NOVA NOTES

Halifax Centre

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1991 Halifax Centre Executive

Honorary President	-	Dr. Murray Cunningham	
President	-	Mary Lou Whitehorne 53 Zinck Avenue Lr. Sackville, N.S. B4C 1V9	865-0235
First Vice-President	-	Joe Yurchesyn 5264 Morris Street Apt. 1104 Halifax, N.S. B3J 1B5	422-8030
Second Vice-President	-	Brian Segal RR#5 Antigonish N.S. B2G 2L3	783-2772
Secretary	-	Wesley Howie 19 Plateau Crescent, Apt. 515 Halifax, N.S. B3M 3K9	457-3052
Treasurer	-	Nat Cohen 32 Roblea Drive Dartmouth, N.S. B2W 1Y7	434-3103
NOVA NOTES Editor	-	Patrick Kelly. 2 Arvida Avenue Halifax, N.S. B3R 1K6	477-8720
National Representative	-	Douglas Pitcairn 13 Ferguson Road Dartmouth, N.S. B3A 4J8	463-7196
Librarian	-	Jason Adams P.O. Box 447 Lower Sackville, N. S. B4C 3G4	865-1437
Observing Chairman	-	David Lane 26 Randall Avenue Apt. 4 Halifax, N.S. B3M 1E2	443-5989
Councillor(s)	-	Dr. David Turner	435-2733
	-	Dr. Randall Brooks	434-7567
	-	Greg Roberts	835-6264
Centre's Address	-	Halifax Centre, R.A.S.C. c/o 1747 Summer St. Halifax, N.S. B3H 3A6	

Notice of Meetings

Date: **Friday, March 15th: 8:00 P.M.** for the main speaker
Place: Nova Scotia Museum, Summer Street, Halifax. Access from the side entrance. Meeting to be held in the lower theatre.
Topic: **Dr. Bob Hawkes** from Mount Allison University will be giving a talk on meteor impacts entitles *Is It Safe to Go Out Tonight?*.

Date: **Friday, April 19th: 8:00 P.M.** for the main speaker
Place: Nova Scotia Museum, Summer Street, Halifax. Access from the side entrance. Meeting to be held in the lower theatre.
Topic: **Nat Cohen**, will give a talk entitled *Practical Applications for Astronomy*.

Date: **Friday, May 3rd: 7:30 P.M.**
Place: Chinatown Restaurant, Bedford Highway (at Kearney Lake Road), Halifax.
Topic: The speakers for the banquet will be **Dave Lane** and **Joe Yurchesyn** who will be presenting *Misadventures with a CCD*. Tickets are available from Mary Lou Whitehorne at $22.00 each (including tips and taxes). More details in the next issue.

Date: **Friday, June 21st: 8:00 P.M.** for the main speaker
Place: Nova Scotia Museum, Summer Street, Halifax. Access from the side entrance. Meeting to be held in the lower theatre.
Topic: **Member's Night**, if you have anything you would like to present, contact Mary Lou Whitehorne.

Halifax Planetarium Public Shows

At the following shows will be on the topic of the current sky. Please note that dates are tentative.

Thursday, March 7th :	7:00 P.M.
Thursday, March 21st:	7:00 P.M.
Thursday, April 11th:	7:00 P.M.
Thursday, April 25th:	7:00 P.M.

The Halifax Planetarium is located in the Dunn Science Building on the campus of Dalhousie University.

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

About the cover:

The cover shows a sketch of Io and its shadow on Jupiter. The sketch was made on February 3rd at 8:50 P.M. (E.S.T.) by Mary Lou Whitehorne using an 8" Meade at 150x.

Editor's Report

Patrick Kelly

I apologize for the lateness of this issue of NOVA NOTES, but the long-expected breakdown of the printing press at media services occurred shortly after the last issue was mailed out. We decided to wait as long as possible before going to a commercial printer but at the time that this was printed, things were still up in the air. Although the Museum has made tentative arrangements for the use of the Queen's Printer, that service isn't in place yet and a result, this issue was printed commercially. Hopefully things will be sorted out in time for the next issue.

Our top news item this issue is that long-time member **Randall Brooks** will be leaving us in early April to move to Ottawa. (Personally, I've never been comfortable with this form of "capital punishment".) Fortunately, this move is not due to him being named to the Senate! Randall will be the new Curator of Physical Sciences at the National Museum of Science and Technology. Congratulations Randall!! It just won't be the same without having the "centre's godfather" around!

Also on the move is **Jim MacGuigan**, who is returning to Vancouver to take over the operations of one of that city's telescope stores. Jim was a familiar sight at many observing sessions out at Beaverbank and always made for some interesting conversations during cloudy breaks.

We have made a major change to the Centre's Burke-Gaffney Award, based on a suggestion made by Dave Chapman. This was due to a lack of entries over the past number of years. The new rules are listed elsewhere in this issue, but basically the main change is that the award will now be given to the writer of the "best" article in the current volume of NOVA NOTES. These new rules don't take effect until next year (the volume of NOVA NOTES beginning with this one), so that anyone wishing to enter for this year must follow the older regulations. They can be found in your last year's March-April issue of NOVA NOTES or you can contact me and I'll send you a copy.

