitting that it took me quite a long time to find it! I shall publish an erratum in the Notes section of the August *Journal*, but I thought I would give other asteroid buffs out there a chance to see if you can find the mistake. No prizes, I'm afraid, but if you think you spot the wrong number, let me know, and also tell me (absolutely honestly) how long it took you to find it! My address is in the *Journal*, but modern types can also get me at universe@uvvm.uvic.ca.

Jeremy Tatum  
*Journal Editor*

### Deep Sky Journal

Ever since word came out that *Deep Sky* magazine has ended its history of publication, amateurs have been wondering what, if anything, will replace it. Many will be pleased to hear that a new magazine will be starting up this summer, featuring many of the former writers of *Deep Sky*. The format will be somewhat different, including a larger "letters" section and more readers' reports. The paper (at least initially) will be semi-glossy stock (called petina, for those who might know the printing term).

Deep-sky photographs are requested by the editor, with the suggestion for interested contributors, to send two prints and, if possible, a list

of your other prints so that photographs can be matched with articles if necessary.

A one year subscription for *Deep Sky Journal* is \$US 24.00 for six issues, available from:

Richard Miles  
6210 Karjala Road  
Aberdeen, Washington 98520  
U.S.A.

Alister Ling  
13327 116th Avenue, Edmonton, Alberta T5M 3E4

### Of Field Lines, Electrons and Reading

As the editor has already replied to the part of Mr. Napier's letter in the April issue concerning the Earth's rotation, I thought that I might add some further details on his other concern, which was why the positive and negative charges in the solar wind separate.

The solar wind contains its own magnetic field because it consists of charged particles in motion. Charged particles in motion produce an electric current, and any electric current produces a magnetic field. In this case, the magnetic field of the solar wind particles is really a combination of its self-generated magnetic field and that of the Sun. It is the interaction of this magnetic field with the Earth's magnetic field which distorts the Earth's magnetic field and gives rise to the magnetotail.

As these charged particles pass along the magnetotail, moving across the Earth's magnetic field, a force acts on the solar wind particles. This is just like a wire inside an electric motor. Current flow in the wire crosses the motor's internal magnetic field, and a force on the wire is produced. As this wire is attached to the rotor of the motor, this force causes the rotor to turn. As there are no wires in the magnetotail, this force simply moves the charged particles themselves. Since the direction of the force is opposite, depending on whether the particle is charged positively or negatively, each type of

(continued on page 8)

## E-mail communication within the R.A.S.C.

Michael Daly  
Toronto Centre

Many members of the R.A.S.C., particularly those on National Council, keep in touch via electronic mail (e-mail). At a recent meeting of council, concern was expressed that some of the smaller centres do not have access to the e-mail network that we use.

Bitnet is the name of the network that most centres' representatives use. Bitnet is part of the Internet, an international network of universities, government agencies and companies that have joined to promote the free flow of information and electronic mail for their mutual benefit. Most Canadian universities and colleges are members of the Internet, either through Bitnet or other allied networks such as Usenet. So important is the Internet that other network and e-mail systems have provided gateways to the Internet. These gateways may let the smaller centres into the R.A.S.C. e-mail stream.

Internet addresses are of the form "user@location". By "user", I mean a name or code assigned to an individual or office; the "location" is the name of a computer that is globally known to the various sites on the Internet. For example, I can be reached by my Usenet address:

**michael.daly@canrem.com**

In this case, my "name" is "michael.daly" and my location is "canrem.com". Similarly, the editor of the **BULLETIN** can be reached at:

**pkelly@watt.ccs.tuns.ca**

where "pkelly" is Patrick Kelly's electronic mail address and "watt.ccs.tuns.ca" is his location. Unfortunately, it is not easy to determine what a person's address is, even if you know who they are and where they work; you must ask them for their address. There are international standards being worked on for creating and maintaining directories - the e-mail equivalent of a phone book - but these haven't been adopted yet.

How does a centre get access to the Internet? A local university may be your best bet. If one of your members is associated with a university, that person can contact their computer centre. The department in the university with which that member is associated probably has an e-mail drop. If they agree to act as a postman for your centre, you're connected. Some universities may allow access for individuals and organizations for a fee. The cost associated with these

services, however, can be quite high - especially for a small centre. If you have a personal computer and a modem, consider a hobbyist's Internet connection point. These are operated like a Bulletin Board System (BBS) and can often be joined for a modest fee. Get in touch with your local BBS's to see if someone knows of one nearby.

