NOVA NOTES

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MAY-JUNE

1978 Halifax Centre Executive

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UP COMING EVENTS

12 May, Friday at 8:00 PM at the Nova Scotia Museum

Speaker: Mr. Donald Crowdis, formerly of the Nova Scotia Science Museum

Mr. Crowdis was one of the prime instigators for the acquisition and development of the first public planetarium in Canada which, for those who may not be aware, was in the old Museum on Spring Garden Rd. Many people still ask about the old planetarium and Mr. Crowdis will bring alive those memories in many people from visits a decade or more ago. It was installed about 1954 and functioned with a lot of volunteer help from RASC members. For hundreds of Halifax children of that generation, it was their introduction to astronomy and that interest in astronomy for many is still alive because of that first encounter with space study. Does anyone know someone with a couple of million to build a replacement?!

The Executive meeting at 7:00 pm is open to anyone interested.

6 May, Saturday Observing Meeting at Mount Uniacke House at dusk (about 9) weather permitting

16 June, Friday at 8:00 pm NS Museum

Speaker: Mr. Larry Coldwell with a review of the Edmonton General Assembly.

Minutes of the March Meeting

The March meeting was to be held at the Nova Scotia Museum on Friday, March 17; however, during the preceding hours so many crystals of hydrogen oxide settled on this portion of the third planet that the meeting was cancelled. Nevertheless, most of the executive met as usual and spent a productive two hours at the helm of the center.

With much better weather, the March meeting was held two weeks later on the 31st. Again the executive met at 7 pm, with the main meeting at 8. The speaker was John MacNeil, and the topic, Astrophotography. For the first part of his presentation, John gave many tips on all aspects of basic black and white photography, supplementing his comments with copies of notes for the audience. For the second part John converted the front of the room into a complete, operating darkroom. Some young members of the audience tried their hand at the art of printing with an enlarger and developing the result. This was obviously a new experience for most of the audience as much interest was shown in the wonders of the chemistry of silver.

The meeting closed, as usual, over refreshments, library books, and conversation.

R. L. Bishop
VP / Secretary

NEW LIBRARY ACQUISITIONS

Since the January issue of Nova Notes several new books have been received for our library. These are listed below. If you would like to borrow one of these or any of the other books or magazines from the Centre library, then come to a meeting & pick it up. For those who are too far away to personally pick up books, we can arrange to mail your choice. The listing at the bottom of the page gives sample data from Wepner's book--observers of double stars may find it particularly useful.

		Call #
Ryan	The Invasion of the Moon, 1969	629.4
Kuhn	The Copernican Revolution	520.9
Hoyle	Ten Faces of the Universe	523.1
Fernie	The Whisper and the Vision	520.92
Brooks	Astronomical Date Book	520.9
Taylor	Black Holes; The End of the Universe	523.8
Thompson	Making Your Own Telescope	522.21
Wepner	291 Double Star Ephemerides for 1975 to 2000	524.84

ADS 2446 OE 53 **PER**

AR $03^h14.5$ DECL $+38°27'$
MAG 7.8/8.3 SPEC G0/-

YEAR	POS °	DIST "	YEAR	POS °	DIST "	YEAR	POS °	DIST "
1975	268.5	0.86	1984	263.3	0.85	1993	257.8	0.81
1976	268.0	0.86	1985	262.7	0.85	1994	257.1	0.81
1977	267.4	0.86	1986	262.1	0.84	1995	256.5	0.80
1978	266.8	0.86	1987	261.5	0.84	1996	255.8	0.80
1979	266.2	0.86	1988	260.9	0.84	1997	255.1	0.79
1980	265.6	0.86	1989	260.3	0.83	1998	254.5	0.78
1981	265.1	0.85	1990	259.7	0.83	1999	253.8	0.78
1982	264.5	0.85	1991	259.1	0.82	2000	253.0	0.77
1983	263.9	0.85	1992	258.4	0.82	2001	252.3	0.76

ADS 2459 AC 2 **95 CET**

AR $03^h15.8$ DECL $-01°07'$
MAG 5.6/7.5 SPEC K1 IV/-

YEAR	POS °	DIST "	YEAR	POS °	DIST "	YEAR	POS °	DIST "
1975	241.5	1.16	1985	244.7	1.17	1995	247.9	1.14
1980	243.1	1.17	1990	246.3	1.16	2000	249.6	1.10

ADS 2612 I 400 **CAM**

AR $03^h30.9$ DECL $+29°52'$
MAG 6.8/7.6 SPEC dF4/-

YEAR	POS °	DIST "	YEAR	POS °	DIST "	YEAR	POS °	DIST "
1975	256.4	1.14	1985	259.7	1.36	1995	262.3	1.53
1980	258.2	1.26	1990	261.1	1.45	2000	263.4	1.60

D. Brooks
Librarian

HINTS for TM's

TESTING YOUR MIRROR--THE RONCHI TEST

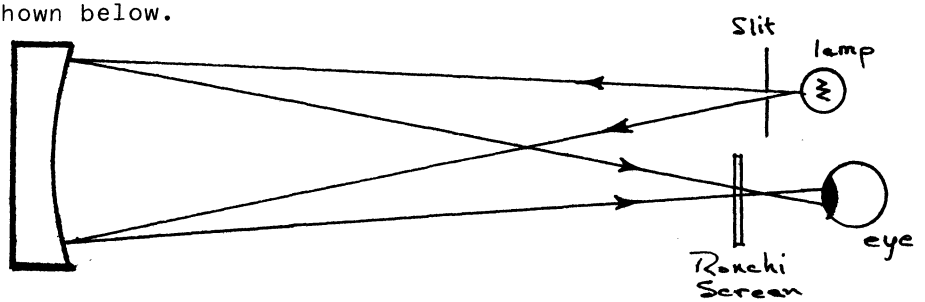
Most potential TM's have heard about the Foucault knife edge test by the time their mirror kit is delivered. Probably the testing required in making a telescope mirror is what scares most people off--the Foucault test does little to allay these apprehensions. This fear is perhaps not ill-founded because it takes time and a lot of practice to be able to read the patterns and shadows in the knife edge test with confidence. It is also performing the Foucault test which takes most of one's time while polishing and parabolzing that mirror--be it the first you've tried or the 10th! Also one needs finely operating parts in the tester in order to use it efficiently and accurately.