We have ordered a 1000 Oaks solar filter (off-axis Type II) for the Centre C8 so that borrowers can use it for solar work as well night-time observing. Also on the financial scene, we have set our "satellite" rebate for this year at $6 per person. This give rebates of $36 to the Nova Central club, $36 to Antigonish and $42 for the group in Sydney. We hope that this contribution will help promote astronomy in other areas of the province.

The recession has hit Halifax's two local papers. Both **Ted McLeod's** and **Doug Pitcairn's** astronomy columns were cancelled recently in addition to many other columns. In addition, **Terence**

Dickenson's column was dropped due to a communication mix-up, but will be starting up again on a monthly basis soon. If you would like to see these columns restored, a letter to the editors of the papers would be a good place to start.

Lastly, the next issue of NOVA NOTES should be out shortly after you receive this one. As I had a lot of articles for this issue, I have decided to postpone some of those items that I received until the next issue. As a result, the *Ask GAZER* and *Periodical Picks* features will not appear in this issue as promised (sorry about that, Chief!) but will definitely be in the next issue. I recently received a note from GAZER to the effect that he hasn't received any new "questions" from me lately and he was wondering if I had forgotten to pass any on. In fact, I haven't received any lately to pass on to him, so if you have any outstanding questions about astronomy, get them in to me as soon as possible!

Clear skies until next issue. Ω

Librarian's Report

Jason Adams

I'm not much of a writer, so here's a brief summary of what has been happening with your library.

In 1990 our library was well used by members, however, I feel that more members should take advantage of this great of knowledge available to them. If you don't see a book you want, just ask, we have a whole locker full of them.

This past year our library has seen a few changes. First of all we gave the library a badly needed facelift by doing a complete inventory of all the books and getting rid of some outdated ones.

Secondly, we purchased several new and exciting books ranging from mythology to building an observatory. If any members have any requests for new books, tell me and I will propose them at executive meetings.

Finally, a new section has been added to our library, that of a rapidly growing video library (VHS only). All of these new products seem to be very popular with the membership.

Though the library is being well used, I would like to remind members that the normal borrowing period is one month. If you require a longer time, please contact me or tell me when you sign the book out. Book returns have been satisfactorily prompt and I thank those members who have been punctual. However, if you are unable to return books at the monthly meetings, you may send them by mail to the Halifax Centre's of my address, both of which are listed on the inside front cover. For those of you who have overdue books, you know who you are, and if you aren't sure take a peek in your bookshelf. Thank you for your cooperation. Ω

Psychophysiological Affects of Microgravity on Astronauts During Manned Space Flights

Michael Hogan

There are four basic forces in nature and the first to be discovered was gravity. Gravity was discovered by Newton but he never fully realized why or how it worked (Snow, 1988: pp. 89). According to Snow (1988), gravity was discovered first because no special conditions were required for gravitational forces to be exerted (all masses attract each other). The law of Gravitation states that: "Gravity is the attraction between any two bodies with a force that is proportional to the product of the masses of the two bodies and inversely proportional to the square of the distance between them". Therefore, zero gravity (also known as microgravity) is the absence of gravitational forces between any two objects. Also, weightlessness is the absence of gravitational forces between objects or interstellar bodies (planets, black holes, etc). During manned space flights there is little or no gravity (zero gravity). Astronauts are faced with the initial problem of adapting to a weightless environment. However, there are noticeable **psychological** (Information processing, visual cue discrimination, etc), and **physiological** effects (taste discrimination, space motion sickness, eye movement, etc) of microgravity on astronauts in space. This essay will attempt to present various **psychological** and **physiological** problems caused by microgravity during manned space flight and successful countermeasures.

Humoral Immunity

Microgravity can be considered an abnormal condition relative to a 1-g environment. Also, microgravity has been considered (biologically) an abnormal environmental condition which is almost nonexistent compared to normal environmental conditions on Earth. Humoral immunity is the ability of human bodily fluids to adapt to sudden environmental changes. The human humoral (bodily fluid) immune response is predicted based on cell differentiation, complex cellular interactions, regulatory mechanisms, mitogenic activation (cell activation) with subsequent synethesis, and secretion of biologically specific antibody molecules. Such complexities increases the potential sensitivity to a wide variety of external stimuli such as prolonged weightlessness. Three important studies have been carried out on astronauts by doctors, neurologists and psychologists to test the affects of weightlessness on humoral immunity. They are as

follows: zero-gravity's effects on circadian rhythms, routine diurnal schedules (activities of astronauts during the day), and blood samples tested for immunoglobulin classifications during pre/post space flight. Results from tests on astronauts revealed that effects of microgravity on immunoglobulin levels are insignificant. However, zero-gravity may impair the lymphocyte activation process. This could affect the astronaut's immune system, which defends the body against diseases.