If you can't get directly connected to the Internet, there are other means, making use of gateways. For example CompuServe, an international computer service, has an Internet gateway. If I want to send some mail from CompuServe to Patrick, I would log on and address the message to:

**>Internet:pkelly@watt.ccs.tuns.ca**

Putting ">Internet:" on the beginning of the address tells CompuServe to send the mail through the gateway. He could respond by addressing his message back to me using my CompuServe ID (70661,750). In this case:

**70661.750@compuserve.com**

Note that the comma in my ID, between the 70661 and the 750, has been changed to a period for the purposes of creating an Internet address.

CompuServe has a reputation for being expensive. However, if you are only interested in e-mail, the cost can be kept low. The base cost is only \$2.00 (US) a month. Add to that connect-time charges at the rate of \$12.80 (US) per hour and, if applicable, long distance phone charges. Since you can use software to do the reading and composition of e-mail while not connected, the charges only apply to the time you actually send and receive mail. This may only be a few minutes a month. Most large Canadian cities have local CompuServe phone numbers, so you may not have to incur long-distance charges. There is also a flat, monthly rate available, with limited e-mail use. This may be appropriate for your centre.

If you have access to a Fidonet BBS, you can connect as well. You'll have to find out from a Fidonet affectionado how to communicate via Fidonet; I know it can be done, but am not sure how. Many other systems, such as MCIMail, BIX and Envoy-100 have gateways as well. If you have such a service, ask them if they provide Internet access.

Individual members of centres are welcome to use these networks to contact members in other centres. However, they should refrain from contacting National Office directly. Rosemary Freeman is quite busy and can't respond to every request that a member may have. It would be better for those members to contact

their local centre council representatives for information first. Council reps should have the R.A.S.C. Manual, which has addresses of all centres and reps. As well, David Tindall, the National Council Secretary (tindall@ac.dal.ca) keeps an up-to-date list. ☺

## La mort de l'U.R.S.S. et celle de l'astrologie?

Jean-Pierre Urbain  
(tiré "Des réflexions de Canis Minor", *Astronomie Québec* volume 2, numéro 3, mai-juin 1992)

Allez dans n'importe quelle librairie. Vous trouverez des rayons bien garnis sur l'astrologie. Prenez n'importe quel ouvrage antérieur à 1990. Un du genre "toutes les prédictions jusqu'à l'an 2000". O surprise! pour toute la décennie on n'a fait aucune prédiction sur la grande puissance disparue en 1991. Etrange non? Comment se fait-il que les astres soient si précis en ce qui a trait à Madona ou Georges Bush et si étourdis lorsqu'il s'agit d'un Etat issu d'un des plus importants événements de ce siècle, la révolution bolchevique. Un événement qui marqua pendant plus de soixante-quinze ans l'histoire du XXe siècle. Rien. Personne n'a su interpréter les positions planétaires et en déduire l'imminence de la désintégration. Et que dire de monsieur Nostradamus, victime d'un blanc de mémoire au moment d'écrire son quatrain annonciateur. Observez bien les falsificateurs qui viendront dire que tous ces bouleversements étaient prévisibles et bla bla bla...

A cause de la Lune: L'U.R.S.S. a amorcé sa déchéance politique dans les années 60, au moment de la course à la Lune disputée aux Américains. Nous pouvons même choisir le point de bascule: l'intervention chirurgicale qu'a subie Sergei Korolov en 1966. Une intervention banale, mal exécutée, réalisée avec précipitation, qui entraîna le décès du génial "constructeur principal". Koroliov a dessiné tous les vaisseaux spatiaux soviétiques et la célèbre et encore opérationnelle fusée Semioroka. Sa mort sonna un double glas sur l'Union Soviétique. Le système spatial perdit son inspiration et le pays, la course à la Lune. Les catastrophes spatiales qui suivirent minèrent profondément le moral des Soviétiques. Un climat de morosité s'installa, que plus tard on qualifia de période de stagnation. Le coeur n'y était plus, le pays avait commencé à s'effondrer.

La SAM témoigne: La Société d'Astronomie de Montréal a organisé, en 1988, une visite

(voir page 8)

## Eclipse Chasing Without the Chase... Sort Of

Steve Edberg  
(A far-flung member of the Kingston Centre)

As a veteran eclipse chaser, I was thrilled by the thought that, for a change, an eclipse was coming to me. The January 4th, 1992 annular (ring) eclipse would make its final landfall at sunset along the coast from about Oxnard, California to Ensenada, Baja California, Mexico. The Channel Islands and portions of the mainland were within the path of annularity, so it was simply a matter of finding a spot on the coast with a good horizon. Such were my thoughts when I started scouting for observing sites. Little did I realize how things would turn out.

