NOVA NOTES

Halifax Centre

Mar–Apr 1990
Volume 21
Number 2

HALIFAX CENTRE - R. A. S. C.
1990 CALENDAR OF EVENTS

January

S	M	T	W	T	F	S
	1	2	**3**	4	5	6
7	8	9	10	11	**12**	13
14	15	16	17	18	**19**	20
21	22	23	24	25	26	27
28	29	30	31			

February

S	M	T	W	T	F	S
				1	2	**3**
4	5	6	7	8	**9**	10
11	12	13	14	15	**16**	17
18	19	20	21	22	23	24
25	**26**	27	**28**			

March

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	**16**	17
18	19	20	21	22	**23**	24
25	26	27	28	29	30	31

April

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	**20**	21
22	23	24	25	26	27	28
29	30					

Key to calendar:

Regular and
Observer Group Meetings: **bold and shadowed**
Special days: **bold**
Possible observing sessions: underlined

Special Days:

January 3 - Quadrantid Meteors
February 3 - Mercury 0.2° N of Saturn
Febraury 26 - Two shadows on Jupiter
February 28 - Mars 1° S of Saturn
March 23 - Venus 2° N of the Moon
April 1 - Jupiter 3° S of the Moon
April 22 - Lyrid meteors
April 29 - Jupiter 3° S of the Moon

Notice of Meetings

Date: Friday, January **19th: 7:15 P.M.** for the regular meeting; **8:00 P.M.** for the main speaker
Place: Nova Scotia Museum, Summer Street, Halifax. Access from the side entrance. Meeting to be held in the lower theatre.
Topic: **Dr. David Turner** from the Astronomy Department of Saint Mary's University will be giving a talk on Wolf-Rayet Stars.

Date: Friday, February **9th: 7:30 P.M.**
Place: Jason Adam's house: 23 Reindeer Avenue, Middle Sackville (map appear elsewhere in this issue - 865-1437)
Topic: Observer's Group Meeting.*Astrophotography*

Date: Friday, February **16th: 7:15 P.M.** for the regular meeting; **8:00 P.M.** for the main speaker
Place: Nova Scotia Museum, Summer Street, Halifax. Access from the side entrance. Meeting to be held in the lower theatre.
Topic: **Father William Lonc** from the Physics Department of Saint Mary's University will be giving a talk entitled *The World of Amateur Radio Astronomy*..

Halifax Planetarium Public Shows

Thursday, January 11th	The January Sky
Thursday, January 25th	Star Clusters
Thursday February 8th	The February Sky
Thursday February 22nd	The Solar System

The Halifax Planetarium is located in the Sir James Dunn Building of Dalhousie University. All shows begin at 7:00 P.M.

Note: The above list is tentative and subject to change.

About the cover

The cover shows noted astronomer Bart Bok when he was about 30 years old. However, this is also a good indication of what one of our centre's former president's will look like when he gets a bit older. Can you guess which one, eh?

Editor's Report

Patrick Kelly

You may be wondering why the March-April issue of NOVA NOTES is arriving in your January mail. Well, for once in my tenure as editor, I've actually been able to find the time to get ahead of myself. In addition, we received a notice from the Museum that the education department's print shop will be moving to a new location sometime in the spring. As a result all societies were advised that they would probably have to have a private firm print one of their spring issues. The last time that happened (when they were looking for a new printer to run their machine) it cost us about $100 and I felt it was better to get this issue printed and out before that time.

Back to more important matters, I hope that all of you had a pleasant holiday season (and that Santa didn't forget to leave you some astronomical treats under the tree!) Still on a Christmas note, I came across the following poem in the December issue of *Skynews* the Victoria Centre's newsletter:

Jack Newton's "Night Before Christmas"
by Alice Newton

T'was the night before Christmas, and on Stanehill Place
The dog lay flopped out with her usual grace.
Alice was fretting about the debris
While puddles of pitch oozed down from the tree.
"Santa" was tucked in at 7:00 in bed
While visions of clear skies danced 'round in his head.
Just like his counterpart in the white North
He'd soon be hitched up and venturing forth.
But not to climb chimneys, 'tho no Scrooge was he
His purpose was astro-photog-ra-phy.
"Move over Blitzen, and Dasher and Donder...
Orion's just cleared those trees over yonder."
The film has been chilled, the scope is in tow
And "Santa" was up again, ready to go.
"Cold camera, dry ice, the (wonderful) C.A.T.
Kiss wife, hug dog, well that should be **that**".
His snowmobile pockets bulged out here and there
With eyepieces, batteries, one or two beer.
His checklist complete, Santa quietly hovered
O'er his wife, who lay happily hogging the covers.
She looked like a cocoon, wrapped up all tight
He tiptoed stealthily out into the night.
And I heard him exclaim as he drove to the Park
"Those damn vapour lights sure @#^$% up the dark!"

The cops got a call sometime past midnight
Some fool in a snowsuit had shot out their streetlight.
But I heard Santa say as they slapped on the cuffs
"Merry Christmas to all you astronomy buffs."

Not only do we start a new year, but also the final decade of this century. Looking back on the eighties, I have seen the Halifax Centre grow not only in terms of the number of members, but also in the effort shown by members in educating the public, organizing centre activities and actually getting out there under the dark sky and observing. As we start into the nineties, I am extremely confident that this trend will continue and that when the year 2000 rolls around, we'll look back on the 1990's as the best years in the centre's history.