Taste Perception

During manned space flights, pilots exhibit changes in taste susceptibility resulting from the dynamic factors of flight. These include taste change of food and perception of an unpleasant taste in the mouth. These changes are believed to be a direct result of a weightless environment because their is a redistribution of blood and bodily fluids in the cranial region (due to weightlessness). Changes in the brains blood vessels cause endocrine and metabolic shifts influencing taste organs and receptors (see Appendix A). The electrogustometer (device used to measure electrical activity of taste receptors) has enabled researchers to study and record the function of the taste receptors in space. Baranski, discovered in 1983 that periods of exposure to microgravity and the variations of human adaption to weightlessness due to the conditions of space flight influence taste perception.

Mass Discrimination

In a 1-g environment it is hard to distinguish between the contributions of weight and mass to what is usually called weight discrimination. In a 0-g environment weight cues are absent and discrimination can be made only by accelerating the objects and using inertial cues. During Spacelab missions, astronauts have shown poorer performance in mass discrimination under 0-g conditions. Sudden changes in weight are known to impair weight discrimination and can remain impaired for as long as nine days in space. Evidence from various Soviet cosmonaut and Spacelab 1 missions indicate that humans are not as sensitive to changes in inertial mass as they are to weight. Misrepresentations of mass can occur because of imperfect monitoring of joint and pressure receptors by the brain. Also, high acceleration shaking due to re-entry into the Earth's atmosphere was found to improve mass discriminations, but weight discrimination was still impaired. Adaptation to zero gravity can only partially compensate for loss of gravity indicating that astronauts will continue to have difficulty coping with the absence of gravity in space regardless of practice or repeated exposures to zero gravity.

Eye Movements During Sleep

Eye movements differ during sleep as opposed to when someone is awake. Research has discovered that microgravity affects eye movements during sleep, especially during rapid eye movement sleep (REM). During normal sleep patterns, REM sleep occupies 20 to 25 percent of the total (one night) sleep time. REM sleep was measured by Medilog electrophysiological tape recorders on Spacelab 1 missions. Electronic recordings of sleep patterns revealed that REM sleep in space was increased by 25% during prolong periods in space. This reflects a temporary imbalance of the REM mechanisms which include other autonomic variables such as heart rate and blood pressure. However, other research has failed to duplicate these research findings. Research in this area is limited and, in the future, more studies should be carried out on this topic.

Spatial Orientation

During manned space flights there have been profound affects on spatial orientation due to zero gravity. Vestibular otolith receptors are small mineral grains embedded in the membrane of the cochlea. These receptors respond to linear motion and gravity. Otoliths are primarily known as gravity receptors, and the brain adapts to microgravity by reinterpreting all otolith receptor output. Sensory conflicts are problems responding to stimuli and storage of information in a weightless environment. Sensory conflict results from disturbance in spatial orientation due to imbalances between the gravity receptors, semicircular canals (located in the ear) and the eyes. Sensory conflict causes the astronaut to have problems determining object orientation. Also during weightless environments, astronauts "use" the retinal vertical and cognitive representations to deal with the loss of gravity. The retinal vertical is what the astronauts determine as up or down depending on their body orientation in the space craft. Cognitive representations are knowledge from prior exposures to zero gravity. On earth, gravity is the primary cue for spatial assignment, however, retinal information is the dominant cue in a weightlessness environment. Therefore, spatial orientation (in space) is affected by zero gravity due to disturbances in otolith receptors, the retinal vertical, and cognitive representations (prior experience of zero gravity encoded in the brain) stored in the brain.

Reaction Time

Reaction time of astronauts have been affected by zero gravity. The following tasks in space flight have been affected due to microgravity, they are: reaction time; quick decision making and control of various computer mechanisms. Not only were they

affected, they were impaired. These various tasks are impaired due to poor reaction time during prolonged space flights because of increased muscle wastage, modifications in calcium and phosphorus mineral balance of bones as well as lower bone density, and sensory-motor coordination impairments. Quick decision making and performance of critical tasks of short duration are also notably affected by microgravity and tend to worsen during space missions. An effective countermeasure would be to limit the amount of time astronauts spend in space during their space missions.

Auditory Changes

Changes in posture and body orientation, due to weightlessness, affect inner ear fluid pressure and auditory thresholds. When inner ear fluid pressure is affected by posture and body orientation, the displacement of the tympanic membrane (membrane in the inner ear) and the transfer of sound waves in the inner ear are disturbed. Results of these disturbances can lead to nasal congestion. Zero-gravity has also been found to alter fluid pressure in the fluid space of the inner ear, and affect receptor activity in the inner ear. This can lead to sensory conflict which can affect an astronaut's performance on the spacecraft and possibly lead to space motion sickness. However, zero gravity has no affect on hearing. The physiological functions of the inner ear affected by microgravity has been found to differ among astronauts due to individual differences in biomechanical properties in the body.