The Ronchi test, by contrast, is simple, quick and needs no particularly accurate equipment. Its prime drawback is that it is only qualitative and not qualitative as is the Foucault test. Where it excells is showing the overall figure of the mirror surface at a single glance--desirable except at the end of parabolizing where a quantitative measure is necessary. With care, one could dispense with the quantitative measure on your first mirror. The more meticulous will not want to skip this step however.

The principle of the Ronchi test is not too different from that of the Foucault test. One places at the radius of curvature a narrow slit facing the mirror. Instead of a knife edge, one uses a Ronchi screen. The screen is a transparent film with lines drawn on it--about 100/cm. I make my own screens by photographing a master which I have drawn up. The original master has apx. 1 line/mm. I then photograph it with a standard 50mm lens on High Contrast Copy film (Panatomic X will do) and develop as normal. The resulting negative is my Ronchi screen and when mounted in a slide frame is ready for use. Anyone who would like to obtain a sceen cheap should see note at the end.

The screen is mounted in a moveable block beside the slit and the screen is adjusted so the lines are parallel to the slit. The slit should be less than 4mm long and

somewhat narrower than for the Foucault test. If you can make the slit adjustable all the better. If this is not possible, you might consider making two or three of various widths placing each in a slide mount. By designing the block so they can be interchanged without disturbing the set up, you will be able to use the widest for rough alignment, then exchange for a narrower to make the test. If the slit is too narrow, diffraction effects will cause the lines to appear fuzzy during the test. The light source should be frosted and if not a piece of wax paper placed between the light and slit. The lines can be made sharper by using a monochromatic source, however this is probably an unnecessary improvement. The overall test set up is shown below.



RONCHI TEST SET-UP

Once the beam is located, the screen is moved inside focus at which time you will observe the lines of the Ronchi screen imposed on the mirror face. The screen should be moved back and forth inside the focus until you see 5 or 6 lines on the mirror. If the lines are fuzzy, make the slit narrower. Also, twist the screen to ensure the lines of the screen are parallel to the slit--as they lose parallism the lines become fuzzy. Once you are satisfied that the lines are relatively sharp, you are ready to diagnose the quality of the mirror figure--the simplist part of all! The diagrams below show what you may expect to observe. The figure should be diagnosed with the screen inside focus.

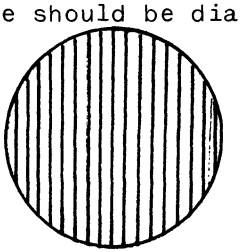


FIG. 1

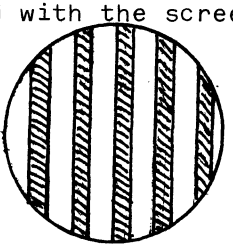


FIG. 2

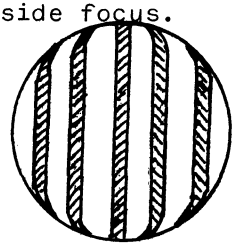


FIG. 3

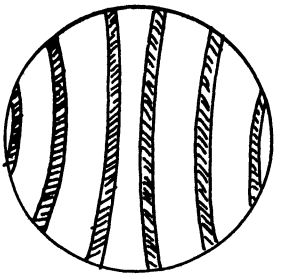


FIG 4

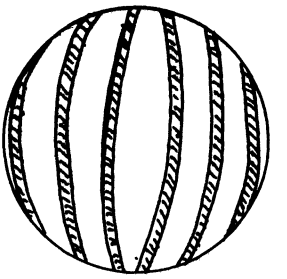


FIG 5

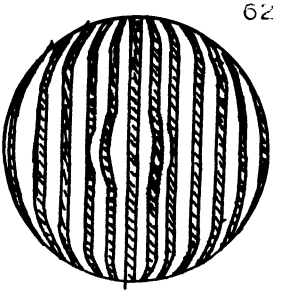


FIG 6

Fig 1 Spherical mirror with Ronchi screen well inside or outside focus

Fig 2 Spherical mirror with Ronchi screen just inside or outside focus

Fig 3 Spherical mirror with turned edge of about ½ wave

Fig 4 Elliptical or parabolic or hyperbolic mirror with screen outside focus. Degree of curvature depends on focal ratio and distance outside focus

Fig 5 Same as for Fig 4 except screen is inside focus

Fig.6 Spherical mirror with 1) extreme turned down edge and 2) central depression

The degree of defects can be estimated from the departure of the lines from what would appear to be smooth curves. The separation between adjacent lines is one wavelength roughly so if the line deviates half the distance, the defect is half a wave. In Fig 6 if the central portion were a hill rather than a depression, the curvature would be reversed from that shown.

One can even photograph the mirror through the screen with relative ease. One removes the lens and places the camera immediately behind the screen. Exposures of 10 to 30 sec are required with plus-X film (ASA 125) so it is essential to do this in a dark location. One can peruse the negative to determine the mirror's surface in comfort without straining your back and neck--not to mention eyes.

If you want to try this method, I will supply the Ronchi screen for two 14¢ stamps. Delivery will be sometime in the last two weeks of June. Contact R.C. Brooks.

MIRA'S MAXIMUM

After some years away from active variable star observing, I undertook - mostly for practice - some observations of Mira, the most famous and most simply observed of the long-period variables. The aims were simply to follow the brightness changes, and to determine the time and brightness of maximum light.

Using either naked eye or 6x35 binocs., and comparison star magnitudes taken from the RASC Handbook, the data of figure 1 were secured. Clearly, the maximum had nearly been achieved by the time I began observing. The date and value of maximum light can be found only with low precision, the derived date depending heavily on whether the "poor conditions" points are included or omitted.