Five years of drought in California had considerably lessened my concerns about weather – it's always sunny here, isn't it? – and so my initial thoughts were how close could I stay to home and still see the annular phase, not wanting to make a big production out of this. Though in the extension of the path, my backyard wouldn't work, but suitable sites could be found within twenty kilometres, in the foothills of the San Gabriel Mountains north of Los Angeles. Finding a low horizon, preferably at a site at high altitude, would extend the duration of visibility. Thus my site search began by watching sunsets at potential sites when the Sun had the same declination as it would for the eclipse, more than a year in advance of annularity.

As time went on I devoted more thought to the geometrical and atmospheric intricacies of the eclipse, and realized that eclipse and atmospheric phenomena could be much more interesting than for an annular eclipse viewed high in the sky. I also realized that site selection could be more complex than what one might divine from looking at U. S. Naval Observatory charts. The end of the path marked on their chart was the geometrical end of the path, the locus of points along which the Sun's center would be seen on the horizon at maximum eclipse, if there were no atmosphere.

But Earth's atmosphere would raise, by refraction, the apparent position of the Sun and Moon anywhere from 0° to 4°, depending on atmospheric conditions. Thus one could gamble on having enough refraction to make more of the event visible before Sun-center-set and be further east of the end of the path. Along the extension of the path inland southern California boasts several mountains whose summits ex-

ceed an altitude of 3000 metres. Observing at a height depresses the horizon below the horizontal, thus delaying sunset from that geographic position and making more of the eclipse visible.

Of course access to the observing site, in winter, was a necessity and the apparent change in our weather that autumn – rain (hallelujah!), and snow at higher elevations – focused the need for a variety of observing sites. In addition, I expected to bring my family along so reasonable roads were a necessity. I spent the eight weeks prior to the eclipse scouring southern California for observing sites up and down the coast and inland. Eventually I had a collection of sites ranging from an ocean view in the mountains above Topanga Canyon near the north limit and inside the geometric path, to seaside and inland sites in southern San Diego County including Palomar Mountain, beyond the path's



*The annular eclipse at its best (at least from Canada!) Photo taken from Victoria, British Columbia by Chris Spratt.*

geometric end. Having checked a dozen sites I left numerous friends frustrated with my reply to their questions of where I was going to observe the eclipse: "I don't know. What's the weather going to be?"

The philosophy expressed by that answer turned out to be a good one. The weather change suggested early in our rainy season was borne out when rain was initially expected on the Rose Parade (heaven forbid! – it didn't) but it did rain heavily on January 2nd and 3rd.

The 4th, Eclipse Day, dawned partly cloudy at my home. Calls to family and friends scattered along the breadth of the path and to the Federal Aviation Administration's Flight Weather Service confirmed what satellite photos on the previous evening's news suggested: the best views would most likely be 200 kilometres south of my house and near the coast. After numerous phone calls to friends wanting to know where to go (but

most of them not taking the advice!) we loaded up the van and headed for Black Mountain, with an altitude of about 450 metres, near Miramar Naval Air Station in San Diego. It is nearly on the extension of the centerline and just a few miles from the coast.