Space Motion Sickness

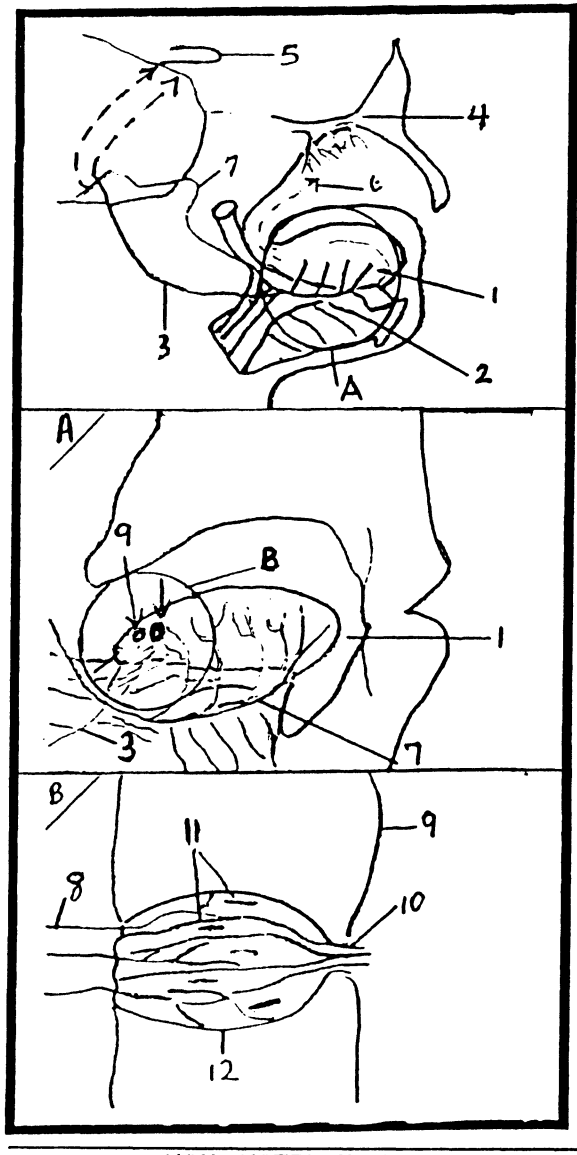
The most prominent affect zero gravity has on astronauts during manned space flights is what is known as space motion sickness (SMS). SMS is reported by almost every astronaut when entering space. There are two important symptoms of SMS: perceptual and physiological. Perceptual symptoms include dizziness and illusory sensations which are characterized by the astronauts difficulty distinguishing what is up and what is down. Perceptual symptoms are caused by otolith organs and inner ear fluid disturbances (already mentioned above). Physiological symptoms include stomach upset, fatigue, vomiting, dry mouth, perspiration and a stuffy head (due to fluid shift). Zero gravity increases prostaglandins (fatty acids in the stomach) causing contraction of muscles in the stomach affecting digestion; this possibly leading to indigestion and vomiting.

Effective Countermeasures

Zero gravity has both psychological and physiological affects which in turn affect the astronauts behavioral performance during space flight. To counterattack these affects, behavioral adaptation programs and drugs have been used to

Appendix A

Location of Taste Receptors and Organs



Key

1) Tongue
2) Muscles
3) Nerve to back of tongue
4) Olfactory nerve
5) Taste center inside brain
6) Aromas from food
7) Nerve in front of tongue
8) Nerves
9) Papillae
10) Pore
11) Taste receptor cells
12) Taste bud

combat the numerous effects microgravity has on astronauts. Behavioral adaptation to zero gravity has been accomplished by helping astronauts distinguish relationships between postures and orientation according to the visual field, prior experience, educating the astronaut about how people construct particular cognitive images in space, and reorganization of motor acts (head and neck). These have helped astronauts improve mass discrimination, control redistribution between flexor and extensor muscles, and improved adaption of vestibulocochlear nerve reflexes. Illusory sensations and other symptoms of SMS caused by perceptual and physiological changes, auditory changes, spatial orientation, and humoral immunity, have been treated by antihistaminic drugs, head caps to restrict head movements, and insole counter-pressure devices that add pressure to the sole of the foot. Stomach upset and vomiting have been reduce by breaking up prostaglandins before they can affect the contraction of stomach muscles. Anti-motion drugs have reduced tiredness in astronauts.

Conclusion

Various psychological (behavioral) and physiological affects have resulted from man's entry into space where gravity is absent. All astronauts are faced with these problems and behavioral adaptation and pharmaceutical drugs have helped dramatically. NASA and other major space research centers have been researching ways to sufficiently control the effects of zero gravity on astronauts. However, effects of zero gravity cannot be fully controlled or effectively prevented because microgravity is an unchangeable phenomena of nature and the universe. In the future, researchers will have to continue to investigate the effects microgravity has on astronauts, thus improving man's "adaption" in a weightless environment. Ω

Book Review: Observing Handbook and Catalogue of Deep Sky Objects by Christian B. Luginbuhl and Brian A. Skiff

Brian Segal

As the authors are quick to point out in the prolegomenon, there has been a need for a comprehensive, descriptive book dealing with visual appearances of deep sky objects for some time.

There are many good books that aim to guide the amateur astronomer through the splendours of the night sky, and many

provide quite reasonable charts and catalogues of sorts.

