

NOVA SCOTIA

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1978 Halifax Centre Executive

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UP COMING MEETINGS:

Friday 17 March: Nova Scotia Museum, Summer St.

Speaker John MacNeil will describe the practical side of astrophotography. Have you not tried photography of the skies because you think you don't have the knowledge or equipment? Well John will show that you don't need a lot of experience or equipment to get photos you'll be proud of--even colour. He has many years of experience and you may be able to pick up some of his techniques. He will touch on the theory of the photographic process, the effects of film speed and grain on the contrast of the final photo, what films to use and what exposures are required. If time permits he may even touch on the use of the camera to test your mirror in the polishing stages. If your results in astrophotography have not been what you'd like then this talk may cure that.

Saturday 11 March: Observing session at the Mount Uniacke House parking lot. 7:30 will be the appointed hour with a couple of cars leaving the Museum about 7 for those requiring transportation. Those with cars should stop there if you have space and if it is not too far out of the way.

Friday 21 April: Centre dinner. See note elsewhere for more information in this issue. Take a break from exams or just have a night out on the town with us. Tickets will be available at the March meeting.

Centre Dinner:

The Halifax Centre's April meeting will be a dinner meeting to be held at a church hall (which has not yet been finalized). All members and guests will be welcome, however, we would like to know of your intentions to attend. Please let Mike Edwards know not later than the March Meeting. The cost will be approximately \$5 per person and tickets will be sold at the March Meeting. It will probably be necessary to have your tickets before the dinner evening but we will let you know before the next meeting. After the dinner will be an informal slide show where you will be asked to bring your 3 favorite slides (not necessarily astronomical) for the show. Should be fun!

Workshop for beginners:

The last two Saturdays of April and the first two of May we are planning to have a short workshop to aid beginning amateurs. Subject matter will be practical in nature with an emphasis on trying to familiarize participants with the terminology of astronomy. Choosing a telescope will be considered but telescope making will not be covered. Coordinates and time systems will be the topic of the first workshop. The object of this particular workshop will be to allow you to determine what part of the sky will be visible at any time and then allow you to locate accurately objects on the sky. If you are interested please contact R. Brooks or Mike Edwards.

Astronomical Calendar:

The complete version of the Astronomical Calendar published last year in Nova Notes is now available in expanded form. There are about 1000 anniversaries given with at least one event for every day of the year. If you would like a copy of the Calendar which contains about twice the number of events printed in Nova Notes, please contact Diane Brooks 434-7274 or 71 Woodlawn Rd., Dartmouth NS B2W 2S2. The price (to cover duplication costs and mailing) will be \$3.00 to RASC members.

Minutes of the January Meetings

Inclement weather is often the cause of fewer meetings; however, for the Halifax Center just the opposite was the case in January. A blizzard prevented Dr. René Racine of the University of Montréal from coming to Halifax to speak both to us and to St. Mary's on January 19. A cold laid low the alternate speaker, and so the executive scraped the bottom of the barrel and asked if yours truly would fill in. My topic was "Joseph Everett and the King's College Observatory", an account of the history of the first educational observatory in the province and of the life of its founder. A paper on Everett and his observatory will appear in the Journal, likely the June issue.

The second January meeting of the Halifax Center was held at the same place (Room 146, Loyola Building, St. Mary's) exactly one week later, on January 26. This time Dr. Racine was present and gave a very entertaining, illustrated talk on the new Mont Mégantic Observatory of which he is the director. The audience was treated to an excellent description of the location, design, optics, construction and plans for an elegant, medium-sized observatory which is distinctly French and feminine (those present saw the pretty skirt). In his reply to a letter of thanks from your secretary, Dr. Racine commented: "It was a pleasure to meet the members of the Halifax Center of the R.A.S.C. and to 'talk shop' with you all."

R. L. Bishop
V.P./Secretary

Minutes of the February Meeting

The February meeting was held at the Nova Scotia Museum on February 17. As usual the executive met at 7 pm.

The main meeting began at 8 pm under the able hand of that member of the illustrious BOG*, our president. Mike introduced the speaker for the evening, Steve Morris, whose topic was "Measurement of Light Pollution". In a very able manner, Steve described the pioneering efforts of a few members of the Toronto Center to quantitatively relate sky light pollution to population, zenith angle, distance and time. Among the interesting items discovered were: sky brightness varies as the square root of a city's population; a nearby street light is not the villain, rather it is the contribution from the lights in an entire town or city that makes the sky bright overhead; sky brightness varies approximately as the secant of the angle from the zenith; the brightness over Halifax is substantially less than one would expect for a city of its population, apparently due to dark bodies of water which limit its borders, particularly to the south; due to snow on the ground and bare trees, winter skies suffer more from light pollution than do summer skies (the opposite impression is an illusion due to the bright stars in the winter sky).

Residents of Halifax are fortunate in that really dark skies are but a half hour drive away. In contrast, the skies over much of southern Ontario are severely degraded. Steve concluded on a somber note: light pollution has been increasing tremendously, particularly

*(Bedford Observers' Group)

since about 1960, and there appears to be no lessening of the trend.

Most lights direct a significant portion of their energy uselessly upward, and many are left on all night, long after they are of any use to anyone. As Fred Hoyle has so accurately remarked on the so-called "energy crisis": "...the underlying issue is whether energy can be made available fast enough and easily enough to avoid significant perturbations in the life style of the middle-class citizens of the U.S.A. and of Europe." The future is indeed bright, at least as far as the night skies are concerned.

The meeting closed on a more carefree note with a Trivia Quiz. Led by Walter Zukauskas, questions submitted by various members were presented. Among the topics were a brass nose, rockoons, and the 13th constellation on the ecliptic. Many stayed for another hour for conversation over refreshments.