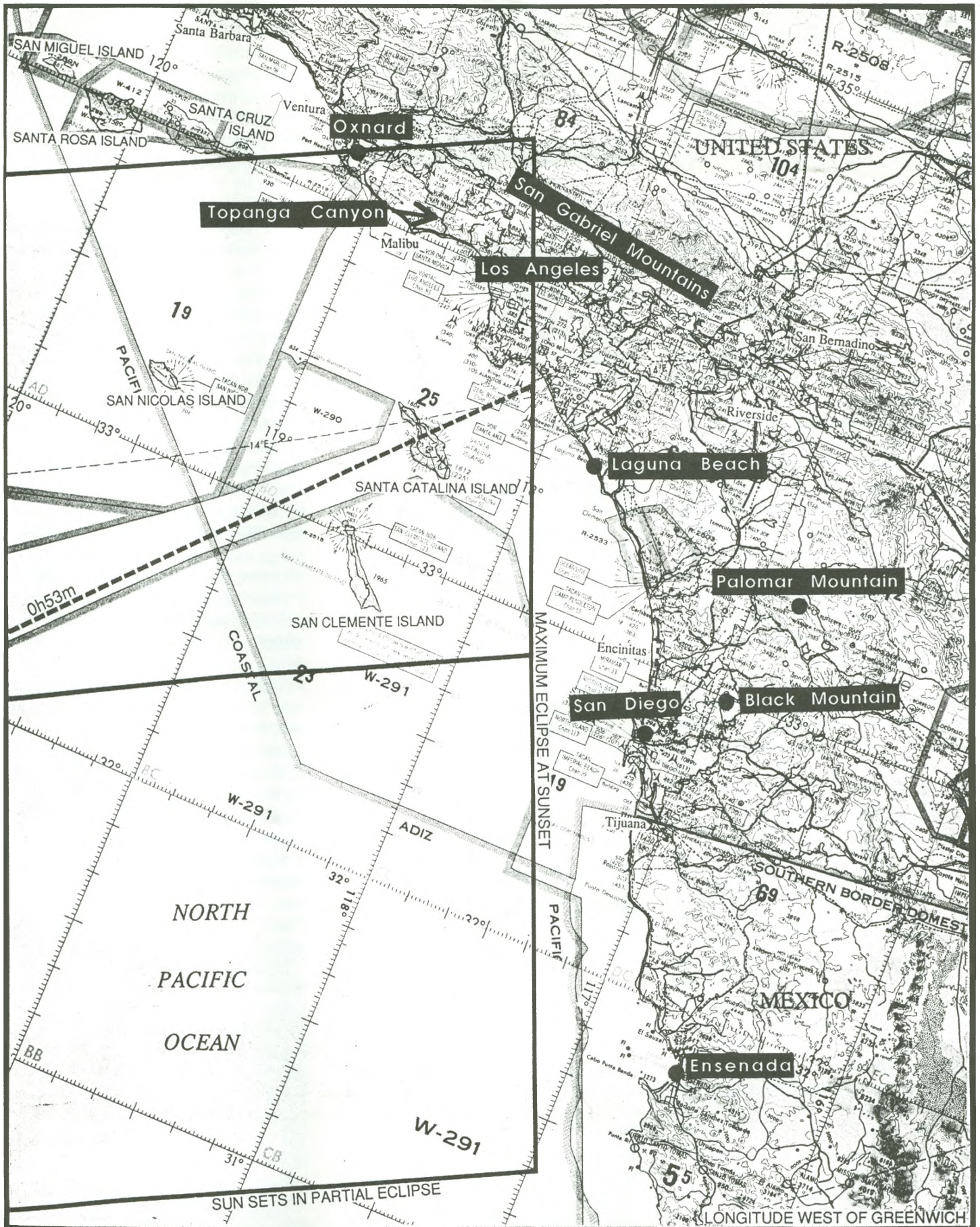
With only minutes to spare before first contact, we drove up the muddy dirt road and got set up. Over the next hour we watched as the Sun passed through occasional patches of cloud, and paragliders, hang gliders, and hot air balloons all flew in the direction of the setting Sun.

It was clear from our site that people to the north would have cloud problems, and they did. Apparently, no one north of Laguna Beach saw the annular phase. We had to contend with haze and some altostratus/altocumulus in patches, but the eclipse was magnificent! We saw the onset of annularity before the Sun entered a moderately thick cloud bank and watched as it later exited. Just before the end of annularity the Sun entered a final, opaque cloud bank perhaps a half degree in height, effectively ending the eclipse for us.

I even broke one of my own rules during annularity: I reloaded a camera, since the long telephoto and the zoom telephoto cameras had both run out of film after second contact. At that particular moment the eclipsed Sun was in a pretty thick cloud bank so I took advantage of the time to rewind and reload the long telephoto and then finish the photographic sequence as the Sun set into that final layer of cloud.

Even with all the thought I had given to phenomena unique to this type of sunset eclipse I was still surprised by what I saw. As the eclipsed Sun sank into the low, opaque cloud bank just above the sea horizon my companions and I saw the upper limb go green as it set behind that cloud bank. My photos of that did not come out (exposure is difficult to get correctly). Prior to the green limb the whole upper thread-limb took on rainbow hues: the rainbow rim, which was striking in the camera viewfinder. With magnification I discovered that my photos just after second contact show a rainbow rim on the lower limb before it went into the cloud; I did not anticipate rainbow rims, though I was expecting green flash-like phenomena. It was low contrast, but from our site on top of the mountain we could see the Moon's shadow projected against the sky. It was not until the next evening's twilight that I realized just how short and dark twilight was on the 4th: the Moon was heavily shadowing the atmosphere and darkening the twilight.