We have an article for this issue which is a bit different in the sense that it is a summary of some of the events of the November meeting for the benefit of those members who were unable to attend. It is in three parts and covers the talk that was given by Dr. Taylor and two awards that were presented at the meeting. (I was informed by our new president that dire consequences would befall me if I left out the third part!) I should add that Dr. Taylor refused to accept the honorarium that the centre had wished to give to him in appreciation of his coming all of the way from Yarmouth to give us his talk. However, not to be outdone, we have decided instead, to give him a gift membership in the society for this year, which we hope will provide him with some interesting reading material and to let him know how much we appreciated his effort.

I received a note from Len Larkin in Saint John who came across an ad for Schiefspieglers that are made in Ohio. He though that other members might not have known about it and though they might be interested. Prices for tube assemblies run from $US 900 for the 4.25" f/26 to $US 1,400 for the 6" f/30. They also sell mirror sets from 4.25" to 12.5" in aperture. A catalog is available for $2 from Lorraine Precision Optics, 1319 Libby Lane, New Richmond, Ohio 45157.

At the urging of another member, this issue marks the debut of a new column for NOVA NOTES. Based on the "Ask the Ultramind" column from another centre's newsletter (Hamilton?) we now have our own "Ask Gazer" column for those with astronomical problems. GAZER (who shall remain anonymous) wanted me to let you know that no question is unanswerable.

Lastly, Dave Lane has provided me with a printout of the best dates for observing sessions from Beaverbank. Starting with this issue, these dates will be used in the *Calendar of Events*. They assume a minimum observing time of one hour and that the observer wants to start no later than 11:00 P.M. Ω

The Burke-Gaffney Award
Halifax Centre

The Burke-Gaffney Award was established by the Halifax Centre to promote the development of the writing skills of non-professional members of the centre. The award also acknowledges the contribution of the centre's first Honorary President to the formation of the group and to his long and tireless efforts to educate the public in the mysteries of astronomy. This year's submissions must reach the President or Editor by March 16th, 1990. Reprints of David Chapman's Simon Newcombe winning essay are available from the librarian for use as a guide to the form used for such a paper.

Rules

1. Topic: Awards will be given for articles relating to astronomy, astrophysics or space science. Topics should interest average to well-informed amateurs and may be of current or historical nature.

2. Presentation: Articles should be no longer than 2500 words, written in proper grammatical form and presented typewritten and double spaced. Diagrams should be complete and ready for drafting and photographs should, if possible, be submitted with the original negatives.

3. Eligibility: Any member of the Halifax Centre in good standing may submit entries with the exception of those who are professional astronomers.

4. Judging: Articles will be judged on scientific accuracy, originality and with a strong emphasis on the overall literary merit. Papers must demonstrate that the author(s) has/have read widely and has/have contributed some original thought to the discussion. Judging will be carried out a judging committee which will consist of the President, the NOVA NOTES Editor and a third person appointed by the Halifax Centre's executive.

5. Prize: The award will be given once annually. The winning contribution then becomes the Halifax Centre's official entry in the Simon Newcombe Award competition which is held annually on a nation-wide basis. The winner of the Burke-Gaffney Award will have the choice of one of several prizes and will have their paper printed in NOVA NOTES.

6. Submission of Entries: Entries will be received anytime until March 16h, 1990. You may direct inquiries concerning the rules to the President.

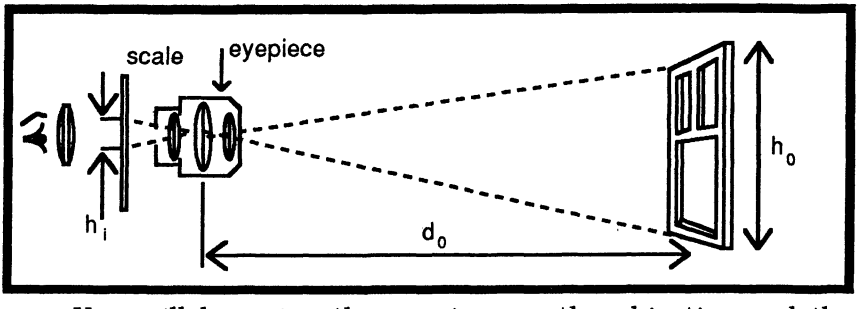
7. Previous Awards: The Burke-Gaffney Award has been won on six previous occasions: Bill Calnen (1979 and 1980), Dianne Brooks (1981), Michael Boschat (1982), Jennifer Wells (1983) and Dan Falk (1988). No awards were given in 1984, 1985, 1986, 1987 and 1989.Ω

A Method of Determining the Focal Length of an Eyepiece

Larry Bogan

I have a small collection of eyepieces from binoculars and other equipment. A couple of them make moderately good eyepieces for my telescopes but I only roughly knew their focal lengths. The following is a description of a method I developed to get good values of eyepiece focal lengths.

I used a comparitor but another eyepiece and a transparent millimetre ruler will work also. Below is a drawing of the geometry of the setup.



You will be using the eyepiece as the objective and the comparitor as the eyepiece of a small telescope. The transparent scale is at the focal point of the eyepiece. Select an object from the other side of the room (e.g. a window) and view it through the "eyepiece telescope". Measure the height of the window image with the scale. make sure the window and the scale are in focus in the comparitor.