R. L. Bishop
VP/Secretary

The night is calm and cloudless,
And still as still can be,
And the stars come forth to listen
To the music of the sea.
They gather, and gather, and gather,
Until they crowd the sky,
And listen in breathless silence,
To the solemn litany.

H. W. Longfellow
1807-1882

Jody LeBlanc

Allen Heights Observatory is an amateur observatory located at the Head of Saint Margaret's Bay approximately 30 km west of Halifax. At this site, Allen Henderson had constructed a small 8'x 8' domed observatory that proved too small for his needs so in the fall of 1975 he decided to undertake the construction of a somewhat more ambitious observatory.

The design settled on was a fairly standard one; a 12'x 12' base with a 10' dome. The base (set partially on concrete but having a wooden floor) was constructed by covering 2"x 4" 's with pressboard inside and out giving the walls a finished look. The construction of the dome, Allen admits, was equalled in difficulty only by the cutting and fitting of the eaves to the walls of the observatory to make a 10' circular base for the dome. The 10' diameter dome is 5' above the ground and is constructed of plywood ribs covered with masonite, treated side out. The ribs themselves were ripped from sheets of 3/4" plywood (two jigsaws were needed for this as they overheated when used continuously) with each individual rib consisting of two plywood cutouts laminated together.

This stage of construction was reached in late November, 1975. Allen had just put the dome (minus shutters) onto the base (minus door) when a small hurricane (!) actually hovered the dome off the base and carried it several hundred feet down a steep incline where it came to rest among some rocks! Needless to say Allen was rather discouraged at this, but undaunted he attempted to rescue and reconstruct the dome. About half had to be rebuilt with the only trace of the incident being a 1/4" variance in the bottom ring of the dome. Allen admitted that little time was wasted in attaching shutters and door once the dome was once again in place.

The shutters slide on a garage track and rollers. The observing slit is 2' wide and 110° high, permitting observation past the zenith.

EDITORIAL

I have waited until receiving the February issue of the Journal and National Newsletter (NNL) to write this editorial so that I might not be accused of pre-judging the situation. It is indeed pitiful that the RASC has slumped to such a point where amateur and professional astronomical material can not be intermingled among the pages of the Journal. It has irritated me for a very long time that the articles of general interest have been separated in the fashion of the last several years--let alone the present ridiculous state.

The publisher's turn around time for the NNL is only marginally shorter than for the Journal. With the present setup of regional editors, the time for publication of articles submitted is further increased, reducing the argument for short turn around times to a matter of semantics. I suggest NNL material should in all rights be in the Journal, not as a coloured supplement but mixed in the pages with the Notes & Reviews portion of the Journal. The Editorial Committee for the Journal should be instructed to approach professional astronomers for review articles; ie. the Editor and his assistants must take an active rather than passive stance in the search for articles among the members of the Canadian Astronomical Society. CAS publishes frequently in our Journal business relating to their Society (for which they pay the page charges). For this service, it is not too much to request that they more actively support the Journal by encouraging their members to prepare articles to bridge the widening gulf between amateur and professional astronomers in Canada. This major gulf was widened dramatically by the formation of CAS in 1970. Steps should be taken to increase cooperation and interaction between our Societies.

Arguments concerning funding for Journal material from the National Research Council are ill-founded. We are not a poor Society and need not submit ourselves to the whims of NRC. Should the editorial policy be expanded to interest a wider audience, and if the NRC feels they can no longer pay the page charges, then so be it! The vast majority of RASC members are amateurs and they should be considered on at least an equal basis with professionals who are, for the most part, inactive in our Society. True, there are several who contribute a great deal to the RASC, but they account for only 10% of professional astronomers in Canada. By the same token, Centre executives across the country must do more to encourage participation and contributions to the Journal in its new form.

Finally, it seems that an overemphasis on tradition is preventing the proper maturation of the Journal. The present editorial policy does not suit the majority of members, and the unwillingness to permit changes in outlook of our official publication is holding back advancement in dissemination of astronomical knowledge and membership growth. Looking through past issues of the Journal, I see a steady evolution in editorial policy--why stop at the present less than satisfactory format?! Tradition is fine to some extent but when it chokes the vitality of a society, it is time to develop a new tradition.

Surely it must be obvious to National Council and the Editorial Committee that the considerable discussion among RASC members over the last couple of years on the state of the Journal and National Newsletter indicates a need for reappraisal. The problem will not solve itself--it must be addressed now! It is the single most pressing issue facing our Society. I hereby request Halifax Centre members to submit their observations and comments to the Editor of Nova Notes, even your signature at the end of this Editorial to indicate your approval of the views stated above. Please assist me to place your views before National Council and the Editorial Committee.