The date of maximum was determined by a "template" technique. The mean light curve of Mira, as defined by AAVSO observations over a fifty year period, was superposed on the plotted data and shifted parallel to both the time and magnitude axes until the curve-data agreement is satisfactory in the vicinity of maximum. The result is:

$$T_{max} = JD\ 2443483 = 5\ Dec\ 1977$$

$$m_v = 2.9$$

The "poor condition" data were ignored. Apparently, maximum occured some 9-10 days ahead of schedule and the brightness was some 0.5 magnitudes brighter than average. Such discrepancies are not significant however.

-- Walter Zukauskas

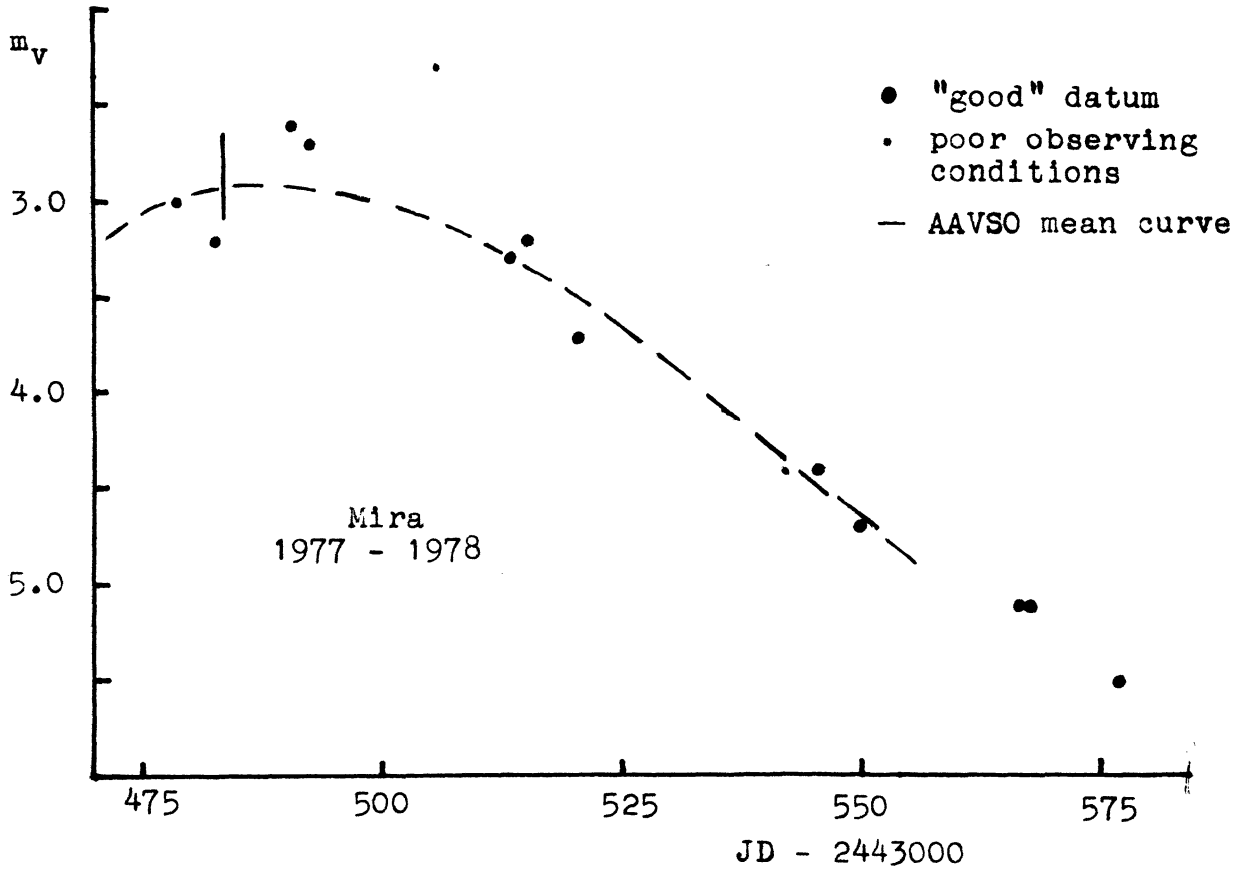
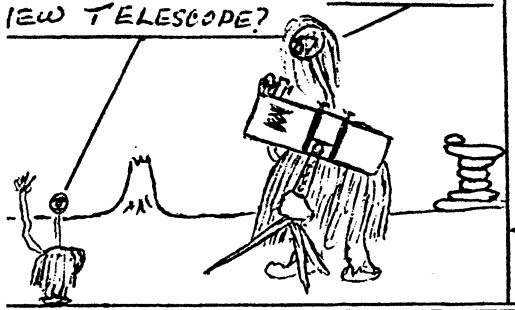
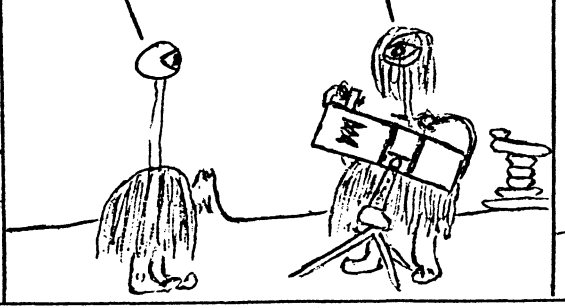


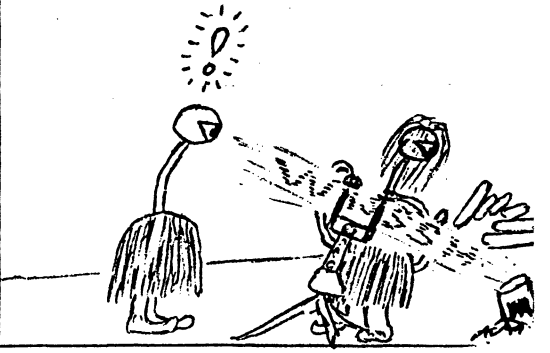
fig. 1. visual magnitude vs. time(Julian days) for Mira