Next measure the real height of the window and the distance that the eyepiece was from the window. Use the formula below to calculate the focal length of the eyepiece. It's all simple geometry and simple optics!

$$f_e = \frac{d_0 \frac{h_i}{h_0}}{1 + \frac{h_i}{h_0}}$$

where : f_e = the focal length of the eyepiece

h_i = height of the image on the scale in mm

h_0 = height of the object (window) in mm

d_0 = the distance from the eyepiece to the object

[Note: If you use a distance to the object (d_0) which is much longer than the focal length, h_i/h_0 will be very small and may be neglected with respect to one, and then $f_e = d_0\, h_i/h_0$.] Ω

Arctic Observations

Dave Chapman

In late summer 1989, I found myself on board a Government research ship bound for the eastern Canadian Arctic. The deck of a pitching and rolling ship is not the best place from which to conduct serious astronomical observations, but I did make several casual naked-eye observations that I thought would interest my fellow R.A.S.C. members:

• On several occasions, I attempted to observe "the green flash" at sunset, with no luck. This is an optical effect that occurs as the sun sets below a flat horizon, or just after. The very last rays of the sun's disk are said to sometimes appear as a green flash. I have never seen it, but will continue looking.

• Once, while waiting to see the green flash at sunset, I watched the sun set through a thick layer of haze, so thick that one could look at the sun directly through binoculars without harm. I observed three very large sunspot groups in binoculars. Later that night, the radio officer showed me a message from Halifax; it warned of possible severe disruption of radio communication due to the eruption of a solar flare.

• The following night, there was a spectacular display of Aurora Borealis. The curious thing was that the ship was headed north and we viewed the Aurora from the afterdeck, looking south. The Aurora appeared as a huge curtain stretching from the eastern to the western horizon across the southern sky. We were so far North that the Northern Lights appeared in the south!

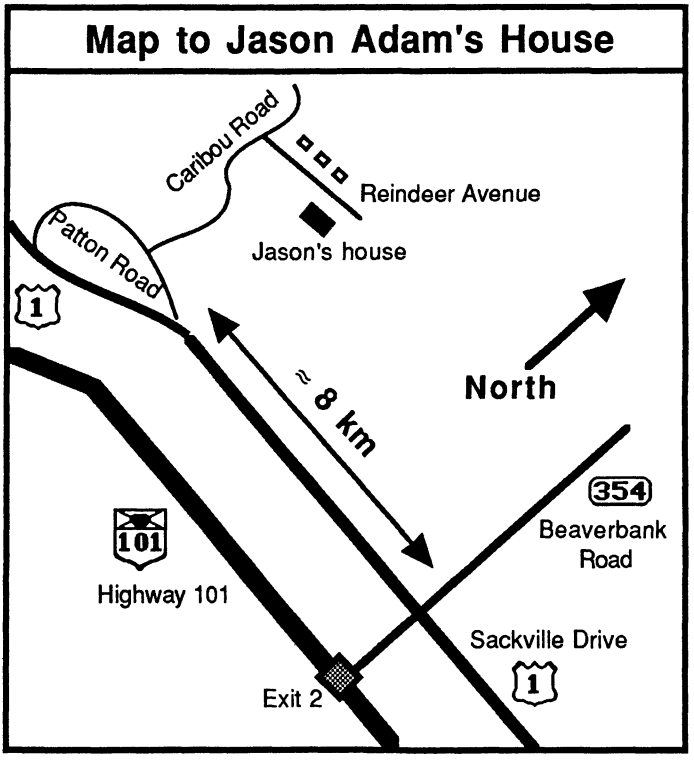
• We were never far enough north to see "the midnight sun", but during the early part of the trip there were several nights when twilight never ended and one could follow the sun's glow around the northern horizon from west to east. One night, I watched the sun set very late, about 11 PM. It took a long time to do so. The air was frosty and I observed a light pillar above the sun (caused by ice flakes suspended horizontally in the atmosphere) and one sun dog to the left of the sun (caused by ice needles suspended vertically in the atmosphere).

• During the same sunset, I observed the waning crescent moon in the sky to the right and above the sun. I did a double take, as the view seemed odd: shouldn't the waning crescent appear in the morning, before sun*rise*? It turned out that the declination of the moon was sufficiently high that the moon in fact *did not set* for a substantial part of the month at this latitude. Upon reflection, I realized that this phenomenon is the lunar counterpart of the midnight sun phenomenon.

• Let's quantify the previous statement. Imagine that we are somewhere in the northern hemisphere at latitude L and the

object of interest has declination d (positive or negative). If L+d is greater than 90°, then the object will never set; if L-d is greater than 90°, then the object will never rise; if d lies between the values 90°-L and L-90°, then the object will rise and set in the usual manner. At my latitude of 74°, anything north of declination +16° would never set, and anything south of declination -16° would never rise. According to the Nautical Almanac (which gives the declination of various astronomical objects for each day of the year) there was a period of one week during the month of September during which the moon would not rise at my latitude.

In summary, even though I didn't have a telescope and I hadn't planned on doing any serious observing, I managed to amuse myself with astronomical diversions on several occasions during my Arctic trip. When travelling about, it's always interesting to see familiar objects from a novel perspective. Ω



Extracting Further Data From the Observer's Handbook

Joe Yurchesyn

I have always been taken with the simplicity of a nomogram for determining information. The one in the *Observer's Handbook* related to telescope exit pupils (on page 22 of the 1990 edition) is no exception. I wondered if it could be expanded to provide actual fields of view as well. In an attempt to answer this question, a review of the governing equations was the first step. The linearity of the relationships was demonstrated (see Appendix A), but so was the field of view's dependence on the actual physical size of the telescope. Hopefully, my modification to the nomogram has sufficiently simplified this complication.

