NOVA NOTES

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THE NEWSLETTER OF THE HALIFAX CENTRE OF THE RASC
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NOVA NOTES, the newsletter of the *Halifax Centre of the Royal Astronomical Society of Canada*, is published bi-monthly in January, March, May, July, September, and November. The opinions expressed herein are not necessarily those of the *Halifax Centre*. Material for the next issue should reach the editor by **March 20, 1992**. Articles on any aspect of astronomy will be considered for publication. "Letters to the Editor" or to our resident expert: "GAZER" are also most welcome. The editor can be reached at:

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Inside This Issue...

Editor's Report: by David Lane

As you will have noticed by now, the format of NOVA NOTES has changed significantly. This is in part because of the new editor, but as was mentioned in the last issue, we had to abandon the old "half-page" format because of printing changes imposed by the Nova Scotia Museum.

The format of this January/February issue represents a "first-cut" of the new format. Consequently, there will be some format changes over the next few issues.

In the last issue outgoing Editor, Pat Kelly, wished me luck in performing my assigned duties using a "only" a DOS computer. I can assure him that even *he* would be at home with "Microsoft Word for Windows", the word processor now used to prepare NOVA NOTES. It is a close cousin of the version of "Word for the MAC" which he has used to prepare NOVA NOTES all these years.

With that aside, we should all be proud of and thank Pat for the work he has done on NOVA NOTES. It has placed the *Halifax Centre* "a notch up" in the minds of other Centre's across Canada. I hope I can maintain the same high standards.

But, as with any newsletter, it is only as good as the articles which the editor receives. This is your newsletter, so please take some time to write an article. As this issue goes to print, I'm almost fresh out of material. So, please send me articles! Ω

Outgoing President's Report: by Mary Lou Whitehorne

Our Centre has had a busy year with lots happening; both good and not so good. The economy has been less than stellar this year leading to a drop in Handbook sales for us as well as the Society as a whole. This loss of revenue for us, coupled with suddenly having to pay for Nova Notes printing has been hard on our bank account. But our dedicated treasurer Nat Cohen and 1st VP Joe Yurchesyn have kept us from spending foolishly and we are well in the black for this year at least. So far we have avoided adding a surcharge to membership fees and let's hope that we can continue this way.

The Centre has enjoyed a year of interesting meetings with a good variety of speakers to enlighten and entertain us - not the least of which was our own Pat Kelly with a fascinating and very memorable (and slightly off-center) look at Venus. We hosted a reasonably successful Astronomy Day in April and a highly successful Nova East in August. Unfortunately there has been little observing done because of the abysmal weather this year. But we do have a new and better observing site at Dollar Lake Provincial Park, thanks to the efforts of Dave Lane and Peter Edwards. This site will lend itself very well to public observing sessions and we hope to host a couple next summer.

An assortment of other events took place this year: a couple of us did TV shows for a local cable TV station. We've had a few radio and TV interviews relating to astronomy and light pollution. Our members have

been to the GA, to Stellafane and to the Big Eclipse in Hawaii and Mexico. We have a new and comprehensive Centre Constitution. The annual banquet in May was well attended and nobody left feeling hungry. We have been active on a national level, too, with plenty of input into the issues of light pollution, Project Gemini, membership survey, the Society's seal, the Simon Newcomb Award, Handbook pricing policy, membership fees, etc. We have set up a special fund to sponsor a science fair award. Thanks to Dave Lane, the national CBC TV children's consumer show "Street Cents" featured an item about the pitfalls of department store telescopes. A few of us have been giving talks to school classes and to various other community groups as a volunteer service.

The *Halifax Centre* continues to provide the Nova Scotia Museum with most of the volunteer speakers for the Halifax Planetarium. Several of our members have banded together, first as a Centre Committee, and then as a separate corporate body (Nova Scotia Planetarium Advisory Committee or NSPAC) to promote the establishment of a major planetarium facility in the province. They are making progress, too!

Last but not least, we will be hosting the 1993 Annual General Assembly at Mount Saint Vincent University in July of that year. Its something to look forward to and a great chance for our Centre to really show our stuff!

All in all, a pretty impressive report card for the *Halifax Centre*. I think we have done a pretty good job of upholding the RASC's aims and objectives of promoting astronomy and related sciences. We have a wonderful bunch of astronomy buffs here and their tireless efforts have made our Centre the vibrant and active body that it is today. We owe them all a vote of thanks.

It has been a great pleasure and honour for me to serve the *Halifax Centre* as President for the last two years. I look forward very much to an enjoyable and active 1992 with Pat Kelly at the helm. Congratulations Pat; I know you will do a great job! Quo ducit Urania! Ω

Incoming President's Report: by Patrick Kelly

I have heard from our new editor that our "old" president has already submitted an article of considerable length to this issue of NOVA NOTES. Thus, my report will be rather short.

As you will read in the Notice of Meetings section, **Terrence Dickinson** is coming to Halifax! As a result, we have moved the date of the April meeting. I expect that we will have a good turnout as the **Discovery Centre** is going to be handling the publicity for his visit.

Hopefully by this time, you will have already read about the new "mini-handbook" in the February issue of the BULLETIN. I am on my way to Toronto tomorrow (the 14th of February) for a National Council meeting and will be bringing back about fifty copies. We expect to be selling them for $6.35 (G.S.T. included).