JOVA NOTES' ASTRONUTS

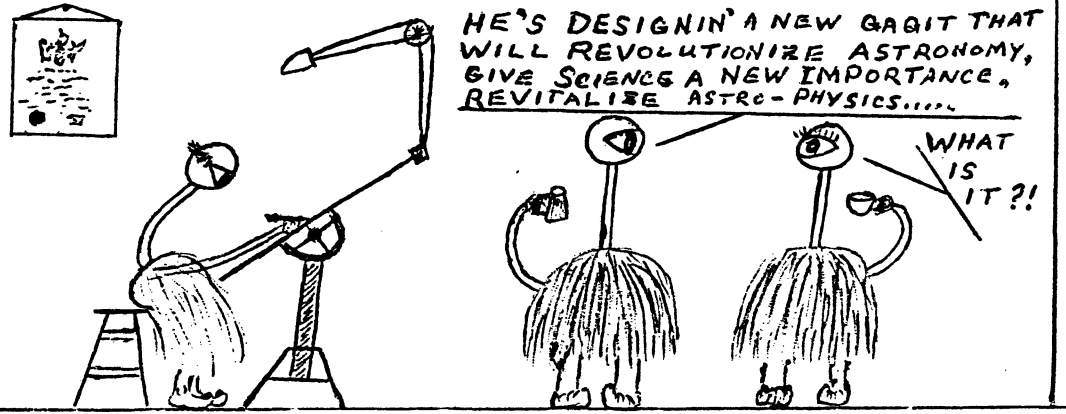




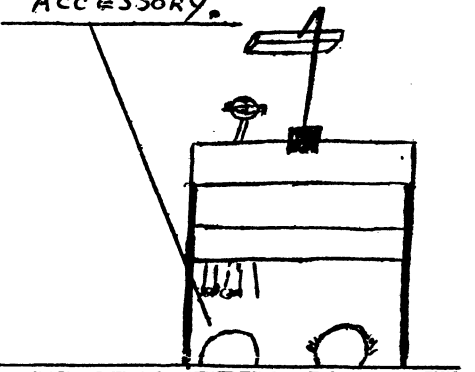
By NEBULOUS



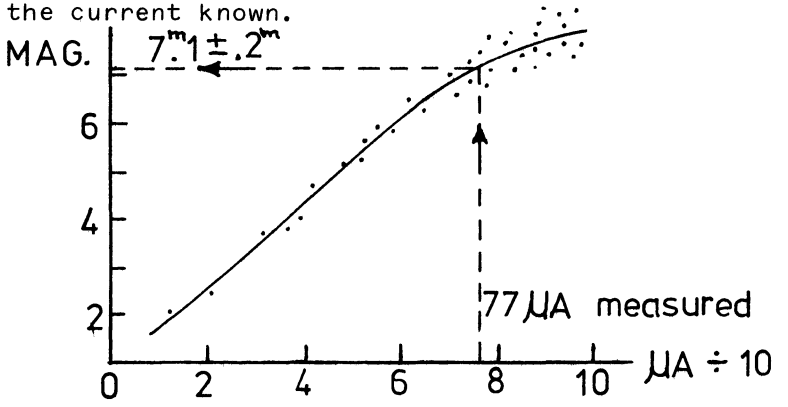
NOVA NOTES' ASTRONUTS



By NEBULOUS



The variable's current output may now be measured and plotted on the calibration curve. Where the current line intersects the calibration curve defines the magnitude. If the star is bright the accuracy can be expected to be greater than if at the faint end of the curve. With care you will be able to measure to about ± .1 or .2 mags. with some confidence. The figure shows how to find the mag. with the current known.



With some thought you will be able to determine where the sources of error arise and may suggest possible cures. You will also be able to dream up other uses for your microphotometer--for example, photographic photometry of the Moon, limb darkening measurements of the Sun, etc.

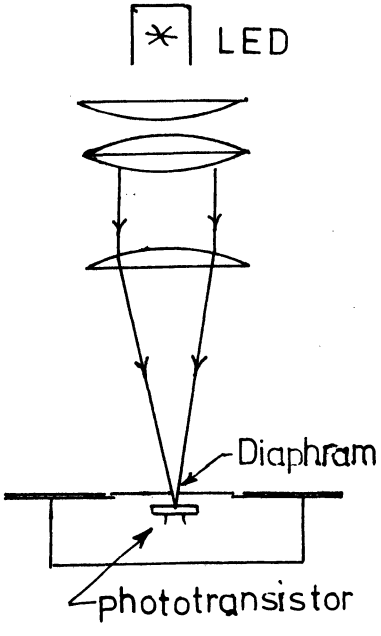
BK

NOTES OF THANKS

We wish to thank Steve Bolton, a Halifax Centre member, and Mr. & Mrs. J.M. Robinson of Peterell St. for their donations of 6" mirror kits. Hopefully someone will soon have an opportunity to start work on these two mirrors to add to the Centre's collection of telescopes. Two other kits are nearing completion and should be ready for summer use. Would anyone out there like to try their hand at mirror making? How about someone who likes wood-working making the tube and mounting for one of these mirrors as well? Even if you have not made one previously there are lots of members around who can give you some hints. Again thanks for the donations!

HP-5 film very effectively. To minimize the exposure time the lens is set wide open (smallest f/no.). The camera is then mounted piggy-back on a telescope equipped with clock drive &/or slow motion controls. The polar axis must be aligned with the north celestial pole and the camera pointed at the desired star field. Exposures should be as long as you can comfortably (and accurately) guide the telescope (typically 2 to 5 min.). A UV filter will cut background fog allowing you to reach below visual limits with ease. Development may be carried out in the kitchen sink following the manufacturer's general recommendations, although it is suggested that you increase the development time by one minute and that you agitate slowly and continuously. This will give you a denser, more evenly developed negative.

