NOVA NOTES

BI-MONTHLY JOURNAL OF THE HALIFAX CENTRE

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1979 Halifax Centre Executive

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Up Coming Events:

CAMPING/OBSERVING WEEKEND: 20,21,22 July at Kejimkujik National Park. This is our third annual weekend out for observing and we have decided to change the venue this year. The park offers an area for groups of campers at a flat rate for the group so this year your camp fees are on us! When you arrive, and we hope many of you will be able to join us, ask for the group camping area and tell them you're with the RASC. If you prefer not to camp but wish to partake in the observing you can lodge in a motel in Caledonia only 10 or 15 minutes away. See you there.

PERSEID METEOR OBSERVING: Saturday 11 August at Ridge Park in Wolfville. The peak of activity for the Perseids is early Sunday morning so we have decided to put up with a Moon a few days past full phase and make a picnic and observing session of the occasion. Ridge Park may be approached by Highland A. which is next to the Wolfville Baptist Church. If you go past Acadia Univ. on the Main St., then you have gone too far. The park is at the top of the hill and is an ideal site for meteor observing. Bring your frisbee, lunch and blanket and join the fun!

August Meeting: Friday 17 August at 8:00pm at Atmospheric Environment Canada, Bedford Towers. We have arranged a tour of the weather office facilities for this mid-summer meeting.

Minutes of the May and June Meetings

The regular monthly meeting was held on May 25 at Saint Mary's University. Walter Zukauskas presented a two-part talk--a description of the General Assembly in London, Ontario, and the paper which he gave as the Halifax Centre's delegate. His paper reviewed the Delta Cephei observations which were obtained by some of the centre's members last autumn. Walter emphasized the strong presence of the Halifax Centre at the General Assembly.

After the talk, the Simon Newcomb Award was presented to its winner, Bill Calnen. The prize for third place, won by the Halifax Centre in the centre competition, was shown to those present. This consisted of a "1,000,000 Galaxies" poster and a copy of the Astronomical Directory by Gall Publications. The prize was won for the centre's Simon Newcomb display.

The meeting dissolved after refreshments. (This is no reflection on Bill, our cookie-monster.)

The June meeting returned to the N. S. Museum on the fifteenth of the month. Dr. Larry Bogan presented a richly illustrated discussion of the discoveries made by the Voyager 1 fly-by of Jupiter. The planet's diameter of 28^{o} at Voyager's closest approach, provided some spectacular photographs. Memorable slides of some of Jupiter's satellites were also shown. Dr. Bogan listed the many discoveries made in the Jupiter system, including the 30 km thick ring around the planet, "whistler" emissions from the atmosphere, a magnetosphere of five million amperes between Jupiter and Io, active volcanoes and great tidal forces on Io, two distinct terrains on Ganymede, and a heavy crater crust on Callisto. The presentation ended with a reminder that Voyager 2 is due in Jupiter's vicinity on July 9.

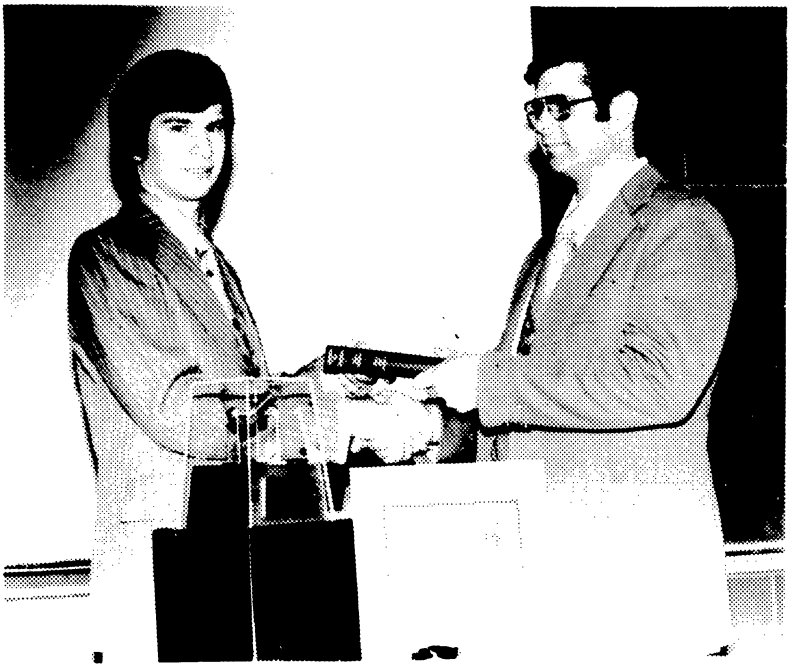
Before a brief coffee break, our National Representative, Peter Edwards, gave a capsule description of some of the activities of the National Council, emphasizing the May