All in all, it was a fine eclipse and well worth the chase. If you have the chance to see a sunrise or sunset annular eclipse, chase it! ☼



A map of southern California showing the locations of various places mentioned in the text as well as the limits of visibility for the annular eclipse assuming an observer at sea level and no atmospheric refraction.

## The Backyard Universe of J.J. Wadsworth

Bob Duff  
London Centre

Peter Broughton, the society's First Vice-president, had little idea that when he wrote a letter to the Norfolk Historical Society over a year ago, that his inquiry would be the subject of a museum exhibit. Peter has been researching a centennial history of the R.A.S.C. and the subject of his inquiry was Dr. James Joseph Wadsworth, a physician and local school inspector.

Wadsworth was one of Canada's astronomy pioneers. In 1893 he built an observatory in the backyard of his home in Simcoe, which is located in southwestern Ontario. It housed a 12.5 inch reflecting telescope which he had made himself. At the time that it was built, this was the largest telescope in Canada!

Wadsworth was a prominent member of the R.A.S.C. until his death in 1905. Portions of his letters were frequently published in the *Transactions of the Society*, the forerunner of the *Journal*. His learned papers detailed his studies of the Moon and the planet Jupiter. He took impressive photographs of the phases of the Moon in the mid-1890's.

The house still stands, but the observatory is now gone. A number of other Simcoe residents became interested in astronomy, including some women who made excellent drawings of the Moon and planets, as seen through Wadsworth's telescope. One of these was Eva Brook Donly, and her house now forms the museum in Simcoe.

Some of Wadsworth's drawings and photographs of the Moon have been included in the exhibit at the Eva Brook Donly Museum. The exhibit was officially opened on March 12th by the museum's curator, Bill Yaeger and his assistant John Tipper. Grant Dixon, of the Hamilton Centre, gave an introductory talk on astronomy in Canada in the late 19th century, with a particular emphasis on Wadsworth's contribution. Some forty-five visitors were present.

Also present was Evelyn Buttersworth, the observatory director for the Hamilton Centre. Evelyn and Grant brought two antique telescopes to show the audience, including a brass transit telescope, which was used to determine longitude, and a refractor which had been used to map the Arctic Circle.

After Grant's fifteen minute address, and the questions which followed, visitors got a chance to do some observing of their own. To help with the star night, Berndt Mueller, John Rayburn,

Jim Graham and Rick Stemmler arrived from the Kitchener-Waterloo Centre with three telescopes. These, together with two telescopes from the London Centre, brought by Hilda Innis, Marian Marques and myself, gave visitors excellent views of the Moon and Jupiter. The telescopes used included a 10" Meade, a 10" Dobsonian and a 3.5" Questar, all brought by the Kitchener-Waterloo members. Also present were the London Centre's 8" Odyssey and my own 5" reflector.

The cold clear night afforded generally good seeing and people had a good time. There were many questions about astronomy and telescopes. A reporter from the *Simcoe Reformer* interviewed us following Grant Dixon's talk. Nothing appeared in the following day's newspaper about the star night. However, the Saturday edition featured an announcement of the exhibit with a photograph of "Dr. Wadsworth's Observatory" in its 1893 backyard setting.

Although the exhibit was due to finish at the end of April, it has been developed as a display that can travel to other museums and galleries. For those wishing to contact the museum, its address and phone number are:

Eva Brook Donly Museum  
109 Norfolk Street South  
Simcoe, Ontario  
N3Y 2W3  
(519) 426-1583

Visiting hours are 10h00 - 16h30 on Wednesday, Thursday and Friday, and 12h00 - 16h30 on Saturday and Sunday.

Many thanks go to Hilda Innis, who brought out the London Centre's Odyssey for this star night. Many thanks also go to Marian Marques who photographed this event. ☺

## The Journal of the R.A.S.C.: A Different Perspective

Alister Ling  
Edmonton Centre

One thing is for sure: the *Journal's* future is a sensitive topic. In this article I would like to discuss some personal points of view as well as address some issues raised in Douglas Hube's article in the February **BULLETIN**. Before I start, I must state that Jeremy Tatum is doing a fine job editing the *Journal*. Furthermore, I do read the *Journal* almost cover to cover. But in my mind, the issue here is not about the *Journal's* uniqueness, nor about quality, quantity, or variety or content. It is about funding.