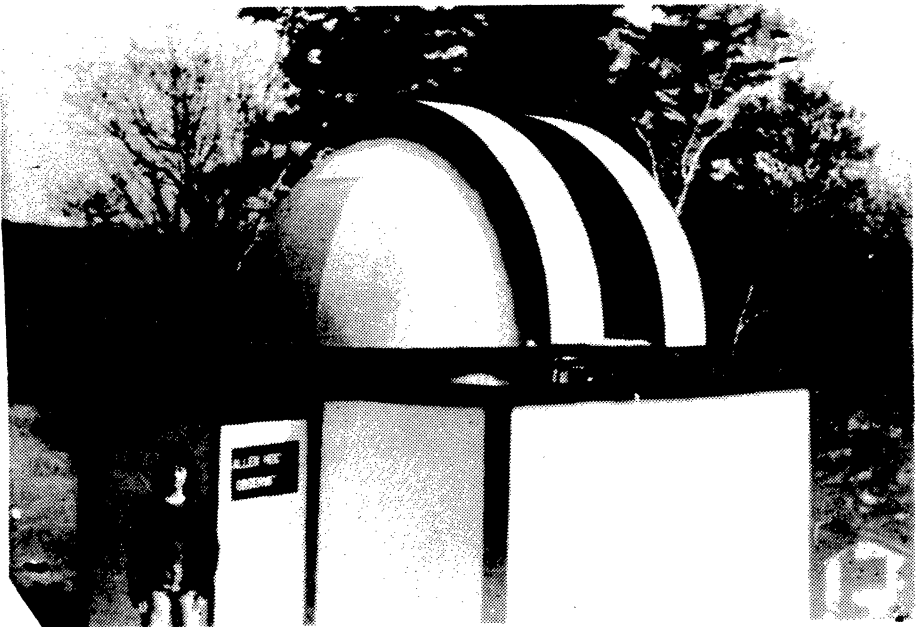
Randall C. Brooks
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37 The dome itself rotates on 3/4" pipe rolled to a 10' diameter, then split in half and attached to the bottom of the dome. Garage steel rollers (2") were then fastened to the top of the base, enabling the wheels to travel in the split piping. The interior of the observatory was painted flat black and wired for normal house current. One plug and two red lights were provided, along with storage space, a desk, and such amenities as a reading light and a clock. Indoor/outdoor carpeting was added later. The observatory's telescope, a three inch Tasco is soon to be replaced by a larger reflector, probably a 10" f/8, says Allen.

Allen's main interests are astro-photography and lunar, planetary and solar observing, to which end he used his considerable artistic talents to produce detailed drawings of such things as planets and sunspots.

Allen is currently co-president of the Halifax West High School Astronomy Club (which regularly conducts observing sessions at Allen Heights) and a member of the Halifax Centre of the RASC.



FROM the CENTRES

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COMMUNITY ASTRONOMY

David F. Hurd
MacMillán Planetarium

The National Museums Policy of the Government of Canada specifies several funding assistance programs for its affiliate members. One of those programs, Core Funding, is designed to assist all institutions in public programming activities which will result directly in better physical and intellectual access by the public to the collections of the museums across the country. While many types of activities could result in better access, clearly, traveling exhibits fit the bill perfectly. They reach outlying communities & people normally unable to visit the large urban centres. So, in 1976 the Vancouver Museums and Planetarium applied to Ottawa for funding. Wishing to make the application representative of the three institutions (Maritime & Centennial Museums and MacMillan Planet.) we added an astronomical program called Community Astronomy.

Community Astronomy is a public lecture/observing program available to anybody. Or, as we put it on the application"for the general public, private clubs and societies provincial and federal campgrounds and parks, summer camps community centres, schools and other groups, organizations and locations where sufficient numbers of interested participants gather". We stipulated a minimum group sizethat was it. Anyone from clubs, to nudists, to inmates could use the program. The one thing we did realize from the outset, and planned accordingly, was the fact that we didn't have time to completely run the program. In fact, unless there was enough funding for planning, equipment, operation, ie the works, we didn't want to undertake the project. Well our application was accepted, and we received \$10,000 for the year. This included \$2,000 for a Celestron with all the accessories, \$1,000 for posters and advertising, and \$7,000 for wages.

The wages are good! In return for that money we expected

the program operator, one of the local amateur astronomers to run the entire thing himself. And you know what?.... it works! Working out of spare office space the operator Allen Stoneberg, contacted all the prospective groups. He put slides together, contracted an ad poster and sent out letters. The biggest Problem?....Everyone thought we were conning them. "What was the cost?" "What strings are attached?" "What's the pitch?" was all Allen heard for weeks. People just couldn't believe they could get something for nothing. Finally some of us had to intervene. I talked with the provincial minister in charge of parks, local parks, boards, schools, cubs, etc. We had planned to cover all the provincial parks and campsites until we found out there were 319 such sites in the province.

Booked up within weeks, Allen began the rounds introducing astronomy to the public and actually training park naturalists to carry on themselves. We hope that we don't run into any snags using federal monies in provincial parks. The endorsements of the B.C. Parks branch should please the National Museum Corp. at least.

Community Astronomy is funded for one hundred nights of observing (we might just get 100 out of 12 rainy BC months). Sixty of those nights are planned for areas within easy reach of Vancouver. The rest, with funding to cover travel and accomodation, cover the remainder of the province. Field trips, lasting up to two weeks at a time, may cover as many as a dozen locations.

Community Astronomy is at present only partially completed. As the weather turns from wet to wetter, and the constellations of autumn appear, we'll be focusing our attention on local areas. When the clearer winter weather reaches interior BC areas, we'll resume field trips throughout the province.

If the community Astronomy concept might work in your area and if you are affiliated with the National Museums of Canada, we'd be happy to send information. Remember, everyone who looks through a telescope is a potential planetarium patron.

from North Star, newsletter of the Planetarium Association of Canada
Winter 1977 issue.

NEW TELESCOPE DESIGN UNVEILED

Bruce Torquemada

Recently at the Pulkova Observatory in the Crimea (made famous by Otto Struve and his binary work), the Russian astronomer Vladimir Trikostov, under the auspices of the Russian "Astrometrik" Association, unveiled a revolutionary new type of telescope. The new device, bearing the ungainly name of Triketsikovtropak, is now being hailed as the greatest advancement since the Schmidt and is somewhat loosely described as a 'modified Coudé', interferometric bipolarized stereoscopic quasi-Cassegrainian".