18th meeting in London. Peter mentioned the Halifax Centre's proposed amendment to a by-law, a speaker exchange program, the up-coming IAU display, and the procedure for submitting papers for the General Assembly.

Steven Morris then briefly took the floor to explain the various features of the "1,000,000 Galaxies" poster, won by the Halifax Centre at this year's General Assembly.

After refreshments, interested persons remained to discuss the centre's proposed observatory site in Enfield. Mr. Brian Guest, part owner of the land, explained the advantages and disadvantages of this particular site. The meeting ended with plans to examine the site further before any final decisions are made.

Diane Brooks
VP/Secretary



Michael Edwards making the first presentation of the Simon Newcomb Award to William Calnen, Jr.

Simon Newcomb Award Presentation of 1979

At this year's General Assembly in London, the Simon Newcomb Award was presented for the first time. The Award was conceived and constructed by the Halifax Centre, for creativity and accuracy in astronomical writing by a non-professional R.A.S.C. member. It was with great pleasure that the first recipient of the Award was Mr. William Calnen of the Halifax Centre.

The topic of Bill's paper was, "Astronomy at King's College, Windsor, Nova Scotia". The King's College Observatory was the earliest facility used for instruction in astronomy in Nova Scotia.

Judging was done as impartially as possible. Each entry was read by the Awards Committee, consisting of Dr. A. H. Batten, Mr. H. Creighton, Rev. N. Green, Dr. H. S. Hogg, and Mr. F. Shinn, without knowledge of the author's name or centre. Each entry was rated in order of merit. Peter Broughton, Toronto, and Peter Jedicke, London, tied for second-place honours.

Entries for next year's competition should be submitted in accordance with the competition rules, which appeared in the National Newsletter for August 1978 and which will appear in future issues of the National Newsletter.

Since Bill was unable to attend the General Assembly, the Award was presented to him on May 24, during the regular monthly meeting of the Halifax Centre. The photograph of Simon Newcomb, which appeared in the Halifax Centre's display at the London General Assembly, and a copy of Newcomb's book, Astronomy for Everybody, were also given to Bill as part of his prize.

Diane Brooks
VP/Secretary

ONWARD AND UPWARD or CLOSER TO THE STARS

Michael P. Edwards

As most of you know or have heard or may have even read in an earlier edition of this fine newsletter (which you are now reading), the Halifax Centre is about to spring forth in the construction of an astronomical observatory. Our reason is not that the building fad of the Royal Astronomical Society of Canada western centres has reached the east, but rather that a keen interest among the members of our centre for an observatory we can call "home" has developed. You also realize that a probable location for this marvellous edifice has been offered by our librarian, Brian Guest. The location for this intended marvell is about 14 miles or 22.5 km (?) from Bedford. It is at Brian's home in Grand Lake (actually beside the lake), about 3 miles (5 km) back the old highway from the Enfield intersection of the 102. As anyone who stayed for the second portion of last month's meeting learned, the specific site is up quite a grade, no, rather it is up a cliff. It has an elevation of approximately 265 ft(80.8 m) above sea level. Though inaccessible to traffic, it is quite possible to unload building materials at the foot of the 60 degree 180 ft (55m) slope to the summit. When at the top, we are faced with a solid outcrop of bed-rock and a fairly level area. If you can fly you will find that it is 200 ft (127 wf) to the Guest's house. The intended building area is well treed but we will be permitted to trim and remove what is necessary so as to provide a good view. Any of you that have made the climb to the top will agree that there is a great view of grand lake from there.