In other news, the *Nova Scotia Planetarium Advisory Committee (NSPAC)*has been very busy lately. This group has just sent out "requests for proposals" to conduct a feasibility study on whether or not the Halifax area can sustain a major planetarium. Once a firm has been chosen to do the study, the process of obtaining the necessary funding for the study will commence in earnest.

Lastly, having seen a prototype of the new format for NOVA NOTES, I want to congratulate Dave on the new look. I think that you will find it most readable. (Sort of looks like the BULLETIN, doesn't it...) Ω

The Quadrantid Meteor Shower: by Paul Gray

The Quadrantid meteor shower has been very unpredictable over the past 30 years, with anywhere from 10 to 250 meteors per hour being reported. The peak of this shower is very short in duration lasting at maximum a couple of hours with the 1/4 period strength lasting just short of a day. For these two main reasons, if the shower is not observed under almost ideal conditions, it could be missed altogether.

On the night of January 3-4, 1992, astronomers in Nova Scotia were lucky since nature provided clear skies with a new moon. The peak was predicted to occur at 2am local time (0600UT). The only flaw was that the radiant was only 20° above the horizon as late as midnight local time.

The evening began with a couple of quick calls to Dave Lane and Pat Kelly to spark their interest in observing this illusive shower. The three of us arrived at the Beaverbank observing site by 11:20pm not knowing what to expect. Upon arrival, the sky was cloudy but thin enough to see the brightest stars though which convinced us to wait. At 11:50pm, the sky had cleared well enough in the north-east sector such that the observing could begin.

We did not expect to see much at first because the radiant was so low and it was about two hours away from the predicted peak.

The observations commenced at 0400UT and were as shown in Table 1.

TIME (UT)	#OBSERVED
0400-0430	12
0430-0500	12
0500-0530	13
0530-0600	25
0600-0630	34

Table 1 - Observations

As one can see, we spent a full 2.5 hours observing on a cold Canadian winter night, but it was well worth it. The skies were mainly clear for the rest of the session except from 0449UT to 0500UT, when some high haze blew over cutting the minimum magnitude to about +4.5. Also, from 0500 to 0514, large patches of cloud blew over and we thought that was it for the night. Fortunately, the sky cleared again, however, we used the

break time to rest our eyes and drink some coffee.

During the hour centered on 0600UT, we saw a total of 59 Quadrantid meteors! Many sporatics were also observed, but were not recorded in the official count.

The session was good fun, considering all the bad weather that we have had lately, and it was especially nice to have a low temperature of only -5 °C. The minimum visual magnitude (MVM) was found to be +5.8 by using the chart from the Observer's Handbook, which was corrected to +5.9 for the zenith.

The '92 Handbook predicted a Zenithal Hourly Rate (ZHR) of 47 meteors per hour for this shower. This was easily surpassed by the 59 meteors that we observed in the last hour of observation. Each observer probably saw about 50 of these because of the overlap of our viewing sectors. To see this many, even when the radiant was, at maximum, 35° above the horizon, one can only assume that the peak must have been very strong indeed. By using the number observed, and data from the Handbook, the calculated ZHR for the hour would have been 92 (assuming that the observer is under dark skies with a MVM of +6.5).

$$\#EXPECTED = \frac{ZHR}{2.1^{0.6}}$$

$$SEEN\ 59 = \frac{ZHR}{1.56}$$

$$\therefore ZHR = 92$$

Figure 1

As time wore on, we started to get cold and tired, so it was to decided to stop at 0630UT. This may have been a bad decision. In the last 15 minutes, we observed 21 meteors. If that rate was sustained, we would have observed 84 for the last hour, which would have put the ZHR at 131 meteors per hour! Also, the 92 Handbook lists the peak time at 0600UT, which disagrees with the January '92 issue of Sky and Telescope listing the peak at 1000UT. It would have been nice to see which was correct.

We feel that the observing session was a success and we plan to do it again in the future when the conditions are right. As far as we know, no one else successfully observed the shower, so our best guess is that the peak was at 0630UT, only a half hour after predicted. The other possibility is that the peak was much later and that we missed a spectacular show that few people would have observed. *(Editor's Note: I made some inquiry's about the weather across North America using the Compuserve Network and found that most of North America was clouded out. Given the short peak duration and the timing of the peak, it is quite likely that we were the only observer's of the event. Other continents (Europe, Australia,and Asia) would have been in daylight during the peak.)* Ω

The Celtic Calendar - Then and Now: David M. F. Chapman

I have been doing some research on calendars and holidays, concentrating on connections with astronomy. It turns out that there are special days of the year that originated long ago with the Celts, yet linger on in our modern calendar, sometimes in altered form. The Celts divided their year into quarters based on the movement of the Sun in the sky from season to season. The *quarter days* were the Vernal (or Spring) Equinox (March 21), the Summer Solstice (June 21), the Autumnal (or Fall) Equinox (September 22), and the Winter Solstice (December 22). The *cross-quarter days* were halfway between these dates and further divided the year into eighths; these days were February 6, May 6, August 7, and November 7. (All these dates can vary plus or minus 1 day from year to year.)