The main feature of this 1.7 meter telescope (the name for it being a Russian acronym from the inventor's name and several Russian words for its description) is an off-centre axially symmetric reverse Fresnel lens of calcite, which splits incoming light into its polarized electric and magnetic components and refracts these components into the Moiré and interference patterns that make the telescope unique in its applications. Aside from the lens, which is located at the end of the telescope (like a refractor's lens or a Schmidt's corrector plate), other unusual features of this telescope are the diffraction grating secondary and a primary with an annular "quasi-Cassegrainian" opening. The primary mirror itself is a simple paraboloid but the secondary is a blazed reflection grating which is axially symmetric about the outside of a hyperboloidal form which is smooth and aluminized on the inside. The Fresnel lens has the non-refractive part (the centre equal to the distance from the centre of the primary to the centre of its annular opening and all other reflective surfaces are slightly conical cylinders with silvered interiors.

By studying the simplified ray tracing at the end of this article the results to be obtained at the instrument end of the telescope should be immediately obvious. Optically, if an observer looks through eyepieces (one with a reversing lens) directly across the telescope axis he will see the spectrum of the target object arranged three dimensionally. The apparent depth of the spectrum depends on the

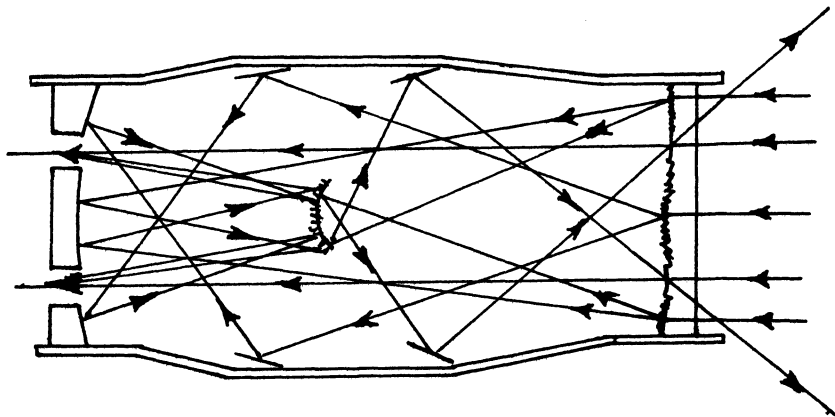
grating and annular opening's radius and a high resolution can be maintained with depth magnifications up to 5.5 times the linear dispersion. Placing a polarizing lens before the off-centre Fresnel lens provides a spectrum at different polarization directions and placing polarizing lenses by the eyepieces allows studies of electric and magnetic components.

Photographic plates taken on the Triketsikovtropak are equivalent in information gained through the third dimension to normal telescopes of slightly over twice its diameter. After he had studied a copy of the ray tracing for a few minutes, Alan Sandust suspected that with very narrow bandpass photographs (as in spectroheliographs) and an annular collimating lens, a holograph could be produced that could be studied even more profitably under monochromatic lasers to obtain very precise ($\pm .05A$) results, with holographs of extended objects showing especially rewarding results. Trikostov stated upon hearing Sandust's suggestion, that he had considered the possibility but ignored it because Doppler shifting would confuse matters and besides, sufficiently good results for specific wavelengths can be obtained without resorting to holographs.

Halton Art suggested that the filter system Sandust mentioned along with a converging offset mirror and variable diffraction could get precise wavelengths for photoelectric study without recourse to the usual filters. Trikostov said that he had thought of this also but refrained from mentioning it while the proper equipment was being built.

Slick Observatory has ordered a 2m Triketsikovtropik from Roller & Bivens and Ale is studying the Pulkovo 1.7m and two well known telescope companies are planning to market 8 or 10 inch devices for those serious amateurs with a hidden desire to be ripped off. From company bulletins, the amateurs had better be serious--prices start at \$2500. It is unfortunate that ATM's will probably be unable to make their own Triketsikovtropaks due to special types of materials, lenses and mirrors needed. But, hopefully, once the companies get into production, prices may drop although undeserved popularity may drive prices out of sight, as has happened with previous products from these companies.

The author wishes to thank both Qelestron International and Cuestar Corp. for their information on this topic and particularly Astro. Jour. for prepublication access to papers by Trikostov et al and to Vladimir Trikostov for copies of private communications by A.R. Sanddust and H. Art.



THE TRIKETSIKOV TROPAK

Note; some features are exaggerated for clarity.



ANOTHER ASTRONOMICAL WORD SEARCH

Harry Myers

E S P I L C E H A S B S
 A Z I M U T H O T U L P
 R C L L N I E S L I A A
 B E H B A R C O F R C C
 I T Y E R O S E I A K E
 L U N A R S O O R T H N
 N S U P O N A C E T O E
 R S I R V C A A B I L B
 U O O E E O A R A G E U
 T M N E R E I D L A M L
 A U R O R A E E L S T A
 S U S A G E P U L S A R

- A-- The 9th brightest star (8)
 One of the larger asteroids (4)
 Borealis and Australis (7)
 The Altar (3)
 Position is given by altitude & --- (7)
- B-- "the closest something can be to nothing and still
 be something" (9)
- C-- The second brightest star (7)
 The whale or sea-monster (5)
 Cancer (4)
- D-- The dragon (5)
- E-- The passing of one heavenly body in front of another
 as seen from the Earth (7)
 One of the larger asteroids (4)
- F-- A bright meteor which may trail sparks (8)
- I-- the largest of Jupiter's satellites (2)
- L-- The scales (5)
 A very cloudy idea (11)
 Of or relating to the Moon (5)
 US Moon car (10)

- N-- Looking like cloudlike masses of gas or dust (7)
Neptune's smaller moon (6)
- P-- The flying horse (7)
Gives off rapid radio signals at precise intervals (6)
Most distant planet from the Sun (5)
- S-- the archer (11)
The god of agriculture (6)
The scorpion (7)
The final frontier (5)
- T-- The first meteorological satellite, ---1 (5)

With the letters that have not been circled, you should find the answer to this 1986 spectacular (12)

Astronomy for Young RASCals (Cont'd from Page 45 :)

that gases are frozen in the rocky material. An old comet which had lost most of its volatile gasses would show similar characteristics. At magnitude 18, Chiron is difficult to observe being now almost at aphelion. In the 1990's it will be at mag. 14.5 and its nature may appear more definite. Two objects, periodic comet Schwassmann-Wachmann and minor planet 944 Hidalgo, move in similar elliptical orbits although both are closer to the Sun. Hidalgo raised similar public interest at its discovery in 1925. Thus, it is unlikely Chiron will be the last such object discovered at such great distances and may indeed be the first of a whole new family of minor planets.