Unfortunately, most of the authors have chosen to lean rather heavily on impressive photographs for illustrative purposes. While these images are exciting and intriguing, and certainly whet the appetite for more, they have a tendency to raise unrealistic expectations. More to the point, the photos usually include far more detail that the eye can see, so there is a lot of room for confusion at the eyepiece.

The books that take a more moderate approach tend to be older. Amateur equipment has grown in both size and quality to a tremendous degree. In many cases the equipment now in common use by amateurs would make the "pro" of yesteryear drool with envy.

When you start relying on such catalogues as the NGC 2000, even in its updated version by Roger Sinnott, you realize quickly that the cryptic description line hardly fills out the visual experience.

The OBSERVING HANDBOOK (let's call it the OH) provides the serious amateur with a smorgasbord of information. The first section contains a discussion of amateur observing and covers hardware, reference materials, gadgets, sites,and note taking, and describes the equipment used for the observations recorded in the catalogue.

This section is fairly brief, although to the point. No doubt the authors realized that so much good information is available related to the above subject matter that its inclusion was more of a way to familiarize the reader with their approach and preferences than a pedagogical treatise. We learn about their site preferences and their opinion that darkness can go a long way to making up for aperture (how true!).

We also learn that despite their preferences, the authors had to do a lot of observing from a very bright location atop the chemistry building at Northern Arizona University at Flagstaff.

On a typical night the limiting magnitude for a 15 cm scope was 13.6 and a 25 cm was 14.4. These are textbook values that tell you a lot about star visibility, but not much about diffuse objects. (James Muirden quotes similar values in his Handbook, but considering the sky conditions described at Flagstaff the authors are doing quite well).

The second section is a discussion of the reference resources used in compiling the catalogue. The authors point out that in some cases the dichotomy between the needs of the amateur and the published data for the professional necessitated the generation of fresh material. For the most part the references are quite traditional.

The third section comprises a brief discussion of the references used in building up the actual observing list.

We, finally, arrive at the catalogue itself. It is ordered alphabetically by constellation rather than by right ascension. This is probably the most convenient format assuming that you know where your target resides. Without a doubt, if you've bought this book, you know you way around the sky by now!

In the actual construction of the descriptive section the authors have presented the list either in order of NGC number or in the case of non-NGC objects in order of interpolated Right Ascension. Each description has a header which gives a two letter object type (i.e. eg for galaxy, oc for open cluster, etc.). This is followed by the catalogue number, angular dimensions, visual magnitude, and then various abbreviated data.

Under the heading is a short, but succinct text, which gives the reader a visual description of the object as seen through a 15 cm, a 25 cm, and sometimes a 30 cm instrument. The authors take pains to point out things visible in the eyepiece that serve to guide the visual observer to the target. Considering the inevitable inability of either a chart or a photo to duplicate the eyepiece view, this is a very valuable feature, and is, essentially, what makes the book so important for the serious observer. The descriptions of the target objects are as you see them in the telescope rather than as the camera saw them from Mount Palomar.

Throughout the text are charts and sketches to help you locate and recognize objects. Both are clear and well laid out with the scale clearly indicated, and in the eyepiece sketches, north indicated. There are also some excellent full page black and white photos found here and there throughout the text (there is a particularly nice shot of M-5 just to remind you of what the camera can do!).

The final pages of the book are taken up with a catalogue of the described objects. The list starts with the NGC's and them goes into the various other lists. The format is more or less the usual with the addition of a column listing the page number of the object. The "notes" column tells the reader if something is a Messier object, within a larger group, found on a particular chart, etc. Coordinates are given for both 1950 and 2000 so the catalogue can easily be used with most of the currently available charts.

The very final pages offer a short list of double stars in catalogue form.

The only awkward feature of the work is that the authors, for whatever reason, decided not to include the R.A. and Dec. of the objects in with the descriptive text. Thus, you have to flip back and forth in order to find the co-ordinates if you plan to refer from the text to the charts. Ω

User Report: Celestron 500 mm f/5.6 Mirror Lens

Brian Segal

Ever since I started using my Meade 97ER Maksutov-Cassegrain spotting scope as a very portable travelling companion – which it is – I had the idea that something a bit more compact and faster would be nice. As the scope is used for both daylight and astronomical tasks (mainly bird watching, solar photography, wildlife photography, etc.) size and weight are considerations. The 97ER has flown with me to the Caribbean, Newfoundland, the West Coast etc., and has done excellent service. Its only disadvantages are its rather slow optics (f/11) and the fact that hand held shooting is out of the question. Also as a 1000 mm focal length lens, the field of view is quite limited.

From an astronomical point of view it's fine for photographing the Sun or Moon, and great for a quick, unguided look at the heavens. However, as an astrophotographic lens for anything else it's slower than my 8 inch with a Lumicon telecompressor which affords f/6.3 optics.

When I heard that Celestron had brought out a 500 mm Maksutov-Cassegrain with a 5.6 focal ratio, my interest was engaged. Such a lens would approximate the view of a rich field refractor with similar lens speed. In addition, Celestron claimed that the lens had a field flattener lens as part of the optical path – presumably to deal with the distortions and aberrations which can plague "Maks". I expected the lens to be at least as sharp as the Meade 97ER which is very sharp... surprisingly so considering the reputation reflex lenses generally have for soft images.