Several possibilities for building funds have been discussed. One is using the centre's funds and applying for a grant from the National Office. Another is that Brian Guest might be willing to provide materials at his cost. Our manpower would entitle us the access to the

structure. The basic plans call for an observatory building of 12 to 15 ft in diameter with a warm room off to the side. Both structures are to be built of stone, which is in plentiful supply. It is proposed that the structure will be owned by Brian Guest with the Halifax Centre holding ownership of the dome and any of the materials we may wish to house in such an observatory.

Subject to the joint approval of John McNeil and Randall Brooks it has been suggested that until the Halifax Centre has its own telescope, the 12½ in. telescope they have been building be housed in this observatory. This was offered by Randall at the discussion in the second portion of the last meeting, of the centre at the Museum.

The problems which are most evident are the placing of materials at the site and the legal problems regarding liabilities. The first problem will be solved by brute force and ingenuity of our membership. The second will be solved by consulting with the National Office. It will probably mean the incorporation of the Halifax Centre. This will be a long process.

It is hoped that if this is to be the location of the observatory that by fall we will have placed a stairway of some kind to the site, we will have most of the building materials at the site and may even have completed the base of the observatory building. Prior to getting underway we have a lot of careful planning to go through.

Though this is the most likely site if someone has an alternative site in mind please bring it up at the next meeting or let the centre executive know your thoughts.

Though interest is keen to proceed, we must proceed in a well planned and responsible manner. If not interest will quickly fade, as in a nova and the desire for a Halifax Centre Observatory may never be realized.

THE NATIONAL COUNCIL--SPRING '79

Generally speaking, the National Council (NC) meets four times a year, the end of September, the end of January, just before the G.A. and just after the G.A. This is a report on the two council meetings held in London, Onatario at GA '79.

The first meeting was held Friday, May 18, 1979 in Delaware Hall at the University of Western Ontario. The President's remarks included the reason I had to go to London, namely the election of the NC represenatives and their alternatives. Halifax intends to seek an amendment to by-law 10a, making it easier to guarentee each Centre can be represented on Council should the elected rep be unable to attend the meeting.

The general business of the meeting included setting up an exchange speaker program with up to $1000 per year alotted for travel grants. Reports were heard from the Officers of the National Executive and the Editors of the Society's publications. The Simon Newcomb Award winner was announced and the two following changes to the rules were approved: 1) All entries, whether they come from unattached members or the Centres' councils are to be sent to the National Office 2) the essay should not contain any direct identification of the author or the aurthor's centre. However, the essay must be accompanied by a letter supplying these necessary details. Dr. Percy reminded the NC reps that he would like to visit all 18 Centres before his term as National President ends next year.

I informed Council that Halifax was already making preparations for the joint meeting with CAS from June 28 to July 1 1980. Victoria Centre extended an invitation for the 1981 GA. The standing committees next reported. They include the Editing, Property, Awards, Historical and Newsletter Committees. The Sept. Council meeting was set for Sept. 29 in Toronto.

The 2nd meeting was held on May 20. Committees were re-appointed and discussion on procedures for submitting papers for GA's followed. These will be included in the call for papers and Dr. Cunningham will be the Papers Chairman.

Peter Edwards, NR

QUASARS IN THE BACKYARD

Quasars, those tremendously bright objects with high velocities, may not all be as far away as has been thought by many astronomers. This bright, compact type of object was discovered in 1963 by Martin Schmidt at the Hale Observatories who recognized the spectral features as highly red shifted. Because the red shifts, 30-40% of the speed of light for those first discovered and now as high as 93%, they were considered to be at the edge of the observable universe, ie. at cosmological distances. A small number of astronomers, however, thought that this was not necessarily the case and two such astronomers are Halton Arp (Hale Obs.) and Jack Sulentic (Padua Ast. Obs., Italy).