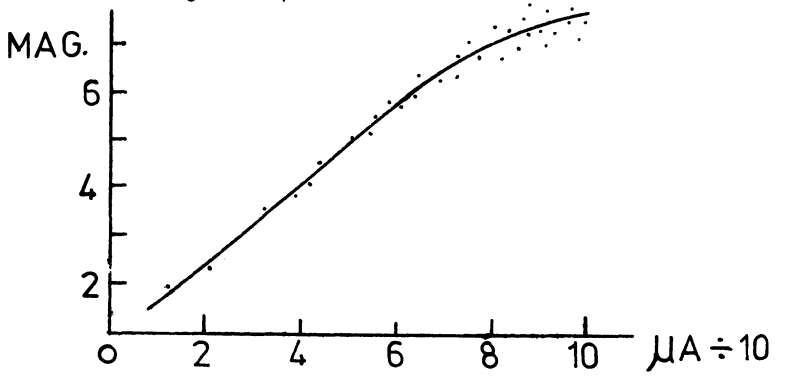
A microphotometer consists of two basic parts--the light source and light sensitive detector. A good electronics shop beachcomber should be able to make one for under $10. The principle behind our simple device is to focus a light of constant intensity on the star image and then to detect the beam after having passed through a small diaphram and then to measure the current created in a photovoltaic cell. The diagram below shows the components.



The system is pretty simple but can be embellished as much as you like to improve its accuracy and simplicity of use. The light source should not be too bright as it will limit the accuracy for faint stars. An LED (light emiting diode) should suffice and requires a 6 or 9 V battery for power. A desirable improvement would be a voltmeter and rheostat to set the voltage of the light source at a constant level regardless of battery condition. The light passes through the two condensing lenses and is focused on the diaphram by a third planoconvex lens. It is important to set the focus carefully on the diaphram and once positioned needs no further adjustment.

The diaphram size is chosen after examining and measuring the size of star images on a negative taken with the lens you intend using for the program. The size of a 2^m or 3^m star should define the diaphram size unless you have a particularly bright star in mind for study. It may be necessary to have this component made by a machinist in order to get a small enough hole. Next the photovoltaic transistor is mounted directly below the diaphram. This item may be had for under $1. with more sensitive ones available if necessary for the required sensitivity. The current output is measured by a microammeter. The scale deflection required should be measured with a multimeter before purchase and will probably be about 100 μA. With no negative in place the meter should read very close to full scale.

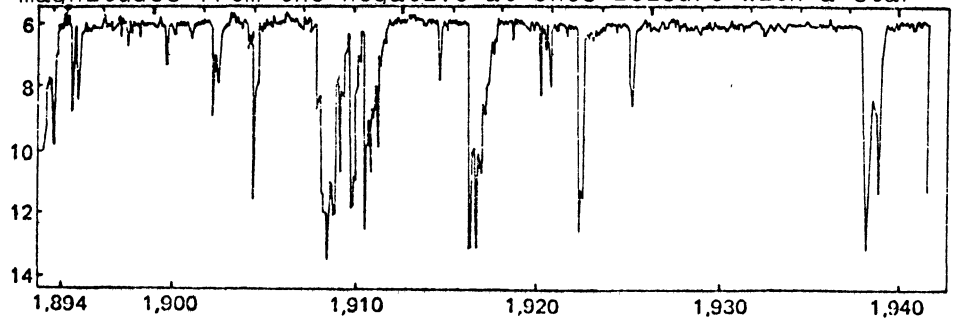
Once your microphotometer has been constructed and the bugs ironed out, you will want to try it out. The procedure is as follows. The negative is placed over the diaphram emulsion side down. The standard stars in the field are measured in order to construct a calibration curve which will be used to determine the brightness of the variable star. The output will yield low current for the brighter stars, the effect depending on the fact that the brighter the star the larger the image on the negative. The magnitudes should be determined from a source such as the Smithsonian Astrophysical Observatory Atlas and Catalogue. Obviously avoid known variable stars in building your calibration curve. For each current value obtained, plot a point on the graph at the corresponding mag. Once all the standard stars are plotted, draw a "best" fit curve through the points. This is your calibration curve. It is better determined with more points, especially at the faint magnitude end, and can give us a feel of the accuracy we may expect for the negative and system. A curve such as one might expect is shown here.



ASTRONOMY for YOUNG RASCals

THE MICROPHOTOMETER

A couple of evenings ago while chatting about variable star observing, Walter Zukauskas mentioned a program of photographic monitoring of variables he would like to start. He has visually observed variable stars for many years but pointed out the difficulty of accurately estimating magnitudes of irregular variables visually. Irregulars are one area where amateurs can still make significant contributions to the advancement of astronomical data. It is easy to see the variations of a short period eclipsing binary in an evening or the regular variation of a slowly varying long period variable. However, the irregular ups and downs of stars such as R Cor Bor are difficult to estimate because one never knows what to expect and because personal bias of the observer may cause an over or under estimate of sudden fluctuating by several tenths of a magnitude. This bias can be somewhat relieved by photographing the star field and then determining the magnitudes from the negative at one's leisure with a star



Thirty years of the light curve of R Coronae Borealis.

atlas. One can also make a more objective measurement using a microphotometer. This article will describe briefly the construction and use of such a device. First, a brief description of the photographic techniques may be useful.