So, on my last trip to Toronto, I went up to my dealer's place with a camera and a roll of Fujichrome 50 film. I figured that a few test slides would tell the tale, at least for daylight use, and I was not about to part with almost $500.00 before testing the equipment (I have learned something over the years). I shot a variety of things ranging from the standard brick wall close-up to test field flatness and resolution to long shots of distant buildings to test for haze cutting ability and general sharpness. I photographed some signs, cars, people and so on.

The results were impressive. The lens is light (you can handhold it with high speed film on a bright day) has a good focus range... it will focus down to about 5 feet which makes it a long distance macro lens, and it generally looks and feels good. The images were really outstanding. Field flatness was excellent, resolution very fine, and the lens cut through a lot of Toronto haze such that every brick was visible on a building about a mile

away. The signs were sharp, the close-ups clear (though depth of field was predictably shallow at close range) and the colour as good as anything I've seen.

Needless to say, I soon became the happy owner of the lens. Once I had it at home I did a number of other tests and shot a bunch of daytime pictures of any number of things. I took it to the beach and captured some wonderful images of a friend's daughter playing, totally oblivious to the camera and me way off in the distance. The one remaining test, and the central point of this report, is, "Is the thing any good for astronomy?" The answer is yes and no.

I have taken a couple of long guided exposures with the lens piggybacked on the 8" Meade and I have also shot the Moon and the recent meeting of the Moon and Mars.

PROS: (1) Very high contrast. The multi-coatings perform as well at night as they do during daylight. After a 25 minute exposure on Fujichrome 400 film shot at an EI of 800 (a one stop push) the background sky was very blue-black, and the stars stood out nicely. (2) Sharpness near the central axis. About 90% of the image area is sharp with good colour differentiation. (3) Rich field. The field of view on a 35 mm slide is approximately 3° by 4.5°. This means that one can capture lovely shots of parts of constellations and at the same time include a number of deep sky objects. Most camera manufacturers define angle of coverage as a diagonal measure which is why the "sharpies" in the crowd will know that the specs are for 5°. However, we astronomers care about the framed image rather than the diagonal as we are using charts which layout the skies in square degrees. Typically you can expect to cover about 3° in declination and about 20 minutes in R.A.

CONS: (1) Chromatic aberration at the edge of the field. The stars at the edges are oval and prismatic. Slightly better than the Hubble telescope only a zillion times cheaper. Well, what more can you say... no one's perfect! (2) Vignetting. Yes, there is some very slight vignetting, but not enough to seriously diminish the image, and anyway it's so close to the chromatically distorted edge that you can't get too excited about it. (3) No custom made lens shade. This may sound petty, but one of the more important functions of a lens shade other than the obvious is protection. For daytime nature work this is particularly the case. At night I have resorted to a stiff piece of matte black cardboard rolled into a tube and secured with a wide elastic band. However, the lens does have a threaded inside ring in the front. Apparently Celestron never bothered to check to see if the C-90 shade had the same thread and assumed it would fit. They should be ashamed of themselves... hopefully at some point they'll get their act together.

All in all the scope/lens is very solid, attractive, light, and

user friendly. Although I'm glad in a way that the focuser is NOT helical (you use a knob protruding from the back) the placement of the knob makes it impossible to mount a large accessory ring or dust seal on the rear exit ring. I prefer to keep my catadioptric lenses sealed. I may yet resort to Crazy Gluing a UV filter to the opening, but I'm hoping that someone will come out with a more elegant and less permanent solution.

The lens comes with a T adapter which also has a threaded set screw which can secure a 1.25" eyepiece or diagonal for spotting scope use (it's great for bird watching). The T adapter has a black plastic rear cap, and a black metal front cap offering adequate protection. The tripod block is solid and big enough to handle a medium format sized quick release plate. The block has a standard 1/4 x 20 thread.

So, if your looking for a very compact, light and pretty darn good spotter/long telephoto/rich field lens and can put up with a few inconveniences and prismatic edges on star fields...it's a good investment. Ω

A Meteor Project

Bob Hawkes

Should there be Halifax members interested in participating in our two station image intensified video meteor observation program I would be interested in talking with you either before or after my talk at the April meeting. I now have two image intensifier-video detectors, and we have begun two station observations which permit triangulation. About 80-150 km baselines are ideal, although somewhat longer ones can be tolerated without much loss in precision. The Saint John Astronomy Club has already joined this project. A baseline from Sackville to the Halifax area would also work.

Essentially the cameras are quite portable and simple to operate. Running a station involves a few preliminary electronic controls (easily done - the picture appears on a monitor in real time), then alignment according to reference stars. Our system sees to about +8 mag. or so over a field of view of the order of 16 by 22 degrees. The cameras are in Dobsonian type mounts. After that it is a matter of simply changing video tapes and periodic checking throughout the night. The ideal situation would be someone with a home with reasonably dark skies, since then it could be set up in a back yard and one would not need to devote hours at a time to it. One of our cameras can be operated without an AC source from 12 VDC, so it would be possible to operate in the country somewhere in a portable sense. I am aiming toward summer 1991 to summer 1992 observations, centered around the main meteor showers for a few nights in a row. Ω

The Burke-Gaffney Award
Halifax Centre

The Burke-Gaffney Award was established by the Halifax Centre to promote the development of the writing skills of non-professional members of the centre. The award also acknowledges the contribution of the centre's first Honorary President to the formation of the group and to his long and tireless efforts to educate the public in the mysteries of astronomy.