Arp and Sulentic have considered two cases where quasars are very close in angular separation from normal galaxies (Astrophysical Journal, 229, pp. 489, 496). NGC 3379, 3384, 3389 are a triple system with 3384 a 'dominant' elliptical galaxy. Nearby is a cluster of 8 quasars which are aligned with 3384 and 6 of which have very similar red shifts. The two closest pairs each have almost identical red shifts although the more distant of the pairs has slightly higher velocities. This cluster of quasars is however not superimposed on and does not stand out from the background count of 8-10 quasars per square degree. Except for their unusual alignment and the similarity of red shifts, they might not have been associated with the central galaxy. Arp has postulated for many years the theory that quasars are formed in nuclei of galaxies and pairs ejected at high velocity in opposite directions. Over long periods, the quasars could move large angular distances from the galaxy becoming part of the field quasar background. The large number of small galaxies visible in the area studied around NGC 3384 may be evolved remains of quasars ejected long ago.

The second study involves three quasars which appear to be embedded in the arms of the barred spiral galaxy NGC 1073. The three are within two arc minutes of the nucleus and Arp and Sulentic pointed out that the spiral arms split just before reaching the quasars and continue past on either side. Also, they have discovered that dimetrically

opposite each quasar is an ultraviolet object. Rather than being violently expelled from the galactic nucleus, they suggest the trio of quasars is being gently carried along by material forming in the arms. If this theory is correct, one might find quasars in the arms of the Milky Way or other galaxies. Indeed an example has already been identified in NGC 4395 in a similar location in the arms. These two studies give some of the strongest evidence for 'local' quasars. Are all quasars associated with galaxies and hence not at cosmological distances at all? If not Big Bang Theory may not be so readily proven.

A BINARY QUASAR ?

The first scientific observations with the MMT (Multiple Mirror Telescope) in Arizona were made about the first of April. These were of a peculiar object which appeared to be a binary quasar. Investigations indicate that it is probably a single object that has had its light split in two by a massive object in the line of sight. The MMT, which consists of 6-1.8 meter mirrors computor controlled to yield the equivalent of a 4.5 meter instrument, is well suited for spectroscopic work and the spectra obtained of the object indicates that the red shift (1.4) of the two components is identical. The features are also identical and this is the basis of suggesting that the light of a single object has been split by a gravitational lens of some type. If so, this is yet another confirmation of Einstein's General Theory. A red shift of 1.4 places (ignoring the evidence of the above article!) the quasar at 6 billion light years. A dark galaxy of 10^{12} solar masses half way between the quasar and Earth might be sufficient to cause the observed splitting. Over a period of a year, it may be possible to observe differences in the two sources--one becoming brighter as it approaches Earth and then the other. However the Earth's orbital motion may not be sufficient to cause observable changes.

The MMT, the first major advancement in telescope technology in the twentienth century, was built at one third the cost of an equivallent 4.5 meter single mirror instrument. It is on Mount Hopkins and was built by the Smithsonian Astrophysical Obs. and Univ. of Arizona. The MMT was dedicated in the early part of May but will not be in full operation until 1980.

UPS AND DOWNS OF SOLAR ACTIVITY:

You're all aware of the 11 year solar cycle and most of you are aware of the 22 year magnetic reversal period. But have you heard of the 2 year cycle? Recently Kunitomo Sakuria of Yokohama announced the discovery of a variation of sunspot numbers over a 25.7 month period. This variation is a ripple on top of the 11 year variation. What is exciting, according to the researcher, is that this newly discovered period corresponds to a variation in the neutrino flux.

This new finding may help astrophysics to develop new theories on the activity in the solar interior. Among other things, we do not yet understand why neutrinos are not produced in higher quantities. The apparent relation between sunspots and the thermo-nuclear core may provide some needed clues to our understanding of stellar interiors.

NEW FILM AVAILABLE:

Astronomers have been using IIIa-J photographic plates for a number of years and now a film version with similar characteristics is available for amateurs. The 35 and 70 mm sizes are known as 087-02 and the sheet version is 087-03.. They are special order items and come in 125' lengths (35mm) on 0.004 inch Estar base. You'll have to have a dealer order it for you or you may be able to get it through University Optics or Optika in the US.

The characteristics are only slightly different from the professional version. It is red sensitive, ie. good for nebulae; has low reciprocity failure; fine grained and has high contrast. Processing can be done in the bathroom sink using D-19 as the developer. Storage should always be near -10°C in a freezer in a very tightly sealed plastic bag.