A camera with a 50-200mm lens may be used with Tri-X or

SOLAR OBSERVING

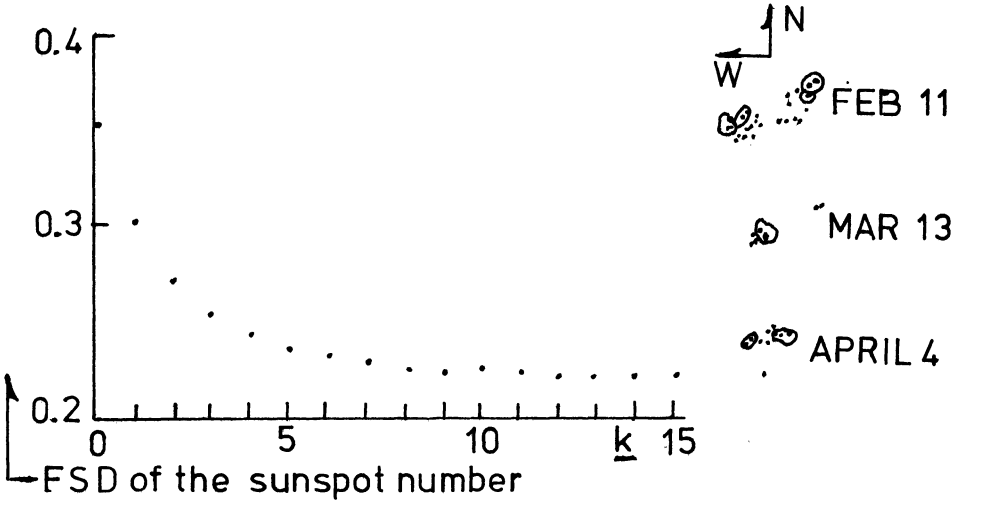
Steven Morris

The Sun has been very active during March and April, with several interesting spots showing up. The large sunspot group that I discussed in the last issue is still around but is getting smaller and dissipating. I have now followed it for three complete passages across the Sun; the diagram below shows its changing appearance during each passage. Although the individual sunspots are short-lived, the group has retained its east-west orientation and its bi-polar nature. The group, if it still exists, should reappear on the eastern limb of the Sun at the end of April.

Most solar observers, having finished drawing a diagram of the day's sunspots, will find the number of sunspots 'f' and the number of sunspot groups 'g', and then calculate the day's sunspot number'n', given by $n = 10g + f$. For example, suppose an observer sees 4 groups containing a total of 18 spots; then $n = 10 \times 4 + 18 = 58$. This number is supposed to be a measure of the Sun's activity and a plot of n over the years will show the 11 year sunspot cycle. But where does the number 10 in the equation come from? The equation implies that the Sun is at a higher level of activity if it has a few isolated spots than if it has the same number of spots gathered together in one group. This seems reasonable, but I have long suspected that the number 10 was chosen primarily for arithmetic convenience. If you write $n = kg + f$, what is the best value of k?

This question is not too difficult to answer. The value of the sunspot number will change from day to day, but as it is supposed to be a measure of the Sun's overall activity, you would not expect it to fluctuate too much. Thus you can change the question to 'what value of k will keep the sunspot number from fluctuating very much?' or in a mathematical vein, 'what value of k will cause the smallest relative standard deviation in the sunspot numbers?' To answer this, I took my 40 recent observations and calculated the fractional standard deviation for different values of k; the graph of these results is

shown below. For large values of k, the curve rises again to the value .238. The'best'value of k (corresponding to the lowest point on the curve) was calculated to be



13.6, but the curve is so shallow that when only my first 39 observations were used, I obtained a best value of 11.9! Clearly, one might as well stay with 10 = k. It is interesting to note that the fractional deviation is very large for k = 0 (that is, if you measure the sunspot activity by counting the number of spots) but does not increase very much for large k (if you measure activity by counting the number of groups). From this, it would seem that the group number alone is a good indicator of solar activity.

For those mathematicians amoung us, I calculated the fractional standard deviation from the following formula:

$$FSD = \frac{N}{\sqrt{N-1}} \times \frac{1}{k\xi_g + \xi_s} \sqrt{\left(\xi_g^2 - \frac{(\xi_g)^2}{N}\right)k^2 + \left(2\xi_{gs} - \frac{2\xi_g\xi_s}{N}\right)k + \xi_{s_i}^2 - \frac{(\xi_s)^2}{N}}$$

and the best value of k from:

$$k = \frac{\xi_g \times \xi_s^2 - \xi_s \times \xi_{gs}}{\xi_s \times \xi_g^2 - \xi_g \times \xi_{gs}}$$

This clearly illustrates Calnan's Rule of Science: Everything, no matter how simple, can be made complicated beyond all comprehension.

SMU FACULTY MEMBER AWARDED NASA GRANT

A member of the Saint Mary's Astronomy Department, Dr. George Mitchell, has been awarded a National Research Council (US) Senior Research Associateship to be held at NASA's Jet Propulsion Laboratory, Pasadena, CA.

Dr. Mitchell's research will involve investigating molecular processes in interstellar clouds. These "clouds" are actually denser concentrations within a tenuous distribution of gas. The molecules found in the gas are similar to the molecules that existed in the material from which the Sun and Earth formed. Ultimately this research could lead to a better understanding of the origins of life.

Dr. Mitchell has been working in this particular area since 1975 in collaboration with Dr. Jack Ginsburg, a member of SMU's Chemistry Dept., and Dr. Philip Kuntz of the Hahn-Meitner-Institut in West Berlin. (George recently spent a sabbatical year at the Institut in Berlin).

Although these "interstellar clouds" are hundreds of light years away, they are studied by means of radio telescopes. They are composed mainly of hydrogen, but, in the last 10 years, many different kinds of molecules have been discovered in them. Some forty types of molecules are now known, ranging from simple species such as carbon monoxide (CO) to large organic molecules such as cyanohexatriyne (HC_7N). Other examples include water, ammonia, formaldehyde, and alcohol.

Dr. Mitchell will construct "models" of the clouds in an attempt to produce the molecules we observe starting with atoms (H,He,C, etc.). As well as clarifying the properties of interstellar clouds, an understanding of interstellar chemistry will be helpful in advancing our knowledge of the interstellar medium in general and of star formation in particular.