How do these dates from the Celtic calendar correspond to today's calendar? Most of us are familiar with the concept that "Christmas (December 25) is really a Pagan festival" celebrating the Winter Solstice. The Roman mid-winter festival, Saturnalia, began around December 19. The longest night occurs earlier on St. Lucy's Day (December 13). Even New Year's Day (January 1) was moved there from March by Pope Gregory to roughly coincide with the solstice. In the Christian calendar, Candlemas (February 2) - called Groundhog Day in North America - occurs near the first cross-quarter day (February 6). St. Patrick's Day (March 17) occurs near the Spring Equinox (March 21), as does the Feast of the Annunciation (March 25). The latter was a traditional rent-collection day in England, as were the other quarter days, and may explain why the early English settlers in Halifax celebrated New Year's Day on March 25.

May Day (May 1) is the relic of the Celtic festival Beltane, with strong images of fertility and growth, coinciding nearly with the second cross-quarter day (May 6). We set our clocks ahead on the last Sunday in April.

Latter-day "Druids" still celebrate the Summer Solstice (June 21) at Stonehenge by watching the Sun rise in alignment with the stones. Midsummer is celebrated in some parts of Europe with bonfires on St. John's Eve (June 23). I witnessed this myself during a trip in Ireland in 1980. This bring's us to St. John's Day (June 24) or St-Jean-Baptiste in Quebec, a well-known excuse for a week-long party. Of course, those incorrigible spoiled-sports, the English, insisted on collecting the second quarter's rent on this day. Could this be at the root of the French/English question?

The Celtic harvest festival Lammas (August 1) occurs near the third cross-quarter day (August 7). In most of Canada we have a civic holiday on the first Monday in August; we celebrate the Halifax and Dartmouth "Natal Days" with fireworks at this time of year. In England, the first Monday in August used to be a Bank Holiday; this has been moved to the end of the month to reduce the carnage from holiday traffic on over-crowded motorways.

Curiously, there seem to be no important festivals or holidays associated with the Fall Equinox (September 21). However, the fourth cross-quarter day (November 7) has lots of company: Hallowe'en (October 31); All Saint's Day (November 1) which is Samhain, the Celtic festival of the departing sun; the bonfires and fireworks of Guy Fawkes Day (November 5); and Martinmas, or Remembrance Day (November 11). To top it off, we set back our clocks on the last Sunday in October. That completes the year, and the list of holidays that I know of. If anyone has any days to add, I'd be pleased to hear from you. I'll leave it up to you to decide whether these coincidences between the ancient Celtic calendar and our modern calendar are due to pure chance or have some basis in tradition. In my opinion, it is quite possible that we continue to recognize these days of the year for reasons that we forgot long ago. Ω

Observing Geosynchronous Satellites: by Joe Yurchesyn

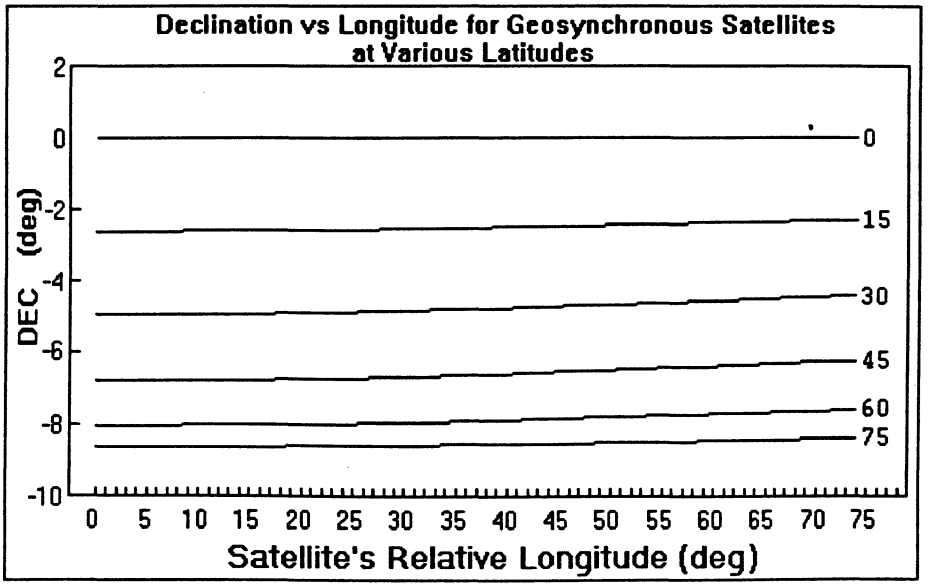
While observing near Sydney with John Fraser and John Reppa, both of the *Cape Breton Astronomical Society*, John (Fraser I believe?) happened to notice a flashing star in the vicinity of the Orion Nebula. Surprisingly, this star failed to drift with the other stars! He had accidentally stumbled upon a geosynchronous satellite, with light fluctuations ranging from less than 15th magnitude to 7-8th and 10-11th magnitude, in a seemingly periodic fashion.