In the future it may be able to link all small non-cometary objects--including Pluto--which move in elliptical orbits among the giant planets. Pluto still gives some astronomers problems when considered a major planet. At 5900 km in diameter, Pluto is not that much larger than the largest asteroid Ceres (1000 km). Because of its cold environment, Pluto probably contains high percentages of volatile molecules not found on the inner planets like Mars and Jupiter. Thus someday we may consider Chiron (diameter 160 km) in the same class as Pluto and Hidalgo.

ASTRONOMY FOR YOUNG RASCalsIS IT A PLANET? IS IT A COMET? NOOOO!!

It's Chiron. About four months ago, Dr. Charles Kowal discovered a faint object moving slowly across the sky. From its daily motion, the body was apparently between Saturn and Uranus making it either a large comet or a small planet (asteroid). The press of course, picked up, indicating a preference for the planet theory. This perhaps stimulated the interest of astronomers more than usual in the new find and the questions raised immediately after discovery have been largely answered.

By looking through old photographic plates, astronomers found more than 30 pre-discovery exposures with the oldest being a 1895 plate taken at Harvard Observatory. From position measurements, the orbit has been determined. It is in an elliptical orbit inclined 7° to the plane of the solar system (ecliptic) and has a 50.7 year period. At perihelion it is 8.51 astronomical units from the Sun (just outside Saturn's orbit) and at aphelion it is 18.89 AU's out (slightly inside Uranus' orbit). It is thought that the object's motion is locked in resonance with the motion of Saturn. Such resonance (which may also occur with Jupiter and Uranus) results in a path which is very stable and unlikely to change in short periods of several hundred years. The resonance occurs because Saturn makes 5 orbits about the Sun while Kowal's object makes only 3. Similar resonance frequencies are measured between Jupiter and certain of the asteroid groups.

The orbit and the fact that none of the images on the old plates show any hazy appearance or strange changes in brightness, lead us to believe the object is in fact an asteroid or minor planet. As is customary, the discoverer was given the right to name the minor planet. In Greek mythology, the gods Saturn and Uranus had a descendant Chiron which was a centaur (half horse, half man). Thus the name Chiron is particularly appropriate. Its preliminary scientific designation is 1977 UB.

Differentiation between an asteroid and periodic comet at the distance of Chiron is difficult. Its distance means

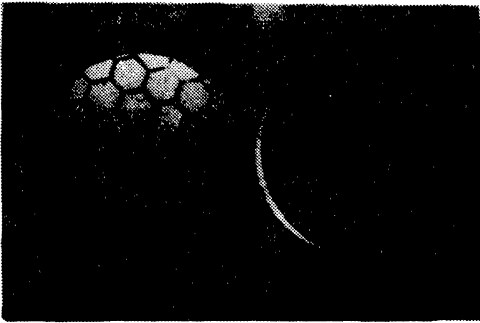
HINTS for TM's

CERAMIC TILE TOOLS

TM you say? No, that's not transcendental meditation but TM for telescope makers. Recently I've been working on a 6"--oops--15 cm mirror. It will be one of the Centre's pair of RFT's (richest field telescopes) of short focal length. There will be nothing peculiar with the mirror itself but the manner in which the curve was generated is not common among amateur TM's. No, I didn't try Larry Coldwell's method of using an orbital sander but I did try a technique employed by companies mass producing optical components and it's obvious why on two counts.

First, it's much cheaper, especially for larger mirrors. Second, it's significantly faster. When the mirrors for the RFT's were ordered, we also requested something called Cera-Hex-Tol. What's that you say? Well Cera-Hex-Tol is hexagonally-shaped pieces of ceramic tile. The tiles are about 1" across and exactly the same as tile found around the house except they are not glazed. I first encountered their use when visiting the Grubb Parsons optical works in Britain several years ago. They are used in place of a glass tool in the rough and fine grinding stages of mirror fabrication.

To prepare for use, it is necessary to find a glass or metal plate on which the ceramic tiles may be placed. I used an 8" mirror which had been dropped and damaged. The back was first ground reasonably flat with any old piece of glass at hand. The tiles were then epoxied on forming a 6" circular disc. About 1/16" was left between each tile and the edge tiles were cut to fit using ceramic tile cutters. The ceramic tool is seen in the accompanying photo. In use it proved to function very efficiently requiring only 1½ hours to generate an f/4.5 curve. In fact, grinding went so fast I passed my desired f/5 curve and had to reverse tool and mirror to bring it back. Mike Edwards was at the same time working the other f/5 mirror. He was using a regular glass tool and had previously spent a couple of sessions on it. Despite his lead, I



Ceramic tile tool for a 6" mirror which is on the right. Tiles are epoxed to a damaged 8" mirror.

was able to catch up and pass his progress in the 1½ hours of grinding.