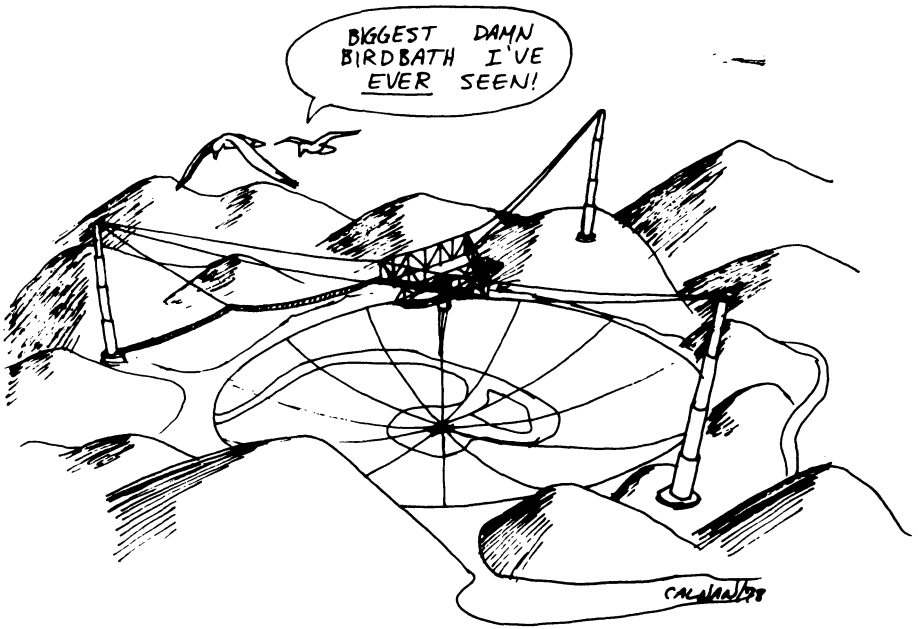
Dr. Mitchell, whose hometown is Brantford, Ont., was educated at McMaster Univ. in Hamilton, and received his Ph.D. from the Univ. of Toronto. He makes his home in Halifax, where he lives with his wife and two children. He leaves for Pasadena at the end of the summer for a year.

SMU Press Release

THE MISSING MASS FOUND....

...ie. part of it may have been found. For several years astronomers have been attempting to determine the total mass of the Universe since it has important consequences for our ideas concerning its eventual fate. A majority of astronomers accept one form or another of the Big Bang Theory, but a major problem which remains is whether the Universe will continue to expand for ever or will eventually slow and then collapse upon itself and undergo another Big Bang. The Hubble Constant, a measure of the rate of expansion of the Universe, is poorly determined with currant values falling in the range of 50 to 110 or 120 km/s/mpc. A value of 100 means the galaxy's distance can be estimated as 1% of the galaxy's velocity in km/sec with the distance being given in Megaparsecs. A value of 50km/sec/mpc implies an indefinite expansion while 100 km/s/mpc indicates that the mass of the Universe will contract.

The slowing of the expansion results from the mutual gravitational attraction of all mass in the Universe. The more mass, the more rapid the deacceleration. For those astronomers who philosophically dislike the idea of a (presumably) unique Big Bang, the news that large amounts of mass appear to be located in the vast emptyness of intergalactic space will be welcome. Until the recent results from the Small Astronomy Satellite and High Energy Astronomical Observatory and from the Arecibo Radio Obs., the space between galaxies was believed to be virtually empty compared to the interstellar space within galaxies. The instruments on SAS and HEAO designed to detect high energy X-rays have apparently found evidence for intergalactic gas which may be as hot as 100×10^6 °C. So far the observations have been restricted to areas surrounding clusters of galaxies. If the missing mass is completely found, then the Universe will continue to expand for perhaps another 40 or 50 billion years followed by a contraction of perhaps 60 billion years resulting in a catastrophic explosion such as occurred some 15 billion years ago.



Some further evidence to support an oscillating Universe comes from recent work by Green and Schmidt at Hale Obs. They have counted quasars ina uniform manner in 1400 sq. degrees of sky. The numberswere then compared to a similar count several years ago by Braccesi but which was to a fainter limit and over 36 degrees of sky. The number of quasars per square degree was respectively 0.0035 and 0.47. The greater density of Braccesi's count would seem to indicate a greater number of quasars at greater distances and, if true, gives evidence of rapid cosmological evolution of the objects--a fact that strongly supports the big bang theories.

Some other recent articles of interest are:

Missing Particles Cast Doubt on Our Solar Theories, by Trefil in Smithsonian, P. 74, March 1978

Supertechnology (excerpt of the Runaway Universe) New Scientist, P. 787, 23 March 1978

Neutrinos: The Ultimate Astrophysical Probe by Turner in Mercury, P. 9 Jan/Feb 1978

The Surface of Mars, by Arvidson, Binder & Jones in Scientific American, P. 76, March 1978

FROM the CENTRES

FROM CALGARY's STAR SEEKER:

Detailed Eclipse Information:
The March Occultation Newsletter from the International Occultation Timing Assoc. or I.O.T.A. lists three publications which give considerable information on sites along the shadow path as well as maps and exposure guides for astrophotographers.

The publication ECLIPSE CHASER ATLAS ($5. US) covers 19 events to the end of the century with 7 maps. NORTHWEST '79 ($ 2.50 US) details over 70 towns and cities in Canada and the US with expected conditions and all times of 'contact' and other relevant data. Africa 1980 ($2.50 US) covers the event on Feb. 16 '80 in South Africa. Make cheques payable to Mr. F. Espenak, 8523 Greenbelt Rd. #103 Greenbelt, Maryland, 20770. All three cost $8.50 US.

(Halifax members interested in detailed information for the 26 Feb 1979 eclipse in western Canada can contact the Editor. The information includes precise path and weather summaries for the major centres near the path.)

From The Observatory via the Star Seeker:

One day the Professor called me into his laboratory. "At last I have solved the equation" he said. "Time is a field. I have made this machine which reverses this field. Look! I press this switch and time will run backwards run will time and switch this press I. Look! Field reverses which machine this made have I. Field is time." Said he. "Equation the solved have I last at". Laboratory his to in me called professor the one day. "For heavens sake, switch it BACK," I shouted. Click! Shouted I, "Back it switch sake heavens for." One day the professor called me into his Laboratory....

THE HALIFAX WEST ASTRONOMY CLUB--

or, How to Become 'WACO' and Like It!