With this modification, the diagonal lines of the original nomogram are made to serve a dual purpose, that of the focal length of the telescope (f) and the apparent field of view of the eyepiece (θ). The top of the graph has been labelled A, corresponding to the actual field of view (θ).multiplied by the diameter of the telescope (D). That is, $A = \theta * D$.

The equation $A \approx \frac{57.296 * d_i}{f}$ can be used to work backwards, when starting with an image diameter. Although it is a linear approximation, it works very well for the small field of view angles common in astronomical telescopes.

For a specific telescope, there is a fixed value for both f and D. The A axis can then be relabelled θ by dividing the A values by D. Several worked examples are given below. These steps for each example are also shown in Figure 1.

Example 1

Assume a 200 mm f/10 Schmidt - Cassegrain used with a 24 mm widefield eyepiece of 65° apparent field of view. What is the actual field of view?

Start with f_e = 24 mm and move up the to the f/10 diagonal to locate the exit pupil on the d_p scale. Move horizontally to the 65° diagonal and then up to get a value of A of 158. Since D = 200 mm, divide by 200 to get θ = 0.79°. If the telescope had been a 100 mm, the field of view would have been 1.58°. Note that the maximum A for a 1.25" eyepiece at f/10 is 155. The 24 mm wide field provides the maximum field of view on any f/10 telescope using 1.25" eyepieces.

Example 2

Assume a 150 mm f/8 Newtonian. Find the maximum field of view possible with a 50° Plössl eyepiece and its focal length?

From the equation $A \approx \frac{1550}{f}$, a value of f=8 implies that A = 193, corresponding to $\theta = 1.29°$ (193 divided by 150). Starting at A = 193, move down the 50° diagonal and then across to the f/8 diagonal. Now move down to get a value for f_e = 30.5 mm.

Example 3

Assume a 1.25" 50° eyepiece. What value of f gives the widest possible field of view?

The widest field of view requires the lowest magnification possible. This occurs when the diameter of the exit pupil (d_p) is largest. Assume that for you, this is a value of 7 mm. Starting here, move horizontally to the 50° diagonal and then up to get a value for A of 350. From the equation $A \approx \frac{1550}{f}$ and knowing that A = 350, we get a value for f of 4.43. Perhaps this explains the popularity of f/4.5 reflectors used with Plössl eyepieces. I personally prefer a value for d_p of about 5 mm. In this case a telescope of f/6.2 would be required to maximize the actual field of view.

APPENDIX A

M = magnification
F = focal length of the telescope
D = diameter of objective
f_e = focal length of the eyepiece
d_p = diameter of the exit pupil
f = focal ratio of the telescope
d_i = image diameter at the focal plane
Φ = apparent field of view of eyepiece
θ = actual field of view of eyepiece
A = θ*D

$$M = \frac{F}{f_e} = \frac{D*f}{f_e}$$

$$d_p = \frac{D}{M} = \frac{D}{\frac{D*f}{f_e}} = \frac{f_e}{f}$$

Note that $d_p = \frac{f_e}{f} = \frac{1}{f} * f_e$. Since $\frac{1}{f}$ is a constant for a particular telescope, we have d_p = constant * f_e which is the equation of a line.

$$\theta = \frac{\Phi}{M} = \frac{\Phi}{\frac{D*f}{f_e}} = \frac{\Phi * f_e}{D * f} = \frac{\Phi * d_p}{D}$$

Thus, $$\theta * D = \Phi * d_p$$

$$\theta * D = A = \Phi * d_p$$

Once again, since Φ is a constant for a particular eyepiece, we have the equation of a straight line.

$$\theta = \arctan\left(\frac{d_i}{F}\right) = \arctan\left(\frac{d_i}{D * f}\right)$$

For small angles, the arctangent of the angle is approximately the same as the angle itself. This approximation and converting from degrees to radians gives:

$$\theta \approx 57.296 * \frac{d_i}{D * f}$$

Multiplying both sides by D yields:

$$\theta * D = A = 57.3 * \frac{d_i}{f}$$

The maximum value of d_i for 1.25" eyepieces is ~ 27 mm

$$\therefore A \approx \frac{1550}{f}$$

The maximum value of d_i for 2" eyepieces is ~ 47 mm

$$\therefore A \approx \frac{2690}{f}\ \Omega$$

Education is that which remains after everything learned in school is forgotten. - Albert Einstein