What is the reason for the great improvement? From my observations, it appears that once the tiles have been worn to conform to the mirror surface (about 10-15 min.) and once the spaces between tiles have been filled in with grit, then the motion of the mirror draws water and grit back up to the top of the tiles. Thus it appears to be almost self priming and the efficiency of each wet increases considerably. Even the amount of water on the grinding surface is regulated with the surplus being quickly forced away through the channels and avoids washing grit off the working surface.

In changing to finer abrasives, it was found only necessary to wash the surface removing only the loose particles in the channels. The next abrasive then filled in the channels and grinding progressed rapidly. After about 5 hours the f/5 mirror was ready for polishing! The Cera-Hex-Tol cost \$3.50 (including customs etc) for 1 sq. ft.--so the 6" tool cost about \$1.00. One precaution! When choosing a backing material for the tiles, it would not be wise to use wood because of the danger of warping the wood when exposing it to water. This could be overcome with suitable coatings, but if you have a piece of glass or metal, choose them. A thick piece (1/4") of plate glass would suffice for a 6" or 8". For 10" or 12" mirrors of short focal length the tile might wear at the edge and need replacing before the curve is generated. In such a case two tools might be necessary. Things might be helped along if the second were shaped with a curve of the required radius of curvature of the mirror, ie. a convex surface. Tiles are available from me for trials.

COSMIC THOUGHTS

According to the naturalist-philosopher Henry David Thoreau: "A written word is the choicest of relics. It is something more intimate with us and more universal than any other work of art." Here are several statements that have an astronomical flavor and which I find to be particularly eloquent and meaningful. Read slowly. Each deserves contemplation by itself.

I listen from time to time to hear the
hounds of silence baying the Moon.

Henry David Thoreau

On the question, why go to the Moon in the first place; it's the sort of situation that if you need to ask, you'll never understand the answer.

Gordon Donaldson

And Earth self balanced on her center hung.

John Milton

The Sun is but a morning star.

Henry David Thoreau

I believe that a leaf of grass is no less
than the journeywork of the stars.

Walt Whitman

A human being is the atom's way of knowing
about atoms, the star's way of knowing
about stars.

George Wald

(On man's brain): The giant confined in
the body's prison roams at will among the
stars.

Loren Eiseley

And with an awful, dreadful list
Towards other galaxies unknown
Ponderously turns the Milky Way.

Boris Pasternak

Few people realize the immensity of vacancy
in which the dust of the material universe
swims.

H. G. Wells

The universe is filled with planets, stars,
galaxies, which, on the immense cosmic time
scale are evanescent, ephemeral entities,
forming, flickering briefly, and then fading,
lost forever in the infinite recesses of
space and time.

Carl Sagan

Into this Universe, and Why not knowing,
Nor Whence, like Water willy-nilly flowing;
And out of it, as Wind along the Waste,
I know not Whither, willy-nilly blowing.

Omar Khayyam

There's the basic question: What is it all?

Donald Clayton

There will never be any long term purpose
for our species other than understanding
of the Universe.

Fred Hoyle

If you have come across an interesting
astronomical quotation, why not submit it
to Nova Notes?

Roy L. Bishop
Maktomkus Observatory

SOME INFO FOR NEW RASC MEMBERS

This year has seen a dramatic increase in membership. For those new members I would like to familiarize them with the operation of the RASC. The Halifax Centre is one of 18 centres across the country and our centre has been operating since 1949 with a brief lapse in the 1960's. We operate rather informally and like to stress personal contact among our members. It is this contact which helps the Executive decide on the activities which are likely to be best received. The Executive meets one hour before the regular meeting and most of the business is carried out at that time. All members are free to attend the Executive meeting, the only stipulation being that you must arrive by 7:00. Regular meetings of the Centre are usually held the third Friday of the month at the Nova Scotia Museum with the time shifted in Dec and April if conflicts occur with Christmas and exams or if a special speaker is to address the Centre.

Observing meetings are held about once a month on a rather irregular basis being dependent on lunar phases and, of course the weather. In general, sessions are held before first quarter or after third quarter phases and are held on Saturday evenings. If you wish to participate on a regular basis, contact our Observing Chairman, Jody LeBlanc and let him know. If weather conditions are questionable, the decision to go is made about five o'clock. You can find out the decision by calling: Jody LeBlanc (443-9509) Mike Edwards (835-3615) or Randall Brooks (434-7274).

Publications of the Society include 6 issues of: the National Newsletter, the Journal (both coming from Toronto in Feb, April etc.), Nova Notes (from Halifax in Jan. March etc), Notices of Meetings (when Nova Notes are not published) and finally an annual copy of the Observer's Handbook. Members in New Brunswick may also receive a Notice of Meeting from the Moncton section of the Halifax Centre. If you want on their mailing list, contact: Don Williams. PO Box 358, Salisbury, NB E0A 3E0.

Finally, the National Office is located in (where else?) Toronto and is source of the Journal and National News-

letter and for Life members the Observer's Handbook. The Executive Secretary is Rosemary Freeman with her duties being the conduct of the everyday business of the Society. The activities of the Society are directed by National Council which meets 3 or 4 times a year and consists of the elected Executive and representatives of the 18 Centres. Important decisions of everyday business are made by the Executive Council of which Roy Bishop is a member. The general meeting of the Society is held in May or June in various locations and is referred to as the General Assembly. The GA met in Halifax in 1975 and in 1978 will be in Edmonton.

COMET BRADFIELD 1978 c

The IAU Telegram below gives the positions and bightness estimates for a recently discovered comet. Unfortunately, it is too far south until after perihelion. Look for it in the morning skies after mid-March ie. after you get this in all likelihood.

Circular No. 3172
 Centrai Burezu for Astronomical Telegrams
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COMET BRADFIELD (1978c)

The following precise positions were obtained by J. Johnson and M. P. Candy with the 33-cm astrograph at the Perth Observatory, Sickleby. Measurers: Candy and P. Jekabsons.