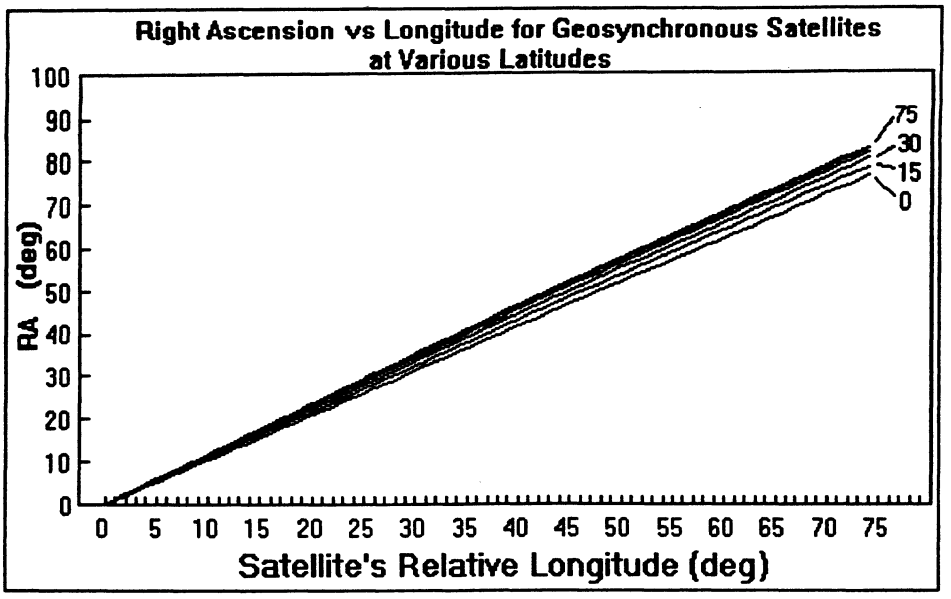
It was estimated that the satellite passed just south of the Orion Nebula at 10:17 AST on December 30th, 1989, from an observing location of 46° 11.15' N Latitude and 60° 11.25' W Longitude. From this information, its observed Declination and hour angle were determined to be at -5.5° and 0h45' east. After some simple geometry and trigonometry using these numbers, I determined the satellite to have a longitude of 50.1° west; placing it over the mouth of the Amazon river, if it was assumed to be above the equator. Working foreword from this longitude predicted an observed Declination of -5.9°, as opposed to the observed -5.5°. This 0.4° discrepancy could be explained by observational error and an inclination in the satellite's orbit, which would cause drift in Declination. The satellite would draw out an miniature analemma as it orbits.

A short time afterwards, I discovered an article in S&T (June, 1986, pp. 606-607) on Observing Geosynchronous Satellites. The theory presented, calculates the observed position of the satellite in Declination and Right Ascension, given the observer's latitude, longitude, and the longitude of the satellite. Working foreword from this information is shown to be very simple and straight foreword. (I refer the reader to this article, for the details which were used to calculate the results given later in this article.) As I already knew the Declination and Hour Angle, working backwards was found to be considerably more difficult. Using a trial and error approach and my earlier estimate of 50.1° east for the satellite's longitude, gave a Declination of -6.9°, and an Hour Angle. of 0h30' east. This discrepancy (1.4° in Declination, and 15' in Hour Angle (~3.75° in Right Ascension)) was larger than expected, and greater then my estimate of the observational error?

In an effort to solve this dilemma, I calculated the Declination and Hour Angle for satellites placed at various longitudes, and for various observer latitudes. In all cases, the satellite is assumed to be directly over the equator. The results have been graphed and are shown on the accompanying charts. These charts make it very easy to calculate backwards from a Declination and Hour Angle observation to determine the longitude of the satellite. The Hour Angle is found to be very linear, being close to the difference in longitude between the observer and the satellite, except in the case of very large longitude differences. The Declination is found to be primarily dependent on observer's latitude, and nearly constant relative to longitude; the parallax being a little greater for small longitude differences.

This was an interesting result, but did nothing to solve the position discrepancy. The only practical solution was to assume that the satellite did have a highly inclined orbit. This seems like a convenient fudge, but there was another observation supporting this hypothesis. When another observation of the satellite was attempted at 11:15, it was not found!





Geosynchronous satellites undergo two annual periods of daily eclipse, occurring near the equinoxes (February 27th - April 12th, and August 31st - October 16th) . While the start of the spring eclipse season was nearly two months distant, a satellite with a more inclined orbit could undergo eclipses during a period offset from the normal periods. I have not attempted to observe this satellite again.

The location charts accompanying this article allow easy location (and hence observation) of geosynchronous satellites. Ω

Starfest Optical Quality Survey:

by Andreas Gada and Effie Ginzberg reprinted from **Astrotent**, the newsletter of the *North York Astronomical Association*

The quality of commercial optics is one of the hottest topics in the astronomical community today. What level of precision is required to give satisfactory results for various types of astronomical uses? Can the average amateur astronomer distinguish good optics from poor? What is the state of commercial optics? In keeping with the interests of their audience, the *North York Astronomical Association* attempted to address these questions by conducting an optical quality survey at their annual observing convention. STARFEST '90 was held August 17th to 19th at the River Place campground near Mount Forest, Ontario, Canada. It attracted over 275 astronomy enthusiasts from Ontario and the United States.

The survey was conducted in two parts, a self-completed questionnaire and an actual optics testing component. During Saturday afternoon, presentations on this topic were given by Terrence Dickinson, Peter Ceravolo, and Andreas Gada. Terrence gave some guidelines for visually assessing the quality of optics based on what experienced observers, using good optics, have been able to see. Peter described the opticians approach to assessing optical quality and showed some test results. Andreas outlined how the survey would be conducted and walked the audience through the questionnaire as they filled it in. The intent of this questionnaire was to collect information about the telescope (manufacturer, size, type, when purchased, etc.), the observer (experience, type of observing done), and the observer's perception of the optical quality of his telescope. By relating this information with the test results obtained in the optical testing the organizers hoped to gain some insight into optical quality issues. In addition, the organizers wanted to gauge participants reaction to the survey and the optical testing.