Although I have delineated one possible route to follow (other suggestions can be found in other centre newsletters), I am mostly asking you, the reader, to think. Is this the best way to spend our money? There are doubtless several alternative goals we can set for ourselves. Are there projects of value within the R.A.S.C. that are being ignored or underfunded as a result of subsidizing the *Journal*? In this day and age of budget reductions, all options must be considered. One option not discussed in the aforementioned article is what our society would be like without the *Journal*.

The mere thought of ending the *Journal's* publication seems to make some people nearly apoplectic or enraged. While it would be best to discuss the problem rationally, it is impossible to deny that there is an emotional component to this issue; there is an element here that the *Journal* must be supported. Analogous issues are: our health care system; sending athletes to the Olympics; welfare; the Canadian space program; N.A.S.A.; publishing and distributing centre newsletters; i.e. anything altruistic (we support certain endeavours, because as human beings, we should). The existence of the *Journal* is an issue almost as complex as these others.

Would professionals stop interacting with amateurs? Some people have suggested that professionals might "retaliate" if amateurs vote for an end of the *Journal*. This is utter nonsense. Professionals and so-called "serious" amateurs have had a long and fruitful association up to now. In Québec and France, for instance, the relationships are quite good, yet those groups do not publish an analogous journal. Any severing of ties would hurt the science more than it would the amateurs. While some theoreticians are proud that they have never looked through a telescope, it has been my experience that those professionals who do encourage amateurs, were once amateurs themselves. For these people, sharing the fun and excitement of astronomy will never stop.

Moreover, the freeing up of monies devoted to publishing the *Journal* could fund numerous serious amateur projects, including photoelectric photometry of variable stars and asteroid occultations, and, I dare say, asteroid astrometry. What better way to stimulate young and old minds in centres across the country, than to expose them to a truly scientific endeavour? The National Office might coordinate the funds and ensure that even the smallest centres could receive equipment grants or loans.

### International Prestige; Not Just a Club

One reason in favour of the *Journal* is that it increases the reputation of Canadian astronomy

across the world. Why then, would Canadian astronomers bother submitting their work to other publications? An author gains more personal prestige by having their article published in one of the main journals, in addition to increasing the visibility of Canadian astronomy. Further, I would find it difficult to believe that technical papers in the *Journal* could not be published elsewhere.

It is laudable that the *Journal* publishes non-technical articles accessible to most of the R.A.S.C. membership. Yet I often feel that these very articles are often perfect material for, say, *Sky & Telescope* magazine. I am also convinced that compared to the *Journal*, *Sky & Telescope* is read more frequently by professionals (also in other countries!). Certainly in the eyes of amateurs around the world, Canadian astronomy would be more visible. Of course, a non-technical article in *Sky & Telescope* might not receive an appreciative nod from a department chairman or dean, since it would not carry the weight of a peer-reviewed publication. Then again, prospective graduate students would readily see that research is taking place at the particular institution.

It has been said that the *Journal* makes the R.A.S.C. more than a club. Would its demise signal the end of our General Assemblies, speaker exchanges, various projects, and the bonds of friendship that exist across the country? I think not. The R.A.S.C. is a lot more than the U.S.-based Astronomical League; our society would still provide many benefits, and more. We are supposedly a society of international repute, a reputation that we would lose if the *Journal* is discontinued. But who really has the repute? Is it the society as an entity, or is the repute enjoyed by a number of the individual members? Would the Planetary Society have as good a reputation if Carl Sagan was not involved?

### Do People Read The Journal?

Without initiating an expensive campaign or a time consuming questionnaire whose results are debatable, it is impossible to state how many and who the readers are. After all, one could say that the 70% of the subscribers who failed to respond were too busy reading. An illuminating discussion on the topic of limiting the number of research journals in a university library, can be found in chapter six of physicist N. David Mermin's *Boojums All The Way Through*, which I urge you to read. The prime purpose of a journal is communication; if a journal is not read, then ideas and results are not conveyed. Does

(continued on page 8)

## Thoughts on the Journal of the R.A.S.C.

Phillip Mozel  
Toronto Centre  
reprinted from *Scope*

There has been much discussion lately regarding the role and future of our society's journal (*J.R.A.S.C.*) with many strong feelings being voiced. Last year, after hearing a number of these points of view expressed, I attempted to take an objective look at who was actually using the *Journal*. To begin with, while *Journal* articles have, in the past, been evaluated on their appeal to the general membership, one can also look at the *authorship* of the articles. Looking through back issues of the *Journal* from 1986 through 1990, I tried to categorize the authors as either "amateur" or "professional". This was not always clear-cut as, for example, some writers were professionals, but not astronomers. I do not think that this affects the main result.