1978 UT	α 1950	δ 1950
Feb. 6.84340	$18^h 35^m 14.532$	$-45^{\circ} 36' 45.0$
6.86111	18 35 21.56	-48 36 06.9
7.85486	18 42 03.88	-47 55 21.5
7.86161	18 42 06.66	-47 55 03.1
8.85215	18 48 49.02	-47 11 39.4

M. P. Candy	D. Herald
(5 obs. Feb. 6-8)	(5 obs. Feb. 5-8)
T = 1978 Mar. 17.964	1978 Mar. 18.109 ET
m = 44.740	42.31
M = 261.254	262.07
q = 50.214	49.76
q = 0.43456	0.4976 AU

The following sets of elements have been determined by Candy and by D. Herald, Kambah, near Canberra:

The following ephemeris has been calculated by J. Achard, Sky and Telescope, from Herald's elements. Differences in the sense listed minus Candy are: Feb. 21, $\Delta\alpha = -0.3''$, $\Delta\delta = -3.4''$, Mar. 3, $-1.0''$, $-2.0''$, 13, $-2.7''$, $-4.0''$; 23, $-5.3''$, $-4.0''$.

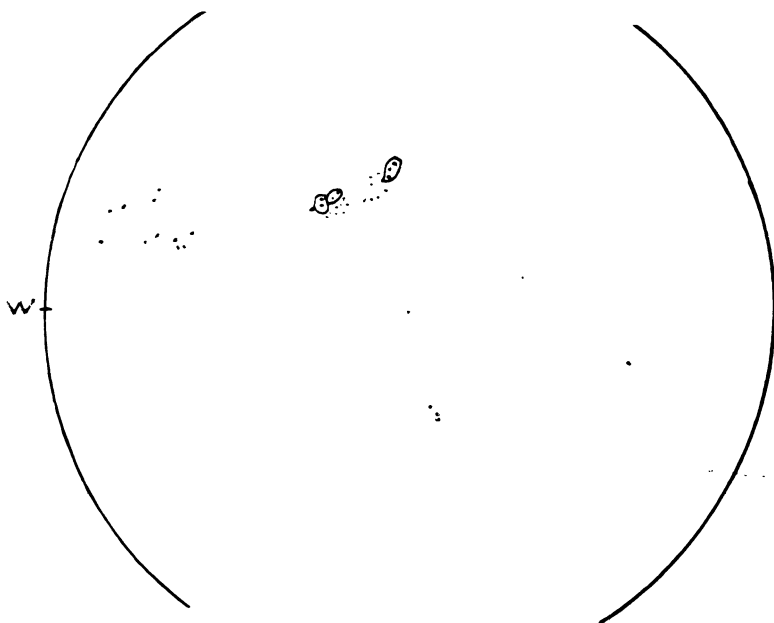
1978 ET	α 1950	δ 1950	A	r	Elong.	m _i
Feb. 5	$18^h 29^m 57$	$-49^{\circ} 09.6$				
11	19 32 30	-45 31.2	1.329	0.936	44.7	6.6
16	19 34.62	-40 59.4				
21	20 04.56	-35 21.3	1.232	0.764	36.3	5.6
26	20 32.97	-28 51.7				
Mar. 3	21 00.41	-21 31.5	1.189	0.606	29.6	4.7
8	21 27.69	-13 41.2				
13	21 55.73	-5 30.2	1.216	0.499	22.5	3.9
18	22 25.29	+ 2 14.9				
23	22 50.43	+ 9 30.9	1.312	0.403	19.3	4.1

$m_i = 6.5 + 5 \log r + 10 \log r$

STEVE MORRIS

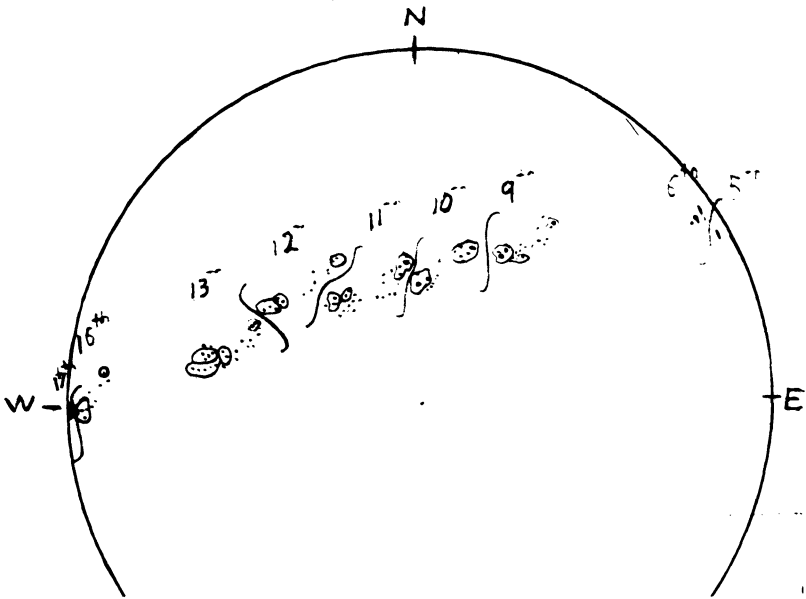
Sunspot minimum occurred in March 1976 and the new cycle has been taking its time in appearing. There has been more major activity lately, and I have started systematic observations again after a lull of about five years. To do this, I have been using a small Copernican telescope stored at the Burke-Gaffney Observatory. Although only 70mm (2.8") in diameter, it is quite large enough for sunspot work. The image is projected onto a screen $4\frac{1}{2}$ inches in diameter (never observe the Sun with filters attached to the eyepiece!) and all sunspots copied onto a piece of paper. Of prime importance to be able to trace the spots onto the paper accurately, is a steady tripod.