I find it amazing that amateur astrophotographers do not use this and other special films (103a-D, 103a-0) to a greater extent. They will spend hundreds of dollars for equipment but will not invest $60 for a two year supply for these super films for astrophotography.

FROM THE CENTRES 1

The Star Seeker, Calgary

The following is a condensed report of a lengthy account in a recent issue of the British Interplanetary Society's publication SPACEFLIGHT.

RARE METEORITE FRAGMENT

Scientists working for NASA and the Smithsonian Institution have confirmed that a meteorite found last winter in the frozen reaches of the Antarctic is one of the rarest types known. The meteorite fragment, which has not yet been named, was found by Dr. William Cassidy of the University of Pittsburgh while on an expedition sponsored by the National Science Foundation.

Called a carbonaceous chondrite because of its high carbon content, the rare meteorite was found with what is believed to be another similar sample and with about 300 other specimens.

Studies of fragments from this meteorite sample are expected to shed more light on the processes of chemical and physical evolution that may have taken place during the early history of the Solar System, and to enhance our knowledge of the regularity of this evolution in other planetary systems.

Dr. Brian Mason of the Smithsonian Institution, Washington, D.C., and a leading expert on meteorites was sent a 0.4 gram (.014 oz) sample from the fragment. By carefully examining a thin slice of this chip, under a high-powered microscope, he was able to observe more details.

The carbonaceous chondrite which was examined is a 19.91 gram (.7 oz) sample about the size and shape of a small egg. The specimen has an overall charcoal grey colour with a slight olive green cast. The interior consists of a fine-grained dark grey matrix with about two to three per cent of crystalline inclusions called chondrules.

The meteorite fragment is a Type 2 carbonaceous chondrite. Fifteen other Type 2 samples have been collected before, but none were in so clean a condition and so well-preserved. The Type 2 carbonaceous chondrites have previously been shown to contain amino acids of a non-terrestrial origin which suggests the chemical formation of the complex organic molecules necessary to life are found in other regions of our Solar System. Carbonaceous chondrites like other meteorites, are 4,500 to 4,600 million years old and preserve a record of how the Solar System formed at that time.

The initial examination took place with the meteorite inside a lunar-type glove box flushed with dry nitrogen gas. A low-power microscope was used for the initial examination that confirmed the carbonaceous nature of the specimen.

The special precautions being taken in the examination and curation of the meteorites arises out of the belief that the fragments have not been significantly contaminated since their arrival on Earth. The samples have been preserved under excellent conditions in the Antarctic. The constant cold and extremely dry air are thought to have kept the samples in a near pristine state, without destroying any of the valuable scientific information that they contain.

FROM THE CENTRES 2

Orbit, Hamilton

Radar Finds Earth-Like Features

New high resolution ground-based radar pictures of a very large area of the planet Venus are providing the most comprehensive view ever seen of the mysterious planet's surface. The pictures show a wide variety of terrains, some similar to those on Earth and some resembling those on the Moon.

The radar observations were made at the Arecibo Observatory near Arecibo, Puerto Rico, by Donald B. Campbell, Barbara A. Burns and Valentin Boriakoff.

The new observations, which cover an 80 million square kilometer area of Venus, show numerous large craters, some 320 km. in diameter. Most of these craters have prominent central peaks resembling many craters on the Moon. As with the lunar craters, the Venusian craters seem to be the result of the impacts of large meteorites. Most of the craters appear to have a blanket of dust-like material on their floors.

A region of special interest, first noted many years ago because of its high reflectivity for radar waves, is the area known as Alpha. The high resolution of the new observations reveals that this region, which is 1200 Km in diameter, contains a very large number of roughly parallel ridges about 19 Km. apart. Some ridges can be traced for distances of hundreds of kilometers.

The Alpha region appears to be the counterpart on Earth, although it bears some resemblance to the mountain ridges of the Appalachian Mountains or perhaps to systems of sand dunes in the Arabian peninsula. A central dark object in this region suggests that a volcano may be part of the large feature.