Of the 111 papers published over this period, 93 of them (84%) were written by professionals, and 18 (16%) by amateurs. Of the 18 amateur papers, 7 were written by one individual. During this same period, *Cassiopeia*, the newsletter of the Canadian Astronomical Society, a professional organization, lists a total of 943 papers published by Canadian astronomers. Thus, only about 10% of all papers published by Canadian astronomers appeared in the *Journal*.

At this time, I learned of an independent source of information indicating the extent to which scientific journals are used: the *Journal Citation Reports (J.C.R.)*. This publication provides information on how often various journals are cited, i.e. referenced in scientific papers. In 1988, the latest year for which information was available, the *J.R.A.S.C.* was cited 86 times. Table 1 gives the number of times particular years of the *J.R.A.S.C.* were cited in 1988.

Each journal was also assigned an "impact factor" by the *J.C.R.* This was defined as a measure of the frequency with which the "average article" in a journal has been cited in a particular year. The *J.C.R.* impact factor is basically a ratio between the citations and citable items published. Thus, the 1988 impact factor of Journal X would be calculated by dividing the number of all the 1988 citations of articles Journal X published in 1986 and 1987 by the total number of source items it published in 1986 and 1987. The *J.R.A.S.C.* had an impact factor of 0.17 for 1988. But what does this mean? For comparison, some other astronomy journals with their impact factors and the number of times they were cited in 1988 are given in Table 2.

These are all foreign publications. How does the *J.R.A.S.C.* compare with other Canadian scientific journals? Listed below in Table 3 are some Canadian publications indicating both the highs and lows of impact factors and the number of citations as listed by the *J.C.R.*

These are the numbers. It is for the membership to decide if they are relevant. ☺

Table 1

Year	'88	'87	'86	'85	'84	'83	'82	'81	'80	'79	Other
1988 Citations	1	4	4	5	5	2	5	5	1	3	51

Table 2

Journal	Impact Factor	1988 Citations
J.R.A.S.C.	0.17	86
Astronomische Nachrichten	0.49	403
Publications of the A.S.P.	1.40	2 376
Astronomy & Astrophysics	1.96	12 721
Astronomical Journal	2.00	5 328
Monthly Notices of the R.A.S.	2.50	10 606
Astrophysical Journal	3.54	44 733
Astrophysical Journal Supplement	4.95	3 874

Table 3

Journal	Impact Factor	1988 Citations
Canadian Mining Journal	0.01	24
Canadian Journal of Information Science	0.15	11
J.R.A.S.C.	0.17	86
Canadian Journal of Chemistry	1.01	9 380
Canadian Journal of Fish Aquatic Science	1.38	3 602

## The Journal of the R.A.S.C.: A Different Perspective

(continued from page 7)

the professional even have the time to read all the journals? Mermin made a list of journals (for physical scientists) that he felt he ought to look at, but didn't. He found thirty-two!

### Summary

Undoubtedly, there would be some loss should the *Journal* cease to be. But consider what an extra \$25,000 a year or so could do for the health of our society. Without increasing the dues (beyond inflation), any debt incurred by the society could be eliminated swiftly. Postage for the exchange of centres' newsletters could be funded on a national basis, since some centres can't afford to do it themselves. We are lacking in a prime function: internal communication. Expensive equipment beyond the reach of entire centres could be loaned out. Interested amateurs, perhaps with the guidance of a professional, could then make observations of value, fostering the advancement of science in their centre, and astronomy as a whole. Best of all, these amateurs would then be able to communicate to others what is so passionate about our interest in the skies. This would truly fulfil the goals of our society. ☛

## La mort de l'U.R.S.S. et celle de l'astrologie?

(continuer à page 3)

d'observatoires soviétiques. Partout les visiteurs furent frappés par l'état d'abandon des dispositifs urbains entrevus. A Piatigorsk, dans le Caucase, un planétarium délabré, un parc négligé, dont l'inauguration remontait à 1965, laissé là comme le témoignage de l'époque glorieuse où les lendemains chantaient. ☛

## Letters to the Editor

(continued from page 2)

charge is pushed in opposite directions as they move down the magnetotail. Eventually, the two types of charges become separated.

