NOVA NOTES

BI-MONTHLY JOURNAL OF THE HALIFAX CENTRE

1978
VOL 9
NO 1

JAN.-FEB.

□□ the 50th issue ! □□

1978 Halifax Centre Executive

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Librarian:	Diane Brooks, 71 Woodlawn Rd. Dartmouth
Centre Rep:	Peter Edwards, 8 Sullivan's Hill, Bedford
Editor:	Randall Brooks, Dept of Astronomy, Saint Mary's Univ., Halifax

UP COMING MEETINGS:

19 Jan 1978 NOTE THIS IS A THURSDAY EVENING MEETING to be Held at Saint mary's Univ. rm 146 of the Loyola Building (academic complex) at 8:00pm.
Speaker: René Racine, Head of the Dept. of Astronomy at the Université de Montréal. His topic will be a description of the new observatory being constructed at Mont Megantic, Québec. This instrument is a 60 inch reflector making it the third largest instrument in Canada. Dr. Racine is a specialist in instrumentation, halo population stars in the disc of the galaxy and observational cosmology.

NOTICE:
For the January meeting of the Executive, it has been suggested that we should open the meeting to the membership at large. If you wonder what goes on in the back rooms of the RASC, then this is your opportunity. The only restriction is that you arrive before the meeting begins (7:00 pm). This is a trial and may or may not be continued depending on response and the effect it has on the operation of the Executive. If you think you have some good ideas for projects or if you wonder what projects we have in mind, come along and lend us the benefit of your experience. Remember though, you must arrive before the meeting starts. The location will be posted on the doors of L146.

BURKE-GAFFNEY AWARD for 1978

RULES:

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

2) Presentation: Articles should be 1000 - 1500 words, written in proper grammatical form and presented typewritten (if possible) and double spaced. Diagrams need not be in finished form but should be complete and ready for drafting. Photographs may also be submitted and if possible the original negative should accompany the submission.

3) Eligibility: Any member of the Halifax Centre in good standing may submit articles with the exception of those with graduate degrees (any field of study).

4) Judging: Articles will be judged on scientific accuracy, originality and with a strong emphasis on the overall literary merit. Judging will be carried out by the President, Editor and one other person appointed by the Halifax Executive.

5) Prize: The award will be given once annualy with the winner having a choice of one of the following: Ottwell's Astronomical Calendar (1979); a year's subscription to the Griffith Observer; or The Amazing Universe by Freidman (published by the National Geographic Society).

SUBMISSION OF ENTRIES:

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

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

TREASURERS REPORT--1977

Balance; 15 Dec 1976			573.26
Receipts:			
Memberships--Regular		690.50	
	Student	254.00	
	Life	150.00	
	Grant(life)	31.00	1,125.50
Grants	Trip	92.00	
	Library	272.00	364.00
Donation		15.00	15.00
Pin Sales			3.00
Handbook sales			120.55
Interest			11.47
			1639.52
			2212.78
Disbursements			
Membership, RASC Office			792.00
Journals (subscriptions)			62.17
Handbooks			116.20
Pins			15.00
Shipping, stamps			70.50
Mirror kit			22.63
Binding of Journals			15.00
Trip			192.00
Books (from library grant)			233.48
Honourarium			25.00
Refreshments			65.57
			1609.55
Ending Balance, 15 Dec 1977			603.23

ALAN BENT, Treasurer

Groaner of the Month: What's an American wrench which has fallen in to a nurtron star called?

A Star mangled spanner---oooooohhhh that's bad!!

PRESIDENT'S REPORT

Since it is expected that the outgoing President contribute a couple of lines to Nova Notes on the past year's peregrinations, I offer the following recap of our Centre's aspirations and activities. The past year was an encouraging one. First, our Centre's membership was up to 70 plus 5 life members. Attendance at meetings has been good, with some new faces. I personally feel it's sometimes difficult for our members to get to know other members, and we feel the coffee/refreshment period after meetings has been useful. If you are having problems with your mirror, bring it along--someone at the coffee break can give you some help!