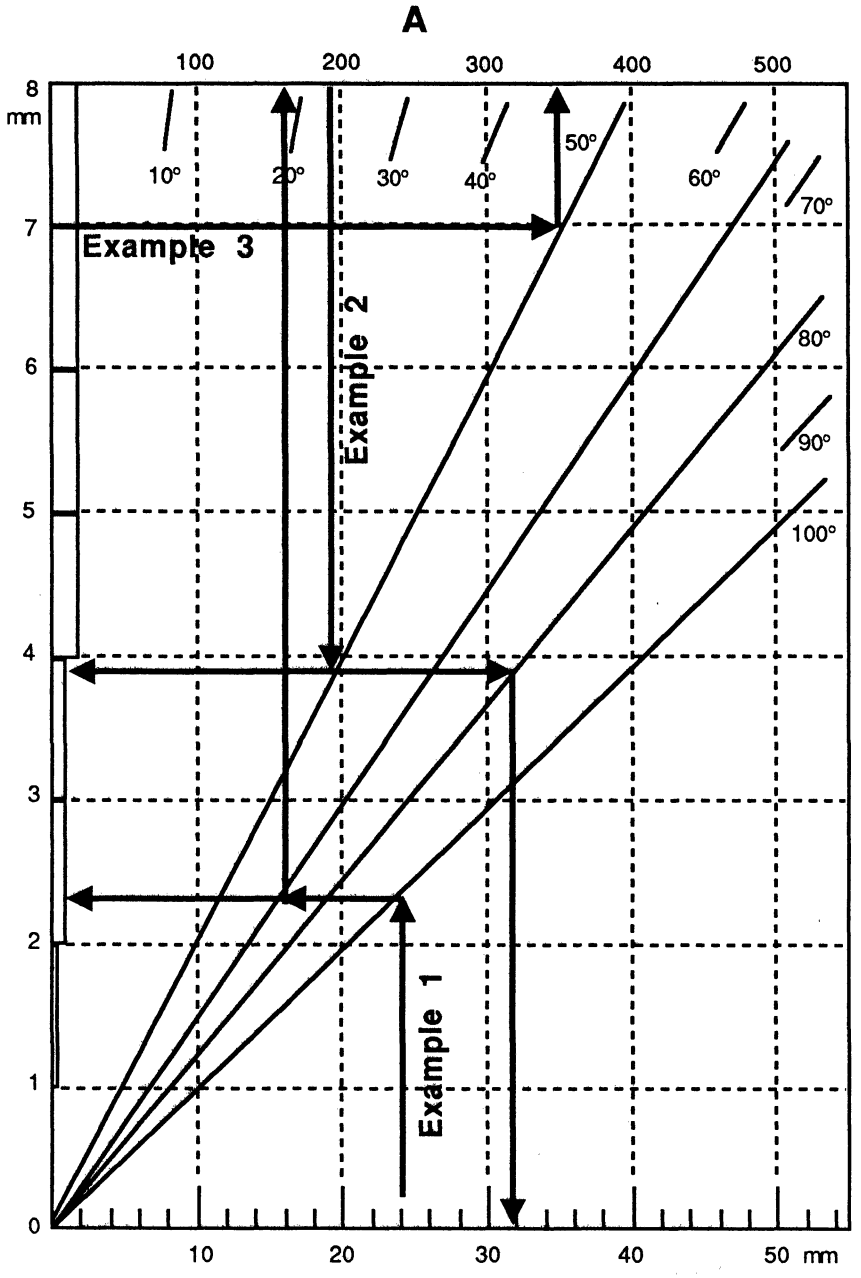

A
100
200
300
400
500
8
mm
7
6
5
4
3
2
1
0
10°
20°
30°
40°
50°
60°
70°
80°
90°
100°
Example 3
Example 2
Example 1
10
20
30
40
50 mm

Figure 1

The November Meeting

Mary Lou Whitehorne

Aurora's on Venus? presented by Dr. Harry Taylor

Venus has no intrinsic magnetic field but the interplanetary magnetic field is draped about the planet in such a way that it may contribute to possible auroral activity on Venus. The Pioneer Venus Orbiter has been observing the planet's electric field and its ionospheric density for the past eleven years. There is a very tight correlation between "ionospheric troughs" and disturbances in the planet's electric field. Interestingly, when one particular radio frequency shows these electrical disturbances, the other frequencies that Pioneer's ears listen to are very suppressed.

The widely accepted theory is that these observations are indicative of lightning on Venus. What Dr. Taylor proceeded to explain at this point were the inconsistencies of this theory. He demonstrated how certain assumptions about preferential clustering of these events were incorrect. There were other observations made that raised a number of not-so-easily answered questions.

Auroral activity in the atmosphere of Venus is one likely cause of the observed disturbances. Dr. Taylor would not, however, say that there is no lightning on Venus at all; or that there were definitely auroræ on Venus. Rather, he stressed the need for an objective examination of the data gathered so far. When an observation is made that shows a problem with accepted theories, the theory needs to be re-examined rather than ignoring the intruding observation altogether. The proper scientific method must be adhered to with no exceptions. If not, our fortress of knowledge will be built on shifting sand indeed. The consequences of irresponsible interpretation of data and hastily drawn conclusions are far reaching and potentially devastating.

Venus is a case in point, where there are two opposing schools of though as to what mechanism is the true cause of the observed atmospheric anomalies. Lighting or auroræ? As yet, the answer is not certain. Since our knowledge of the dynamics of our own planet's atmosphere are, at least partially, dependent on our understanding of other atmosphere's and comparative planetology, we had better be very sure that our interpretations are correct. We may not be given a second chance!

Joe's Messier Certificate

Our past president, Joe Yurchesyn, was presented with the Society's Messier Certificate in recognition of the fact that he has observed all 110 objects on Charles Messier's list of celestial objects. It is noteworthy that he tracked them all down with a 60 mm refractor - no small feat! Congratulations Joe!

Membership Certificate Awarded to Pat Kelly

This award is intended to honour "work in" and "achievement for" the R.A.S.C. and Pat Kelly is one member who definitely qualifies. Presented here is the citation nominating Pat for this award.

Pat has been a member of the R.A.S.C. since 1981 and has been actively involved for most of that time. Pat is deserving of a membership certificate for the following reasons:

- *has been editor of NOVA NOTES since 1984,*
- *volunteers time as a public lecturer at the Halifax Planetarium,*
- *speaks frequently at our public meetings,*
- *is actively involved with Astronomy Day,*
- *is an active observer,*
- *obtained his Messier Certificate using a 60 mm refractor,*
- *helps out with most other activities sponsored by the Halifax Centre,*
- *is a life member.*

By far the most outstanding service Pat provides for the Centre is editor of our newsletter, NOVA NOTES. It is without question one of the better "centre newsletters" published within the R.A.S.C. The style, format, content, quality and actual publication of this newsletter is due almost entirely to Pat's hard work as editor.