As I indicated in the article, once the charges are separated, they want to recombine. There are two possible paths: directly across the magnetotail, or down the Earth's magnetic field lines to the poles, and back up again. It was not mentioned in the article, but the recombination process is primarily due to electrons, since their smaller mass gives them easier mobility. The direct path does not contribute to the aurora. The other downward and upward path has less

complicated physics and is where the aurora is produced.

The number of electrons impinging onto the Earth depends on the number of solar wind particles available, and on the polarity of the solar wind's magnetic field relative to the Earth's magnetic field. If the polarities are the same, the field lines repel, and there is no direct magnetic field line path from the solar wind particles to one of the Earth's magnetic poles. Then the downward and upward path is not possible by following a single field line, and much fewer solar wind particles can reach the aurora oval. If the polarities are opposite, the field lines will link, and the magnetic field line path will be formed. If this polarity condition coincides with solar wind particles from a solar flare reaching the Earth, a dramatic auroral display may result.

If Mr. Napier, or others, wish to do further reading, I know of four recent layman articles which are available: *Scientific American* (May, 1989), *New Scientist* (March 1992), *E.P.R.I. Journal* (July/August 1989), and *Science* (Vol. 256, April 10, 1992). The *Scientific American* article offered the following references:

- SOLAR-TERRESTRIAL PHYSICS, Syun-Ichi Akasofu and Sydney Chapman, Oxford University Press, 1972.
- AURORA, A. Vallance Jones, D. Reidel Publishing Co., 1974.
- MAJESTIC LIGHTS, Robert H. Eather, American Geophysical Union, 1980.
- THE NORTHERN LIGHTS: FROM MYTHOLOGY TO SPACE RESEARCH, Asgeir Brekke, Alf Egeland, Springer Verlag, 1983.
- THE SOLAR WIND AND THE EARTH, Syun-Ichi Akasofu and Yosuke Kamide, D. Reidel Publishing Co., 1987.

Some engineering trade magazines, *Electrical World* (Dec. 1989 and Sept. 1990), *The Institute* (Sept. 1989) [supplement to *I.E.E.E. Spectrum*], and *I.E.E.E. Spectrum* (June 1989) have carried articles on how the aurora affects the power system. Numerous other research articles have been published in various journals, including the *I.E.E.E. Transactions and Proceedings*, the *Journal of Geophysical Research*, and *EOS*. These deal with the effects on the power system, and the physical phenomena giving rise to these effects.

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*A hypothesis may be simply defined as a guess. A scientific hypothesis is an intelligent guess.*

Isaac Asimov

American Biochemist/Author

## Across the R.A.S.C.

### Edmonton

The Astronomy Workshop in October was yet again a gastronomical and astronomical feast. Local talent, including John Mirtle of Calgary, gave excellent talks, capped off with a presentation by Stephen James O'Meara from *Sky & Telescope*. Although December and January were poor months for observing, February and March almost had a surfeit of clear skies. Keen observers could be found out at the centre's Blackfoot 2 dark site three times per week during dark of the Moon periods. El Niño provided a welcomed number of clear nights above the freezing mark. Aurorae and volcanic aerosols continued to plague the deep-sky observers, but transparency seems to be returning of late. A star of magnitude 6.5 could be seen with the naked eye, yet we all agreed this one night was not as good as it could be!

Our 60th anniversary banquet was a success. David Roles gave a slide show and talk about his last fifteen years in the Edmonton Centre. This was followed up by several great humorous songs and skits, including "Starbust: The Musical."

## A Cure for Mosquitos!

Bill Broderick  
Kingston Centre  
reprinted from *Regulus*

With the mosquito season soon to be upon us, you may be interested in a letter that appeared in the September 1991 issue of *Astronomy* magazine. Mr. E. W. Brisley of Cornwall, England, wrote giving a very effective formula for a mosquito repellent which is recommended by the Entomology Department of the British Museum.

The ingredients are readily available in drugstores (ask at the pharmacy counter) and the mixing is simple: just follow the proportions given below. You can keep the mixture in the two bottles that the main ingredients come in if you get them in identical sizes.

The formula is:

30 ml of oil of eucalyptus

30 ml of oil of citronella

1 drop of pure carbolic acid

If you try the formula, I would appreciate it very much if you would let me know how effective it was for you. I will, of course, have my own experience, but I would like to know how others find it.

Good luck and good observing! ☛