Another prominent radar feature known as Beta is about 800 Km. in diameter with long tongues of rough material extending irregularly from it as far as 480 Km. Beta has

a central dark feature, visible in the best resolution, which resembles the caldera of a volcano. Information from NASA's Jet Propulsion Lab in Pasadena, suggests that the feature has a height of about 10Km. All the data, taken together, indicate that this feature is of volcanic origin and is immense.

In another part of Venus, two parallel ridges extending more than 960 Km. have been found. These ridges have a height of about 2,100 meters and form a structure exceeding the Grand Canyon in scale.

The radar evidence indicates that volcanic and mountain building processes similar to those on Earth, as well as meteoric impacts, have played a prominent role in shaping the surface of Venus.

[From NASA News Release 79-47].

MAJOR NEW OBSERVATORY

Britain has been looking for a new site in the Northern hemisphere for major astronomical instruments for a number of years. On 26 May, Britain, Sweden and Denmark signed a treaty with Spain for use of a mountain top on La Palma in the Canary Islands. The signing capped an 8 year search.

The Isaac Newton Telescope which was completed in 1967 and which is at Herstmonceux, Sussex will move there and be ready for use by 1982. The 2.5 meter (98") has been plagued by clouds and has only 1000 hours of usuable time at its present site. La Palma will offer more than twice the time. In addition a 1 meter reflector will be moved to the new site and a 4.2 meter is in the early planning stages.

The mountain is an extinct volcano and the observatory will be known as Rogue de los Muchachos Observatory. Sites in Italy and Spain were also considered but found inferior. Britain's other major astronomical efforts include a large infrared instrument on Mauna Kea and 1.2 m. Schmidt and 4.2 meter both operated jointly with Australia at Siding Spring, Australia.