I believe that it has been demonstrated that Pat meets the qualifications of singular and well defined work which supports the objectives and goals of the R.A.S.C., as well as continuous membership for a minimum of five years. Therefore, on behalf of the Halifax Centre Executive Committee, I am pleased to nominate life member Patrick Kelly for a Membership Certificate.

Sincerely,
Mary Lou Whitehorne
Second Vice President
Halifax Centre, R.A.S.C. Ω

[Editor's Note: Since I have a few lines left to fill at the bottom of this page, I'd like to thank everyone who was involved in nominating me for this award. It came as a complete surprise to me, which made it even more enjoyable. I'm pleased that people feel that my efforts with NOVA NOTES are worthy of such high praise. However, without good articles, no editor can produce a good newsletter, so a lot of the thanks should go to all of those members who, over the years, have taken the time to write articles. Although I don't get the "thrill" of getting a new issue in the mail, I get as much fun reading articles that are submitted by mail, so please keep them coming!]

Venus: Evening Star *and* Morning Star?

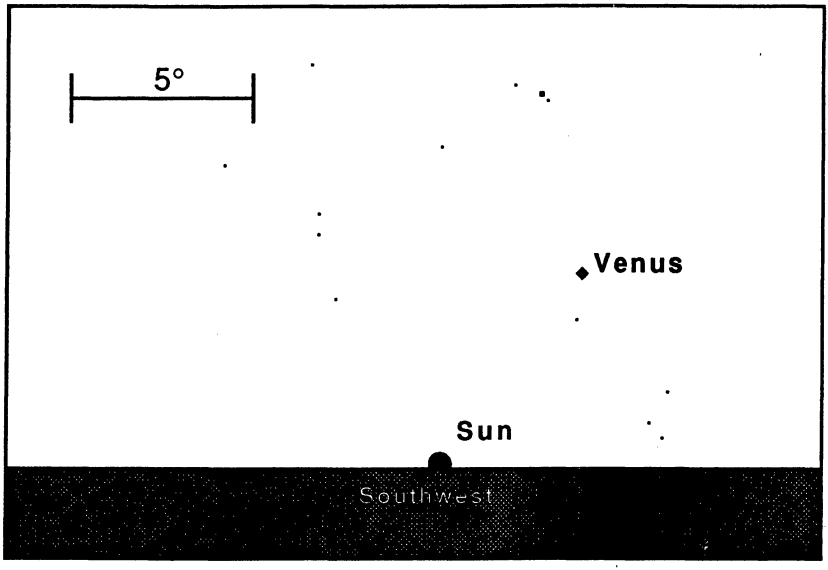
Dave Chapman

At some inferior conjunctions, Venus sets after the Sun in the evening and rises before the Sun in the morning. For several days, Venus is both an Evening Star and a Morning Star! The last time this happened was in April 1985 and it will happen again in January 1990. *[See Dave Chapman's Journal of the R.A.S.C. article in Vol. 80 No. 6 (1986); copies are available from the Librarian]* If you are interested in observing this:

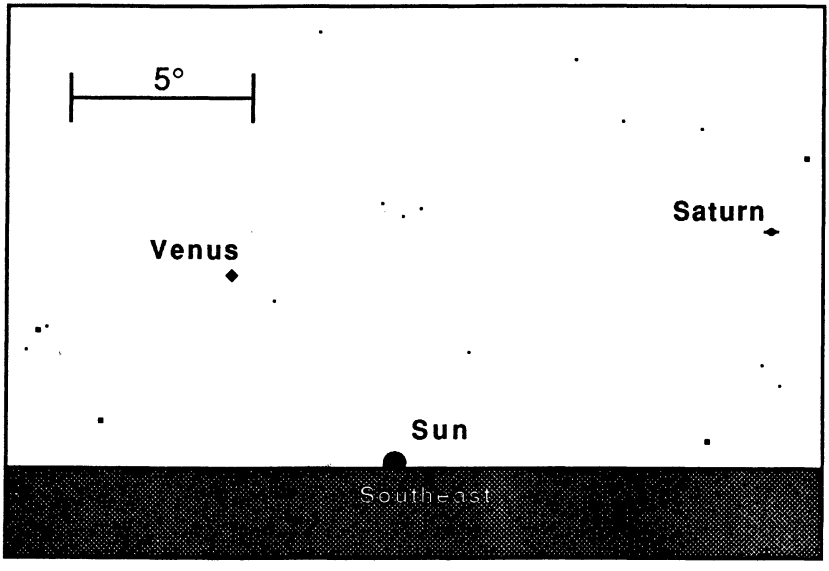
- Starting around January 14th, look for Venus low in the morning sky just before sunrise (about 8:00 A.M.) in the southeast, about four to eight degrees to the left of where the Sun rises.
- Until about January 21st, look for Venus low in the evening sky just after sunset (about 5:00 P.M.) in the southwest, about four to eight degrees to the right of where the Sun sets.
- Inferior conjunction (in Right Ascension) occurs at 10:16 P.M. Atlantic Standard Time on January 17th. On that evening, Venus will be about 5° above the horizon and 4° to the right of the Sun at sunset. The "evening star" will set about thirty minutes later. Venus should appear as an extremely narrow crescent. The next morning, Venus will be about 5° above the horizon and 4° to the left of the Sun at sunrise, with Venus rising about thirty minutes before the Sun. (See the diagrams on the opposite page.)