Jody LeBlanc
Co-President

During the 1977-78 school year, several interested Halifax West students got together and formed a school based Ast. Club. The club currently has 15 active members and is the second (or perhaps even best) most well-known club in the school behind the radio station--such a performance by a first year club is certainly not the norm. Our success is due almost entirely to Co-Pres. Allen Henderson's brainstorm. The club shows bi-weekly movies. These full length feature movies are shown in the AV room of the school on Wednesday and Thursday evenings.

These movies started out as a losing proposition but soon --due to both the efforts of the club members and to the catching on--they began to be money making propositions. Door prizes and a canteen are provided and although not easy money, the work involved is tremendous. The club has ammassed enough money to purchase a 8" F/6 Meade reflector (being shipped), a Zenit 35mm SLR, films for the camera and to make a $50 donation to a fire fund for a family burned out during a recent fire.

The club is also active in observing. Frequent trips are taken to Allen's observatory, and when this is impossible, observing sessions are held in your's truly backyard. At these sessions basic observing techniques are taught and members get acquainted with telescopes and the sky first hand.

The club's prospects for the immediate future look good. The 8" should arrive shortly and we hope to have an observatory set up soon. And if you're curious about what WACO stands for, try West Astronomy Club Observer.

SNIFFLING THROUGH SPRING SKIES

At long last the winter snows have gone. No longer will I have to spend 15 minutes shoveling before observing and I'm proud to announce that I've packed away my faithful skidoo suit until next year. With the return of reasonably comfortable observing conditions, I think most of us will be tempted to observe more frequently than we have during the last few months. Unfortunately, with the return of spring's fine weather also seems to come a corresponding increase in the activities of most people. From yoga groups to overtime to school exams (expletive deleated!) we astronomers are usually hard pressed to fit observing time into our already packed schedule.

But astronomy need not take hours and hours. For example, when was the last time you really looked at the Moon? Why not take 30 minutes some clear evening and reaquaint yourself with some of the Moon's features. A book like Patrick Moore's Revised Guide to the Moon, that has sectional maps designed for use at the telescope, make crater spotting easier. If you're not a lunar observer, how about doing some disc drawings od Jupiter. They are great for training your eyes no matter what the aperature of your telescope. Observations such as these can be carried on during fairly strong twilight, but if even this is impossible, don't overlook the Sun. We owners of small refractors are perhaps the only people who consider the Sun worthy of attention which I consider to be a sorry state of affairs. Why not get up half an hour earlier tomorrow (this will certainly bring smiles to people who know of my last minute dashes to first period classes) and have a look at some sunspots? Not only will you get the best seeing but you'll have a good chance to avoid embarassing stares of passers-by and your projection apparatus will probably not look... er, as unique as my Kentucky Fried Chicken projection box.

Lastly, but certainly not least, why not try some relatively short exposure astrophotography? The Sun is a natural--just take the picture on fine grain film such as Kodachrome or Panatomic-X. Another easy target is the Moon where even the owners of much maligned department store refractors can do a creditable job--no clock drive needed. For F/15 refractor owners, you can start with these

exposure times for Plus-X. Crescent 1/8^s; quarter 1/15^s gibbous or full 1/30^s. If you're using a yellow filter to cut down chromatic abberation and as a blue haze cut-off filter (ie. a Wratten k2), increase the exposure by one stop. As for you reflector owners, you've probably done more lunar photography than I have, so I'll not make any recommendations for their use.

If you can do your own developing through the negative step or know someone who can process the film, why not try Kodak's 2475 Recording Film and shoot at ASA 3200-4000. This film, using a 50mm F/2 lens, will give very pleasing shots of constellations just using a camera tripod. Try 30 seconds for the Big Dipper or a bit less for your favorite southern constellations. If you insist on color try High Speed Ektachrome pushed 1 stop (some labs will do this) or try one of the new 400 ASA print films. A 3 or 4 minute exposure with guiding will surprise you--even right here in Halifax. But watch out for 'fogging' due to bright skies in exposures over 5 minutes.

So let's take advantage of our hopefully mild spring weather and do some observing. One warning; (which you've probably been waiting for since reading the title) spring is a great time to catch colds, as I know only to well. If anyone knows anything more--achoo--effective than Dristan, would you please--sniff, sniff--let me know!

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COMET KLENZER (1978d)

Earnst Klenzer, P.G.Obs.reports the discovery of a bright comet in Ursa Major with the 3m. Schmidt. Preliminary ephemerids are given below. Early spectra of the comet show lines of water and chlorine emmision. Dr. Klenzer also reports that 1978d passed in front of Eros. Photo-electric photometry of Eros obtained after its passage through the tail of 1978d reveals a sudden brightening of 4 mag. This would represent a change in albedo of 30% ±1.5% for the normally dark asteroid. R. Snortal observed a definite green appearance to the Comet on April 26.543578 when observed with 200 x 500 binoculars. The tail is in position angle 0°.0 and extends some 25° in a curved path with in the bowl of Ursa Major. This most interesting object deserves close attention and may prove to be one of the most spectacular comets of the century.

The following are precise positions for Comet Klenzer

1978 UT		1950	1950	m_1	Observer
April	10.30475	22^{h}13^{m}05^s.43	+56°14'30.5"	3.5	Klenzer
	12.28129	21 53 41.01	+53 21 46.1	3.1	"
	22.63472	20 58 15.73	+56 32 37.9	2.3	Snortal
	24.89243	21 20 34.56	+62 08 45.1	2.0	Klenzer

The following are the ephemerids for May 1978.

May	1.5 UT	21^{h}32^{m}54^s.23	+60°07'59.9"	1.6
	3.5	21 43 28.01	+59 58 46.3	1.3
	5.5	21 56 17.89	+58 54 09.4	1.1
	7.5	22 09 30.12	+56 38 54.9	0.7
	9.5	22 16 12.85	+56 01 32.7	0.0
	11.5	22 02 48.93	+56 04 58.9	-0.6
	13.5	21 54 12.76	+53 02 24.6	-0.9
	15.5	20 53 36.92	+55 18 31.8	-2.8

1978 April 20 Bryan C. Marsbar

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