It was cloudy that night, so after renowned comet hunter David Levy concluded his talk - to a standing ovation by his "Home Town Crowd" - an announcement was made that the optical testing would be conducted that evening instead of the next morning.

People scurried to their campsites and returned moments later with their telescopes, each trying to be the first in line. The tent now took on a different appearance - that of an Optician's waiting room with the "patients" cradling their pride and joy in their arms. A hint of anxiety hung in the air. At the front of the tent was the optical bench consisting of a 17" optical flat, a Ronchi tester with a 100 line per inch grating, fixtures to hold the telescope and tester in place, and a TV monitor and video camera to enable everyone to see the test results for themselves.

Peter addressed the crowd; "What we are going to do this evening is examine a number of telescopes using the double pass autocollimated Ronchi test. Since this test does not easily yield quantitative wavefront quality no wavefront ratings will be made. The test interpretation will be purely qualitative based on my experience. As an Optician I have used this technique to test many telescopes and the best that can be done is to isolate good telescopes from poor ones. I will comment on any defects seen through the tester and the possible effects these defects would have on different type of observing." With those remarks the first telescope, a 8" SCT, was placed on the optical bench.

After aligning the Ronchi grating and scrutinizing the image, Peter moved the video camera in place. The tent which had been buzzing with the conversation of 150 people fell silent as the first image appeared on the screen. Peter walked over to the monitor and pointed out the features on the Ronchi bands that formed the basis for his remarks. The sensitivity of the double pass autocollimated Ronchi test made it easy for everyone to see these

Summary of the Optical Testing Results

SUPERB	7" AP Starfire	-ronchi bands were razor sharp
	Televue Genesis	-ronchi bands were razor sharp
	Celestron C70	-overall image was clean
	Celestron 5	-smooth wave front
	(two tested)	-good overall correction
		-no edge defects.
GOOD	Cave 6" f/8	-a good wave front
	Edmund 6" f/8	-overall good correction
	Coulter 8" f/4.5	-straight edge
	Coulter 10" f/8	-straight edge
ACCEPTABLE	Celestron 8	-edge roll
	Meade 8 & 10 SCT	-zonal errors, roughness
	Celestron 90	-a lot of colour.
		-curvature, not completely corrected
POOR	Celestron 14	-severe roughness (two tested)
	Galaxy 10" f4.8	-spherical aberration
		-unacceptably undercorrected
		-high in the centre of the mirror
	B & L 5" f/5	-rough surface
		-edge roll and zonal errors
	Criterion 8	-very rough wave front
		-edge roll and zonal errors
		-spherical abberation

features. As Peter made his comments, Andreas recorded them.

This procedure was repeated many times during the 4 hour, 22 telescope marathon. After only a few telescopes, the audience was able to distinguish good optics from poor and the "armchair" opticians began to actively participate in the testing by trying to anticipate Peter's remarks.

The highlight of the evening came when a 7" Astrophysics Starfire was placed on the bench. The atmosphere was incredible, you could have heard a pin drop when the image finally appeared on the screen. The ronchi bands were razor sharp. The overall image was clean. When Peter announced that the optical system had excellent spherical correction the audience broke out in spontaneous applause.

Unfortunately not all telescopes proved to be as good as the Starfire. The two Celestron C14's tested were unacceptably rough. Superimposed on an overall good wavefront correction were concentric sharp narrow zones that covered the whole aperture. These rings made the optics look like a very rough phonograph record. It appeared that the two C14's optics set were made at the same time since they looked alike except one had edge roll as well. Such optics would be unsuitable for high contrast observing required for planetary work. This was not the first time Peter had seen such defects in a SCT. You could see the disappointment, both on the face of the owner and the dealer. Even the audience was sympathetic.

Considering the reputation of Galaxy Optics, the surprise of the night for many people was an unacceptably undercorrected 10" f/4.8 Galaxy mirror. Curvature in the bands were clearly seen, even when there were three bands spanning the aperture, revealing considerable undercorrection. The difference in focus between the centre and edge zones was easily measurable (it shouldn't be at f/4.8) and the wave front quality could have been approximated had time permitted.

Of the 22 telescopes tested that night, the 3 "new generation" refractors, a 7" Astro-Physics, a 4" Tele Vue Genesis and a Celestron C70, were rated as the best. Clearly, these examples of the new generation of refractors live up to their advertising.

Next came two "vintage" Celestron C5's SCT's. These telescopes generated a great deal of discussion as people tried to determine why these two telescopes were so much better than their bigger brothers. One person who had used several of these telescopes in the mid 1970's suggested that these scopes may have been manufactured during this period. At that time, for this particular model, the optics produced were superb. Since both telescopes had been purchased used, it is possible that they were manufactured in the mid 70's.

Newtonian telescopes manufactured by Cave, Coulter and Edmund Scientific were rated as good. These displayed good wavefronts, straight edges and had good overall correction, with one exception; a 10" f/8 Coulter mirror appeared astigmatic. This perplexed Peter at first, since the Ronchi test was only sensitive to spherical aberration, yet he was seeing signs of gross astigmatism which might be brought about by severely pinched optics. On questioning the owner Peter discovered that the mirror was fastened to a plywood mirror cell without proper support.

The C8's, C90, and the Meade 8" telescopes tested were rated as acceptable. All of these telescopes displayed some type of defect, edge roll, zonal error, and/or roughness. And in the case of the C90 a lot of colour.