I would like to hear about your observations of Venus during this period, especially dual observations of Venus as Morning Star and Evening Star. Please record the date, time, observing location, viewing conditions at the horizon, instrument and any comments. Send them to: David Chapman, 8 Lakeview Avenue, Dartmouth, Nova Scotia, B3A 3S7, telephone: (902) 463-9103. Who will be the first to see Venus as a Morning Star before inferior conjunction? Ω

Astro Ads



Venus at sunset, January 17th, 1990



Venus at sunrise, January 18th, 1990

Ask GAZER

GAZER

I've finally convinced your editor to allow me some space in this rag to help out those of you who have not yet reached the same level of consciousness that I have attained in astronomical stuff. Far be it from me to point out to others the error of their ways, but since this is an advice column I might as well tell it like it is. Now, let's get started by reaching into the mail bag and seeing what we've got...

Dear GAZER:

This Christmas I asked for and got a 400x50 ACME refractor utilizing state of the art optical plastic, on a deluxe lightweight ball and socket alt-azimuth mount. (They even included a solar filter at no extra charge!) My problem is that the scope came unassembled and it is still in pieces because the instructions have no pictures and are written in Japanese. What should I do?

Confused amateur astrologer

Dear confused:

Boy, is your name appropriate, or what! The only reason I'm replying to your letter at all is on the assumption that the "astrologer" bit was just a slip of the crayon. Well, I've got a few things you might try. You could try to learn Japanese, but this would serve no useful purpose since every set of *English* instructions that I've ever gotten with Japanese equipment proves that something is always lost in the translation!

The next thing to try is to attempt to put the telescope together by instinct. Even if you should get all of the parts together, you aren't going to end up with a useful telescope. This leaves you with one of two choices. The first is to try and return it to the store where the ~~pigeon~~ person who brought it for you got it and try and get the $9.99 back. Keep in mind that they will not reimburse you for what was paid for it, but for what it is worth. The last choice is to use a band saw to cut open the optical tube and use it as a planter. The other parts can be put to various useful purposes; for instance the tripod can be used to make a nice lawn ornament!

Well, that's about it for this issue. If you've got questions that need answering, just send them to the centre address or the editor and be sure to mark them as being for the "Ask GAZER" column. I'll get 'em and reply as soon as possible. Write now, while you still have that question in your head! No question is unanswerable! Ω

Heaven is Hotter Than Hell

reprinted from **Astronomy London** - London Centre

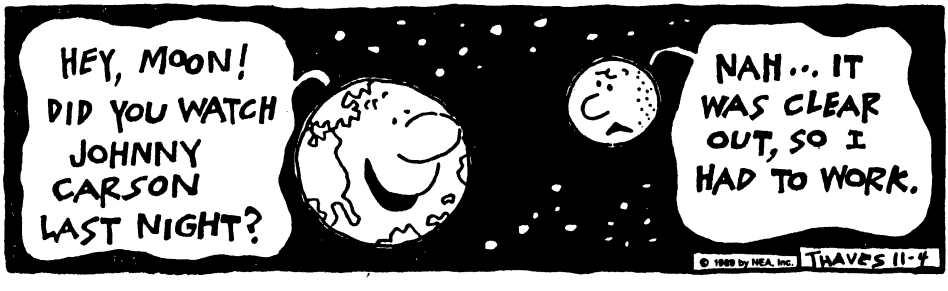
The temperature of Heaven can be rather accurately computed from available data. Our authority is the Bible. Isaiah 30:26 reads: "Moreover the light of the Moon shall be as the light of the Sun and the light of the Sun shall be sevenfold, as the light of seven days." Thus Heaven receives as much radiation from the Moon as we do from the Sun and in addition, seven times seven as much as the Earth does from the Sun, or 50 times in all. The light we receive from the Moon is 10^{-4} times of the light that we receive from the Sun so we can ignore that. With all this data we can compute the temperature of Heaven. The radiation falling on Heaven will heat it to the point where heat received by radiation is equal to the heat lost by radiation. In other words, Heaven loses 50 times as much heat as the Earth does by radiation. Using the Stefan-Boltzmann 4th power law for radiation:

$$\frac{H^4}{E^4} = 50$$

where H is the absolute temperature of Heaven and E is the absolute temperature of Earth. Since E = 300 K, this formula yields H=798 K.

The exact temperature of Hell cannot be computed but it must be less than 718 K, the temperature at which brimstone, or sulphur, changes from a liquid to a gas. Revelations 21:8 says "But the fearful and unbelieving... shall have their part in the lake that burns with fire and brimstone". A lake of molten brimstone means that its temperature must be below the boiling point of 718 K.

We have then, that the temperature of Heaven is 798 K while the temperature of Hell is less than 718 K. Therefore Heaven is hotter than Hell! Ω



Yor Heavenly Constipations – Yor Eye On

H. Healy

reprinted from **Astronomy North** - Sudbury Astronomy Club

Hi there! This month, I'd like to begin with the constipation of *Yor Eye On*. You know *Yor Eye On*, it's that big sonofagun of a winter constipation that lies jest west of yor prime muriderin, after the sun has given up its holy ghost. Since I ain't much at drawin', I axed my son Ian to sketch it up so you can git the gist of what's up. *Yor Eye On*, commonly called *The Hunter*, is made up of a hole bunch of interestin stars an stuff. I'd like to take you on a little toor, startin and commencin at the beginnin at the top left and gallyvantin in the same direction as yer clockwork orange.