A major sunspot group is illustrated below as seen on Feb 11. All minor spots observed are also marked for this particular date. The group at left turned out to be remarkably persistent. It was first seen on the limb on Feb 2 and although its large size and small number of spots made it seem like a disintegrating group, it held together until at least 13 Feb. when it passed over the western limb. The three spots below centre were the first appearance of a small short-lived group; by the



time it reached the limb on Feb. 16 nothing was left but some bright patches of facculi. The sunspot at left, first seen the day before, lasted only a few days and did not develop at all.

The major group shown on the first drawing is shown below illustrating how its appearance changed day by day as it travelled across the face of the Sun. I was expecting to see aurorae from this group during the RASC observing session on Feb. 11, but none appeared. Perhaps there were some the following evening but which was overcast.



If nothing else, one always knows when it might be worth while looking for aurorae as a side benefit of your solar observing!

NEW MEMBERS

Since the last listing of Halifax Centre Members, the following have joined our Society. Dr. G. Brodie, Moncton; Diane Brooks, Dart.; Dr. W.G. Chesser, Moncton; Carl Fleck, Moncton; Dr.F.E. Girouard, Moncton; Glen Graham, Hfx.; Ralph Fraser, Dart.; Toby Randal, Mahone Bay; Mathew White, Hfx.; Don Williams, Moncton. We wish to welcome these members and hope they will benefit from the Centre.

PLANS FOR 1978 CAMPING/OBSERVING WEEKEND

The Halifax Centre is currently forming its plans for a second annual observing/camping weekend to be held once again at Blomidon Provincial Park in the Annapolis Valley. After the success of last year's outing, enthusiasm is high among Centre Members who have high hopes for this year's weekend which is scheduled for 27-29 July.

This weekend is just after last quarter moon so we are looking for clear dark skies early in the evening while the observers with true stamina should enjoy some pretty lunar views during the wee hours of the morning. Following the tradition started last year, activities such as hikes and photographic forays are planned and rumours of a small scale observing competition are in circulation. Also planned is a picnic at the one and only confirmed black hole in the Universe--special precautions are in effect to avoid loss of any Centre members into the anomolous gravitational feature of Nova Scotia known as Black Hole.

Considering the success of last year's weekend with its rather uncertain weather, a clear weekend this year would make an already good thing great--you won't find me packing a rain coat.

Once again the Halifax Centre extends an invitation to anyone (and their families of course) interested in sharing in the fun. Just bring your tent, telescope and hiking boots. "Think Clear" and leave your raincoat at home! For those unwilling to rough it, motels are located within an easy 15 min. drive. If you would like more details, please contact me at:

Mr. Jody LeBlanc
196 Main St
Halifax, NS, B3M 1B5

Jody LeBlanc
Observing Chairman

STUMBLING THROUGH (late)

WINTER SKIES

Despite the cold weather, the winter months are really a great time to observe--really! Not only is a good selection of deep-sky objects well placed for observation but with the exception of the odd snowstorm or two, the weather is usually cold and clear. In addition, dark skies are available nice and early--what other time of year can you observe several hours and then nip in to catch The National?

If you decide to brave the elements and observe some winter evening, here are a few things to remember:

- 1) Don't set up on a concrete or asphalt base--they conduct much needed heat from you faster than you'd believe.
- 2) Dress warmly. This may seem obvious but I've seen quite a few people who should know better ridiculously attired for cold weather observing. I'm a firm believer in dressing for the occasion as anyone who has seen my ski-doo suit will attest. Try gloves with the thumb and first two fingers cut off for doing drawings--a hand warmer in the pocket is a much appreciated piece of equipment in this case. If long underwear, hot tea and all else fails, shut down and warm up--Saturn will still be there later.
- 3) When picking up cold metal wear gloves. I've lost part of a palm that way and believe me, it hurts! In the same vein, it's a good idea to cover all metal parts (especially viewfinders) with a good layer of tape to avoid the problem. (Surely there is someone else out there who guides 30 min. exposures in January)
- 4) Close the door as you leave the house. A warm kitchen makes a good 'run out of' observatory, but as my father has reminded me time after time, "Close the Door!"

But honestly, winter is a great time for observing, especially for us planetary observers with Jupiter, Saturn and Mars all favourably placed. You know, shoveling snow to uncover your regular observing site isn't that bad--at least you're not bothered by mosquitos!

Jody LeBlanc
Observing Chairman

BURKE-GAFFNEY AWARD

for 1978



RULES:

- 1) Topics: 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 interest.
- 2) Presentation: Articles should be 1000 - 1500 words, written in proper grammatical form and presented type-written (if possible) and double spaced. Diagrams need not be in finished form but should be complete and ready for drafting. Photographs may also be submitted and if possible the original negative should accompany the submission.
- 3) Eligibility: Any member of the Halifax Centre in good standing may submit articles with the exception of those with graduate degrees (any field of study).
- 4) Judging: Articles will be judged on scientific accuracy, originality and with a strong emphasis on the overall literary merit. Judging will be carried out by the President, Editor and one other person appointed by the Halifax Executive.
- 5) Prize: The award will be given once annually with the winner having a choice of one of the following: Ottwell's Astronomical Calendar (1979); a year's subscription to the Griffith Observer; or The Amazing Universe by Freidman (published by the National Geographic Society).

SUBMISSION OF ENTRIES:

For 1978, all articles must be obtained by 15 April with the winner being chosen by 15 May. Mail entries to:

R.C. Brooks
 Editor, Nova Notes
 71 Woodlawn Rd.
 Dartmouth, NS
 B2W 2S2

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