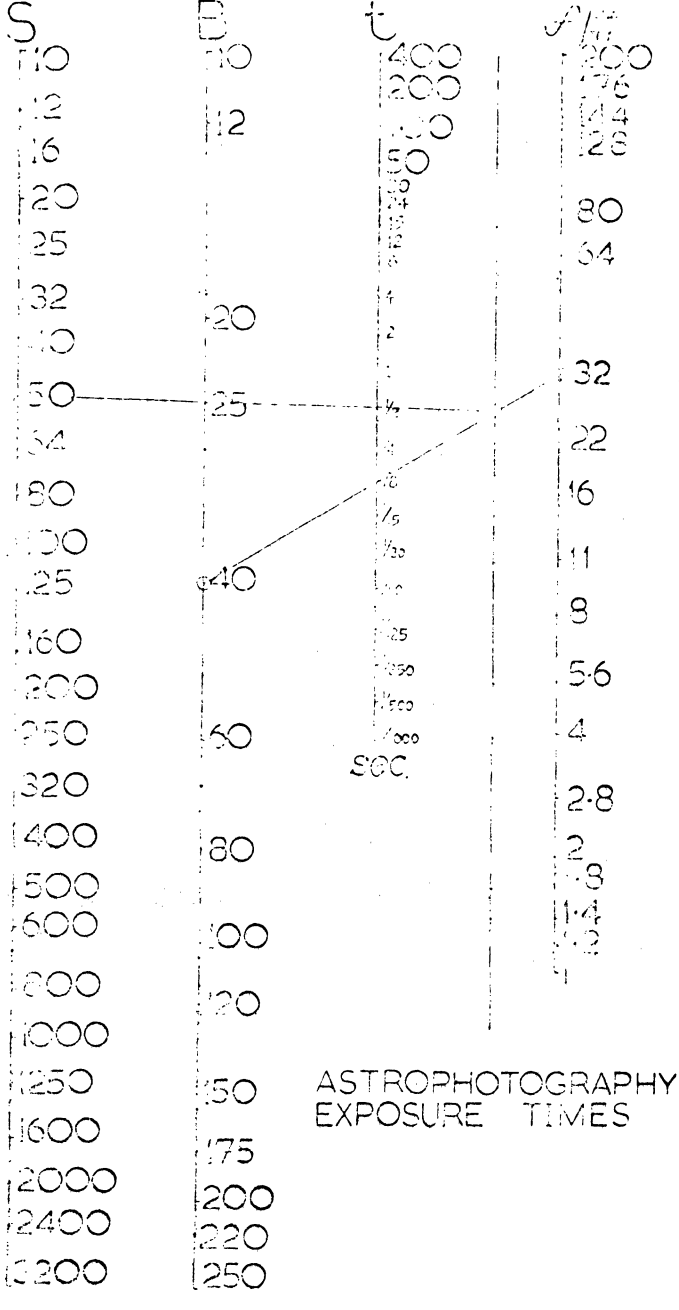
HINTS FOR TM's

I have mentioned the use of ceramic tiles and sub-diameter tools for mirror grinding before but will pass on a few hints that I have gained and some which were passed on to me from Bill Parnell. Ceramic tiles of any type can be used but must not have the glaze that your bathroom tiles have. I have used some which I obtained from Willman-Bell in the US and they are hexagonal in shape. They may be cemented to any thick, strong material to act as the tool. I used an old broken mirror blank but a piece of metal 3/8 or 1/2 inch thich would suffice. The backing material should be cleaned thoroughly before applying epoxy and the ceramic tiles. As with making the pitch lap, start with one tile off centre so you will not generate zones. The tiles are applied with 1/16 inch space between adjacent tiles, and the outer ones are cut to form a circular form. In use the ceramic tiles are very fast in generating the curve--I made a 6" f/5 curve in less than 2 hours--and can be used from rough to fine grinding. In changing grit it is wise to wash lightly and remove only the loose particles which are trapped in the grooves. The speed of this type of tool comes from the grooves which act as the channels in a lap, ie. they direct the grinding compound to the working surface instead of pushing the compound off the side.

When it comes to making the pitch lap and polishing a large mirror, then consider using a sub-diameter tool. Bill sent me one along with the following suggestions. "You said your mirror was a 12½" f/4 so I generated a 100" R of C on one side so the pitch would be of uniform thickness. When putting the pitch on the tool, I first wiped the tool with acetone to clean it, then warmed it in water, dried it, wiped it with a little turpentine and then applied the pitch which stuck well. A note of warning- in polishing and parabolizing my 8" f/4 all with a 4½" tool, I found that if I crossed over the centre on most strokes, the centre of the mirror deepened too much. In using circular and curved strokes where the tool passed about 1-1½" from the centre with an occasional pass over the centre, all worked out OK. I found that the aluminum tool works well, the only fault I found was that your hands get black from handling the back of the tool". Indeed it worked well on my 12½" and saved a lot of energy.

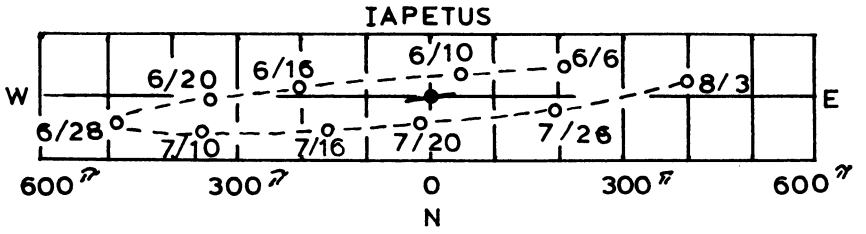
ASTROPHOTOGRAPHY EXPOSURE TIME NOMOGRAM

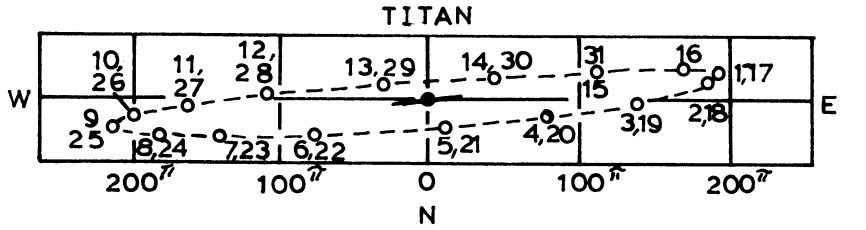
After placing a similar nomogram in the last issue, I received my JBAA with this one by C.J.R. Lord. It is used in the same manner, i.e. if two parameters are known the other two follow simply. 't' is time in sec., f/# = relative aperture; S = emulsion rating (ASA); B = Subject brightness in arbitary units.