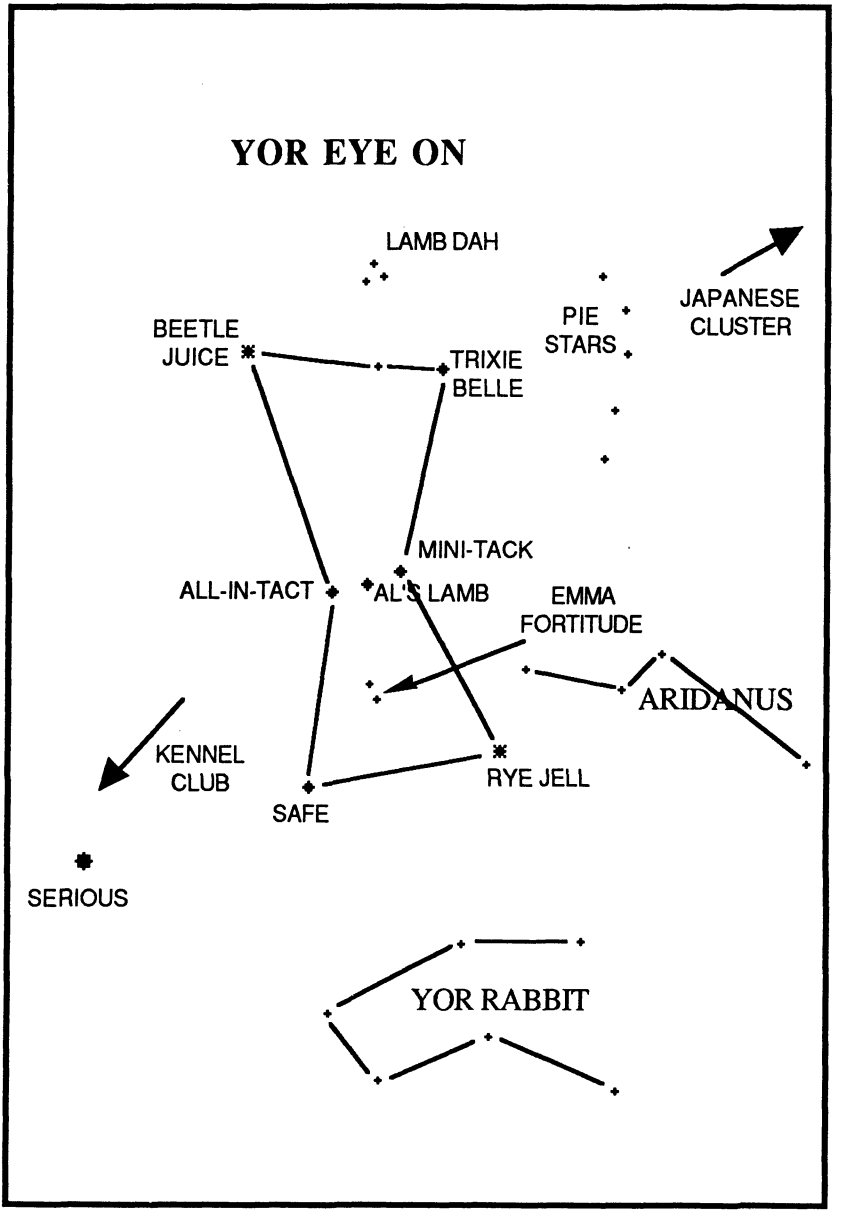
The first star, what makes up one should of the big guy is called yor *Beetle Juice*. It's one of your Giant Reds. After that is three little stars called yor *Lamb dah*. It's the head of the hunter you no! Next is yor other shoulder called *Trixie Belle*. Another big'un.

You'll notice three stars all lined up like for the firin' squad. This is the part of the hunter what holds up his britches called the belt stars. In order they are *All-in-tact, Al's Lamb* (you no Al, our Al) and your *Mini-Tack*. If you draw a maginary line along the belt to yor right you point to the Japanese Cluster called yor *Subaru*. but if you are a real *Serious* observer, you'll look along the belt in the t'other direction. I've heard that over there you'll find yor Kennel Club with a hole bunch of dog-type stars, big and small alike.

Getten back to *Yor Eye On* and again moving as the clock, you come to a big bright star called yor *Rye Jell*. That's the left knee of the hunter. Over on the other side you'll come to *Safe*. *Safe* is the right knee.

Iffen you look under the belt we see what appears to be three stars pointin' straight down. Commonly called the sord of *Yor Eye On* Now it turns out that the middle star ain't a real star after all, it's one of your gassey nebulas, going by the name of *Emma Fortitude*. She must be the den mother up there. Here is where us stronomers beleaf new stars is a nursin'. I here tell from my friend Enos, on the next concession, that there's a trapeze up there launched by them Mericans on their Polo Missions back in the 60's. Great thing about the sky is you never no what's up.

Over to the right of *Trixie Belle* is a loop of six tiny stars wich form a shield for the hunter. These are called your pie stars. Gess they was put there to feed that big guy on his huntin trip. Though these stars ain't got no names I kinda figger they're called apple, rasberry, strawberry, lemon, raizin and peach. Ω


YOR EYE ON
LAMB DAH
JAPANESE CLUSTER
PIE STARS
BEETLE JUICE
TRIXIE BELLE
MINI-TACK
ALL-IN-TACT
AL'S LAMB
EMMA FORTITUDE
ARIDANUS
KENNEL CLUB
RYE JELL
SAFE
SERIOUS
YOR RABBIT

NOVA NOTES INDEX

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