Rules

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

2. Presentation: Articles should be no longer than 1000 words, written in proper grammatical form and presented typewritten and double spaced. Diagrams should be complete and ready for drafting and photographs should, if possible, be submitted with the original negatives.

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

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

5. Prize: The award will be given once annually. The winner of the Burke-Gaffney Award will receive as a prize one book, of the author(s) choice.

6. Submission of Entries: All qualifying articles received and published in the preceeding year's volume number of NOVA NOTES will be considered and judged for the award. You may direct inquiries concerning the rules to the President.

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

CCD Imaging – One Night's Story

Joe Yurchesyn

The phone rang. "Hello?"... "Oh, hi Dave!... Tonight, to try out the SBIG CCD camera? But it's cloudy?!... Clearing later on... O.K.!... Your right, this will probably be our only chance to try it out before Christmas, and before you return it to Bill.... I'll call a friend to see if I can borrow his laptop and get back to you."

Damn this clear weather, now I have to defer my Christmas shopping. That's the danger of doing it at the last minute - why don't I ever learn?! Several calls later, including one to Roy for weather conditions in Avonport, it was determined that it was clearing, and we needed a DB25 to DB9 connector converter. Fortunately Dave had one, and our night was a go.

That's how we started our first attempt to image with Bill Thurlow's CCD camera from the Santa Barbara Instrument Group. Bill had loaned it to Dave to have him adapt the hand controller of his C8; and he would have it for only a short time. On the way to Dave's place, I dropped in on my friend Paul, to borrow his Toshiba 1000; the sky was six tenths cloudy now.

"Hi Joe, here it is, but the battery is a little run down."

"This isn't your Toshiba?"

"I know, its my NEC 386 ProSpeed demo machine! I can't have you guys borrowing that Toshiba junk! (Paul is with NEC Canada.) I'm off to Montreal tomorrow, so I need it back tonight. Take my cellular phone and call me when your returning."

"OK, we'll make it an early night."

By 9:30, Dave and I found ourselves at Beaverbank. It was a cold, clear night with heavy dew. (I hate the wet ones.) A light shower earlier that day left a sheen of ice on the runway. Fortunately, it was discovered without dropping anything too expensive! It took some cold, uncomfortable labour (It's a good thing Doug wasn't there with his easy to set up Dob), but sometime later Dave's 2120 was set up, with the CCD camera attached to both the telescope and the blanket covered computer (to keep it warm and dew free). I suggested taking a picture of the whole setup, but we decided it would be too undignified, since the computer was improperly dressed without a pair of earmuffs for the LCD screen. The computer, telescope and camera were powered up, and the computer booted from ROM - Password!? Rats, I guess that's the real reason Paul gave me the cellular phone. Fortunately we had adequate signal strength from Beaverbank. After the call, the password was entered - NEC 007 (licensed to compute!) The software disk was inserted, and the drive grunted and growled as the program was loaded.

The first step was to focus, so we started with a bright star, and tweaked the focus knob until the display on the camera gave a

maximum pixel brightness. This meant all the light of the star was falling on a single pixel of the CCD chip. The star images on the LCD screen became corresponding smaller.

We decided to see how well the instrument functioned as a stand alone guider. In guide mode, the Dec. and R.A. motors began to pulsate with corrections about ever half second. Dave decided to give the instrument a work out as a guider, if the weather cleared again, before the instrument had to be returned.

Finally set up - now... what to image? We need something small in size, yet fairly bright. How about M15? Too low and too late! What about NGC 2158 near M35? OK, but it may be too faint. First a dark frame (thermal noise) exposure of two minutes, followed by a real exposure of two minutes. Next, subtract the dark frame from the image frame and voila, display the results.

"Looks like noise to me, Dave!"

"Well,.. there is that little irregularity, maybe that's it?"

"O.K., I'll save it."

The process was repeated for the Saturn Nebula, with a depressingly similar result. We didn't like the fact that the identical irregularity was still there. The low power light came on so the laptop was switched to sleep mode.

One last try for an image was made - the Trapezium was the target. Why didn't we do this one first? The brain's really in neutral tonight! The telescope was pointed and the laptop awakened. As it sprang to live the screen suddenly lit up - boy is that backlight bright, even at minimum intensity. A quick half minute exposure was made, and we packed it in.

At home, I couldn't retire until reviewing the night's three images. The first two could not be enhanced in anyway. There seemed to be nothing there except noise. I concluded that the exposures were probably too short, however, I did discover a possible incorrect setting in the program, so the dark frames may not have been subtracted. That would explain the noisy images, and why they were virtually identical. The image of the Trapezium, which was short, had little noise, but showed only three stars, so I was not hopeful. Comparing it to the Trapezium demo image, after being suitably adjusted of course, it was virtually identical to ours! The faint star in the Trapezium must be to dim for short exposure times used in both images. At least the night was not a totally wasted effort.