The two Celestron C14s and the Galaxy 10" optics were rated as poor. The Bausch and Lomb and the Criterion Dynamax 8 telescopes were the worst telescopes tested. These telescopes displayed rough surfaces, rolled edges, zonal errors and in the case of the B&L 5" f5 a nearly spherical mirror.

A complete listing of the telescopes and their ratings are presented in the accompanying table. These results were consistent with Peter's past experience in optical testing; the telescopes ranged from

very good to very bad, among the Schmidt-Cassegrains, there was no consistency.

One of the scopes tested which does not appear in the table was one that Peter had refigured. A visible sigh of relief appeared on Peter's face when it displayed a good wavefront, straight edge and good overall correction.

It was 2:00 AM when the last telescope was tested. It had been an incredible evening, an astronomical first. Clearly a success! Optical testing using optical bench techniques can successfully be conducted in the field in front of a large audience. As Richard Berry, formerly of Astronomy Magazine, put it when he first heard of this event, "You're going to make optical testing a spectator sport!"

The self completed questionnaire results also had some interesting findings. The typical amateur astronomer has been observing for 6 years, owns 2.1 telescopes and makes telescope buying decisions based first on reputation, then on features and lastly on price. Observing time is equally split between deep sky and planetary. The next most popular observing activity was lunar followed by astrophotography. The least amount of time was spent observing the sun, double and variable stars.

All of the 43 people who completed the survey felt that manufacturers should provide some form of universal standards by which their telescopes could be evaluated and compared. Given that the average cost of their telescopes was $1800 and that the average cost of all their astronomy equipment was close to $4000 per person, it is not surprising that people wanted assured value for their money. As put by one scope owner whose optics were not up to their advertised quality, "I'm glad someone is addressing this issue. Fortunately my loss was minor financially, but this could be a big problem for those with 10" scopes who are making a significant investment."

When asked, "How much more are you willing to pay for certified optics", people indicated that on average they were willing to pay around $300 more. However, six people said they were not willing to pay extra for certification. As one person put it, "This is a cost of business which should be part of quality control. Why should I pay to have the manufacturer certify he did what he already was supposed to do anyway." The majority of people said they were willing to pay an extra $51 to $500 for certified optics and two people were willing to pay over $1000, if "certification was independently done and not by the manufacturer, and as long as the optics were certified as good or excellent."

One of the comments received sums up most respondents feelings, "Product quality must comply with some minimal independently assessable standards. This should expedite consumer disputes and benefit those manufacturers whose products deserve it. I think it is fair to say that most buyers would expect a mirror to be produced to a higher standard than they themselves could make. Further, consider the plight of foreign buyers (a lemon in Australia is an ugly predicament). Of course the makers could advertise lower standards, then there might not be disappointment."

To determine if the average observer could distinguish good optics from poor and to identify what level of precision is required for various types of astronomical uses, two questions were asked in the survey, "Based on your experience how satisfied are you with the overall optical performance of your telescope?" and "Please explain why you answered the way you did." Based on the nine telescopes for which there was corresponding optical test data these are the results.

Six people indicated that they noticed some type of image degradation, they could not get sharp planetary images, they were not able to bring stars to a sharp focus. Their telescopes were rated as acceptable or poor during the optical test. Two people said they had good stellar and planetary images. Their scopes had been rated as superb. Only one person out of nine had a subjective evaluation of their telescope that was inconsistent with the optical test results. This person said he got, "nice tight star images, even under high power", yet his telescope's optics (Galaxy Optics 10", f4.8) tested out as poor. Upon further consideration by Peter it was noted that the mirror exhibited under corrected spherical aberration which is a lot less disastrous in terms of image quality when compared to overcorrected mirrors or optics suffering from zonal aberrations.

Based on these results one can conclude that the average amateur can distinguish really good optics from poor, and that optics free of defects (those rated as being superb) are required for detailed planetary observing. Astrophotography on the other hand is a lot more forgiving. The Dynamax 8, the worst scope tested, has been used for years by Mike DeVillaer to do some exquisite deep sky astrophotography. What level of precision is required for Deep Sky work could not be determined based on the limited data. However, it is interesting to note that people who indicated that deep sky observing was their most frequent activity tended to rate their scopes lower than people who did other types of observing more frequently. Further investigation is required.

There were other factors related to people's evaluations of their telescopes. A very interesting effect was found for the degree of light pollution. The more light pollution, the higher the rating given for one's telescope. Observers who never saw the Milky Way from their observing site rated their scopes better than observers who often saw the Milky Way. We can only speculate as to why. Perhaps poor observing conditions hide defects in optical systems.

Another interesting result was the effect of years observing on telescope rating. The relationship was curvilinear. That is, the rating of telescopes decreased, then increased as years of observing increased. People with less than 1 years observing rated their telescopes on average as highly satisfactory while people with 1 to 2 years observing rated their scopes as satisfactory. The lowest rating was for people with 3 to 5 years experience and

as people had 6 or more years observing, their satisfaction with their scopes began to increase again. Is it possible that as people gain more skill and experience they discover the limitations of their telescopes? Is it possible that after several years people upgrade the telescopes and gain more satisfaction?

Peoples subjective ratings of their telescopes are similar to the pattern of the optical testing. Refractors (of which there were 7) received the highest satisfaction rating of all types of scopes. Next came the Newtonians (13 telescopes) and last, the SCT's (23 telescopes).