OBSERVING SATURN's MOONS

Have you ever looked at Saturn and wondered which of the star-like dots was actually Titan or Iapetus? Most of Saturn's Moons are fairly faint but several can be observed with small telescopes. The charts below show the positions of Iapetus and Titan for July and early August but Saturn moves into conjunction with the Sun in August and September, so you had better not delay too long to use these. Titan is the sixth from Saturn and the brightest. Iapetus is eighth but only reaches about 11 mag. Iapetus is however slightly variable and shows definite brightening near western elongation. Tethys (3), Dione (4), and Rhea (5) are all closer to Saturn than Titan and these three are also brighter than Iapetus. These three were all discovered by Cassini in the 17th Century while Titan was first observed by Huyghens (1655) and Iapetus also by Cassini (1671). The sacles on the diagrams are in seconds of arc.





TELESCOPE WANTED

If you have a telescope which would be suitable for a young teenager and will sell at a reasonable price, please call Mr. Ken McKenzie at

home 465-9643 or office 428-2536

THE JOYS OF COUNTRY LIVING

Jody LeBlanc, OC

As you may have gathered from my article in the last issue of NN's, I'm a died-in-the-wool in-town observer and have no intentions of giving up observing from my corner of suburbia until I can no longer find the Moon. However, even I am subject to the lures of dark country skies and their promise of long fog-free exposures and dim Messier objects, and I usually sucomb to these promises during the summer months.

I'd like to take this opportunity to tell the other side of the story--the half those 'country folk' never tell. There are in reality many hidden hazards in country observing; here are a few that I've run into. (In defense of Glenn, I suppose I'll put getting hopelessly lost near the top of my list. We've got a cowbell, compass, long leash and some bread crumbs for him for this years C/O Weekend).

I've done most of my observing from farmers' fields. Although at first glance they may appear ideal for astronomy, when darkness falls their pitfalls become apparent. When struggling to carry your equipment over dark, unfamilar terrain, some 'darker than the rest' spots must be avoided. This brings us to the next hazard; oftentimes fields which appear dark and deserted are in reality occupied by large animals that seem to have little interest in astronomy but great interest in astronomers. My experience in this vein was in trying to outrun several race horses (where did they come from?) while carrying/dragging four cameras, one cot, one sleeping bag, two thermos and a radio. Note that music does not always sooth the savage beast! I was holding my own until one of those damned dark spots appeared....

Even when your choicest site is safely reached, you and your telescope may become a temporary home for 100,000 ants. The first time a bug walks across the field lens of a Ramsden or Kellner eyepiece and is projected in startling relief against the Moon, is an experience that has to be lived through to be believed.

Holes dug by strange burrowing animals never seen in Halifax seem to lurk in hiding, waiting to have a particular affinity for people carrying expensive equipment but what can you expect from something that hides under a foot and a half of grass?

Oh yes, the grass. I wish I had half the stuff I've lost in knee-deep grass. When I drop the first eyepiece and begin feeling around for it, I begin to dream of my well-mowed and yes, well lit backyard. Right on cue, the fashlight dies. Gone is my one link with civilization, and as I chide myself for once again forgetting the can of Deepwoods Off I begin to wonder if maybe insects aren't the superior race.

After ruining several exposures by trying to operate unfamilar cameras by feel (I once focused a twin-lens reflex at 3.5 feet for an entire night) it usually begins to rain. This means a quick retreat, invariably leaving something behind, and a reenactment of the events of the outward trip--barbed wire is impossible to see without a flashlight.

Why do so many of us city dwellers subject ourselves to such torture year after year? Because the skies are that much better and the results are worth it, either visually or in the eventual photographs. But as I contemplate another 'fun' summer of astronomy, country-style, all I can say is "Thank God I'm a city boy!"

This months note to astro-photographers: Several in-city labs will push-process E-6 films including Fujii, several stops. I've only tried The LAB on Blower St. Their processing is OK, but their mounting is a little erratic. Check prices before committing yourself; this push-processing can be expensive.

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