Dave and I concluded that CCD imaging is very difficult to do from a field set up. An observatory is almost a necessity. Additionally, the SBIG instrument may be very good as a guider, but is not so good as a CCD camera. The experience gave us a feeling of the difficulties encountered when trying to obtain real scientific data at the telescope. Dave was able to try out its guiding abilities on a later night, but I'll leave that story for him. Ω

An Astronomy Program for IBM and Compatibles

David Griffith

Aside from the now legendary *Voyager* program designed for the Macintosh family of computers, the world of astronomical computing can indeed be a bewildering one. Astronomy programs for DOS machines are abundant, but their features and quality vary greatly. While *Voyager* is the program of choice, the prohibitive cost of the Macs has lead many of us to DOS. Is there hope for those astronomy buffs among us whose budgets demand DOS? I think so, in the form of *Lodestar Plus*, an ambitious and full-featured program available from Zephyr Services of Pennsylvania.

Lodestar Plus is a comprehensive program boasting a database of 9096 stars, 7840 NGC objects, Messier objects and solar system bodies (i.e. the Sun Moon and planets). The program is capable of plotting maps of for any terrestrial location for any year from 9999 B.C. to 9999 A.D. Among its features are the ability to find or identify objects, plot paths of objects, search for and report on eclipses, occultations and conjunctions, print maps to a desired scale and record celestial motions and events to video files for playback.

Display options are excellent, including constellation lines, constellation boundary lines, grid lines, sky fill/ground fill options, star magnitude filter (up to 8.0), a mirror image display, colour coding of stars to spectral class and an all-red dark-adapt mode.

Lodestar Plus is accurate; there are options to correct for precession, nutation, parallax and refraction. Menu options allow easy choice of location (longitude, latitude and elevation) and date (any time zone, Gregorian or Julian, standard or daylight savings).

I tested this program on my modest 286/CGA/9-pin DMP setup, and even with this humble configuration, the program performed admirably. Graphics are not as "jaggy" as one would expect with CGA, although EGA or VGA is required to use the colour or dark-adapt mode.

While powerful and accurate, *Lodestar Plus* is not without its warts. The manual is barely adequate, devoid of detailed instructions and examples of how to use each feature. There is no on-line help and the pull-down menu/windows interface is rather clunky. Simple functions often require as much menu shifting as more complex operations. The program is mouse driven, but requires the little guy to scurry about far too much. Hopefully future upgrades will address these deficiencies.

Despite its mediocre interface and documentation, *Lodestar Plus* is a quality program offering a wealth of astronomical data and operations. I wouldn't hesitate recommending it to anyone looking for a higher-end astronomy program.

Minimum requirements include two disk drives, IBM PC,XT,AT,PS/2 or compatible, DOS 2.0 or higher, 512k and CGA or Hercules graphics. To maximize the program's potential, a hard drive, EGA or VGA graphics and a math co-processor are highly recommended. Ω

Astro Ads

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- asking $1000

Contact Octave McLaughlin, Meteghan River, N.S. B0W 2L0

FOR SALE: 8" MEADE 2080 G.E.M.SCHMIDT-CASSEGRAIN

- 8x50 finder
- 26 mm Meade 4000 Plössl
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- moon filter
- Pentax camera adapter
- carrying cases
- other accessories
- excellent condition
- asking $1500

582-3183 (after 5:00 P.M.)

NOVA NOTES INDEX

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Patrick Kelly
2 Arvida Avenue
Halifax, Nova Scotia
Canada
B3R 1K6
477-8720

HALIFAX CENTRE - R. A. S. C.
1991 CALENDAR OF EVENTS

January

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

February

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

March

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

April

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

Key to calendar:

Regular and Meetings: **bold and shadowed**

Special days: **bold** (On dates marked with an asterisk, the event occurs on the **morning** of the date given. Check your Observer's Handbook for details)

Possible observing sessions: underlined

Special Days:

January 3 - Quadrantid meteor shower
January 6 - Two shadows on Jupiter (5:03 A.M. AST)
January 7 - Two shadows on Jupiter (11:32 P.M. AST)
January 15 - Two shadows on Jupiter (1:25 A.M. AST)
January 22 - Two shadows on Jupiter (3:41 A.M. AST)
January 29 - Two shadows on Jupiter (6:18 A.M. AST)
January 30 - Penumbral lunar eclipse (2:00 A.M. AST)
February 1 - Two shadows on Jupiter (7:37 P.M. AST)
February 8 - Two shadows on Jupiter (10:14 P.M. AST)
April 22 - Lyrid meteor shower

Halifax Centre
Royal Astronomical Society of Canada
c/o 1747 Summer Street
Halifax, Nova Scotia
Canada
B3H 3A6

National Office R.A.S.C.
136 Dupont St.
Toronto, Ontario
Canada
M5R 1V2