Peoples comments as to why they rated their scopes as they did, yielded some interesting patterns. Both owners of Meade and Celestron scopes had more negative things to say than positive about their scopes. Owners of Meade scopes noted poor planetary detail and colour, problems with mounts and controls, corroded mirror coatings and poor electrical systems. The positive comments by Meade owners included, "light and portable" and overall good views and photography. Celestron owners noted poor planetary images, low contrast and poor images at high magnifications, especially of bright objects. One Celestron owner indicated that he had good star and planetary images and another owner felt his instrument was superior to other SCT's. The three Astrophysics owners who responded to the survey had nothing but good things to say about their telescopes. The three Televue owners were also pleased with their scopes, although one did note a problem with some chromatic aberration. But in this case it must be considered that the Genesis refractor operating at f/5 is expected to produce more colour than a Starfire at f/9.

It is only fair to say that given the large numbers of Meade, Celestron, Astrophysics and Televue telescopes in use, that these results are based on a small sample size. We cannot say that the experiences of the amateur astronomers noted above with their particular scope are necessarily indicative of all such scopes. It would be very interesting to survey a large sample of telescope owners about their experience to determine if these results are typical.

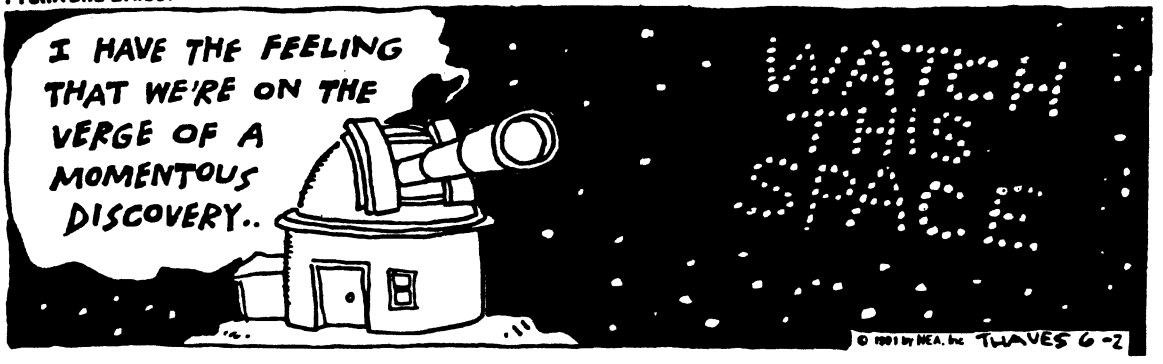
The organizers also wanted to know why people chose to either have their scopes tested or not, and how people would react if their scopes tested out poorly. The most frequent reason given for deciding to have the telescope tested was to confirm their subjective opinion of their scopes, good or bad. People also wanted to know if the problems they had been experiencing with their scopes was due to their inexperience or to their optics. The most frequent reasons participants gave for not having their telescope tested was that they didn't bring it with them to Starfest '90 or that they had no time to get it tested (originally the scopes were to be tested on Sunday morning). Some people indicated that they were satisfied with their telescopes performance and 3 people didn't want to know. As one person put it, "Who wants their telescope, however bad, to be called a bowser!"

The organizers asked about how people would react if their telescopes optics tested out poorly. Seven people indicated that they would either send the scope back to the dealer or manufacturer, or seek some remedy for the poor optics. Eight people indicated that such a result would leave them feeling disappointed. Others would accept the results but would not deal with that manufacturer again. Still others would try to upgrade to a better scope. Two people said that they would still judge the scope by the views it gave them rather than the test results.

In closing the organizers would like to thank the telescope manufactures, namely Astrophysics, Celestron, Coulter, Edmund Scientific, Galaxy, Meade and Tele Vue, for their input into the optical quality survey. Although none accepted the invitation to actively participate on the day of the event, their responses were interesting and where possible their concerns were incorporated into the survey.

Al Nagler, of Televue Optics, suggested, "Make sure the scopes are collimated if possible, so tests are limited to inherent optical quality." Unfortunately collimation could not be assessed prior to testing, but the effects of collimation were only evident in two cases. In one case, a C14 collimation problem was totally overwhelmed by the "zoney" figure. In the other case, the alignment of a home made telescope was so far off that it was rejected out right. Beyond these scopes collimation was not a problem.

Al was also concerned that four manufacturers which indicated that they had other commitments and given such short notice (invitations were mailed on June 18), could not attend. Three supported our efforts, wished us well and indicated that they would be anxious to hear the results. One was "reluctant to be the harbinger



of bad news to happy telescope owners". Another was concerned about stepping into a hostile environment and one did not reply.

What happens next depends on you. Based on the circulation of Astronomy Magazine there are at least 300,000 amateur astronomers, and at 2.1 telescopes each, this represents over 600,000 telescopes. Clearly more information needs to be gathered. To this end the organizers are preparing a comprehensive report explaining what they did, how they did it, and reporting their findings in depth. This report will be sent to members of TOMA (Telescope Optics Manufacturers Association) for review and comment. They would like other groups to conduct the same type of survey to expand on the work they have started. They would like TOMA to take an active part in these surveys and involve the astronomical community - their customers - in the development of standards. Ω

Notes from the Chair:
by Doug Pitcairn, Observing Chairman

Well, its winter time again. We poor amateur astronomers are stuck with either armchair observations or -20°C observing, Brrrr! Ah, I know the very thing to pass the winter months. I'll spend some money on a new observing toy. Ah yes, whip out the latest copy of Sky & Tel, flash up the VISA card, and settle down for a long session of mail order browsing.

What to buy, what to buy, hmmm.... How about a Goto Planetarium Projector? Sure would look nice in the rec room; $300,000!!! for the economy model! That's worse than buying a Japanese car. How about a new Astrophysics 7" Starfire? Yours for only 10 GRAND! Great bazookas! I'm in the wrong profession. Hmmm, here's a good one. Compact chemical toilet with electric seat for observatories and smelt shacks! Sounds like a good idea, but I don't have an observatory yet, and Pat down the street gets me all the smelts my cats can eat.

Perhaps, if I should try those photographic wholesaler types at the back of the magazine. Let's see ... "Complete set of eyepieces by world famous astronomer, only $4.95", The price is right, but I don't know about the quality; who is this Huygens guy anyway. Ah, here's a deal if ever I saw one; "Thermal 220 Volt electric underwear complete with a RS232 port providing the coordinates of your body in respect to the celestial grid." Wow, that would be handy! Oh oh, its been designed by some strange looking tech. named "Sleazyguider"? ... I don't think so.

Wait now, here's something that is interesting. That "Wizard of the Oculars", Ol Al Nagler has come up with a new, low power eyepiece. Hey, fat city! Easy ticket to the front of the lines at Nova East '92.

Actually, Mr. Nagler was showing off views at last year's Stellafane. This eyepiece, called a Panoptic, is a new five element design which is supposed to rival the Nagler's performance, but with very long eye relief, and at 22mm and 35mm focal lengths! The price is steep, but compares very favorably with the Type 2 Naglers at $255 US. Being one of those silly "deep sky" types, I'm always in the market for a better low power. It will be curious to see how well the Panoptic stacks up against my trusty 24mm Televue Wide Field. I'll pass on the results of this high tech show down in a future issue of Nova Notes. Till then, Clear skies! *(Editor's Note: **Notes from the Chair** will be a regular feature in Nova Notes. Doug has written several similar columns in the past (some even famous across the country!), usually related to observing equipment or "hardcore" observing. I encourage you to submit a light hearted article about your observing experiences.)* Ω

Ask GAZER: by GAZER

Ask GAZER is a regular feature in NOVA NOTES. Send your astronomical questions, serious or otherwise to the editor. He will pass them on to GAZER for his/her expert answer.

Dear GAZER:

What is so great about these new "panoptic" eyepieces? Everybody is going nuts for them, wanting to waste a perfectly good mortgage payment on a new eyepiece that will (supposedly) show them a whole new universe! I'm perfectly happy with the views I get with my 16 inch "StarSpire" refractor and my extensive collection of 25 element Oogle eyepieces. Why should I waste any of my filthy lucre on a paltry 7 element piece of glass?

Most solicitously yours,
Omar Ocular
State of Confusion

Dear Omar:

You obviously have not grasped the advantages of eyepiece designs that use fewer elements! Each time that light has to go through a piece of glass you lose a little bit of it. Thus, the fewer the number of elements, the brighter the image that you will get. That is why I use nothing other than Huygenian eyepieces. Nice and simple with the minimum number of elements possible. Besides, this type of eyepiece has to be one of the best designs going because after almost 400 years, Huygenian eyepieces are still made the same way!

If you are worrying about the small number of elements in the Panoptic, here is something that will cheer you up. If you read the fine print in Televue's ad in the current Sky & Tel, you will see that they sell a "lens" gadget that lets you combine one of their two-element Barlows with a Panoptic and voila, you have an eight element Nagler eyepiece with half the focal length but the same eye relief of the Panoptic! Two eyepieces for almost the price of one! Sounds like a good deal to me!

Clear Skies,
GAZER

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Notice of Meetings

Date: **Regular Meeting - Friday, March 20th: 8:00pm** 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: The main speaker is **Dr. Doug Forbes** of the Sir Wilfred Grenfeld College, Memorial University, Corner Brook, who's talk is entitled: **"The Milky Way Midtown ... Is There a Bar at the Galactic Centre?"**

Date: **Regular Meeting - Wednesday, April 29th: 8:00pm** for the main speaker.
Place: Sir James Dunn Building, Dalhousie University, Halifax. Meeting to be held in the Room 135.
Topic: The main speaker is **Terrence Dickinson** of Yarker, Ontario. Terrence is Canada's Leading astronomy writer. He has written several Astronomy books and also writes a monthly column for the Halifax Chronicle-Herald. Terrence's talk is entitled: **"Seeking the Holy Grail of Amateur Astronomy"**

Date: **Annual Banquet - Friday, May 22th: 7:00pm** with dinner to be served at 7:30pm.
Place: Waverley Legion on Rocky Lake Drive, Waverley.
Details: The cost is $20 per person all inclusive; a cash bar is provided. Dinner is to be a "gut-buster" Turkey Dinner catered by the ladies auxiliary. Contact Nat Cohen for details and tickets (434-3103).
Topic: The main speaker is yet to be finalized.

Planetarium Shows

Planetarium shows are held each Thursday at 7:00pm at the Halifax Planetarium located on the main floor of the Dunn Building at Dalhousie University. Shows are given on various topics. Contact the Nova Scotia Museum for details.

1992 Halifax Centre Executive

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