What have we accomplished during the past twelve months to help the Centre? Probably one of the most significant and long lasting efforts has been the upgrading of our Centre's library. The Executive applied for and received a grant from the National Council for $270 for new library books. Virtually all of these books have now been received, and we now have also added a large number of books from our Centre's budget. These new acquisitions have been organized and looked after by our Centre's first librarian (Diane Brooks). A list of holdings may be found elsewhere in this issue.

Another indication of interest in the Centre's activities was the intriguing display assembled for the NS Museum's Societies Show in May (see photo in JRASC Vol 71, p. L56). If you helped put that display together, then we wish to tell you again that we appreciate your efforts. If you missed that display, then I think you would have been very surprised at the professional appearance! The public certainly gained an appreciation of our Centre's purpose and activities.

On the observing side of things, progress has been made in several respects. First, the Centre has added the office of Observing Chairman, ably handled this year by Mike Edwards. He has helped establish a regularly-scheduled observer's meeting on the Saturday evening

eight days after the Centre's monthly meetings. These observer's meetings take place at the Burke-Gaffney Obs. or in the mirror grinding room one floor below and at the end of the year acouple were held on the grounds of Uniake House at Mount Uniake. To encourage some mirror grinding by first-timers, the Centre bought two 6-inch mirror kits--available to anyone to devote some effort to. One objective (irresistable pun) was to assemble a portable telescope for the Centre's observing sessions. Progress has been a little slower than hoped, but work by a committee is always slow. One mirror is now headed for the design submitted by Larry Bogan (see elsewhere in this issue), and the other mirror still needs a few strokes!

This year has probably seen more observing sessions organized than in any other year. A camping/observing weekend was organized at Blomidon Park, and another observing session was held on the site of the 18th century BesBarres observatory. In addition there was the summer Picnic/Observing session. Credit for some of the cohesion and enthusiasm within the Centre should go to the Editor of Nova Notes for his excellent efforts.

I will close by recommending one of our library's new books--if there ever was a book to offer excitement and stimulus to the amateur astronomer, the recounting of the life of Russell W. Porter is certainly paramount. Are you aware that Stellafane would almost certainly not exist except for Porter's efforts? That Porter spent years exploring the artic north? (you think your backyard is cold on a clear winter night?!) Or that Porter influenced the design of the 200 inch mount, in addition to producing the famous drawings? The book is Russell W. Porter: Artic Explorer, Artist, Telescope Maker by Berton Willard. Read it!

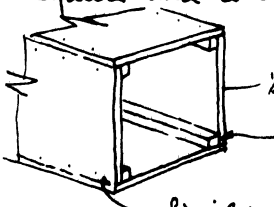
David L. DuPuy
President
Halifax Centre

DESIGN FOR THE HALIFAX CENTRE 6" F/5 TELESCOPES

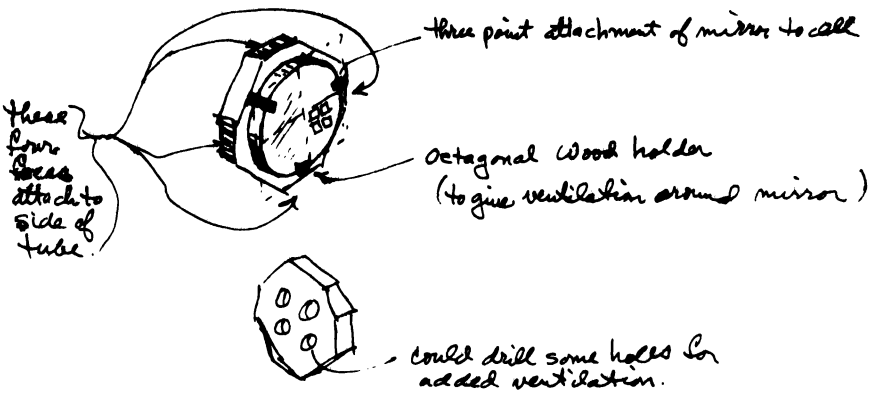
The drawings presented here have been supplied by Larry Bogan and have been adopted for the two Centre telescopes being constructed. You may find them useful in construction of your own instrument now or in the future.

Telescope Design — L. Bogan

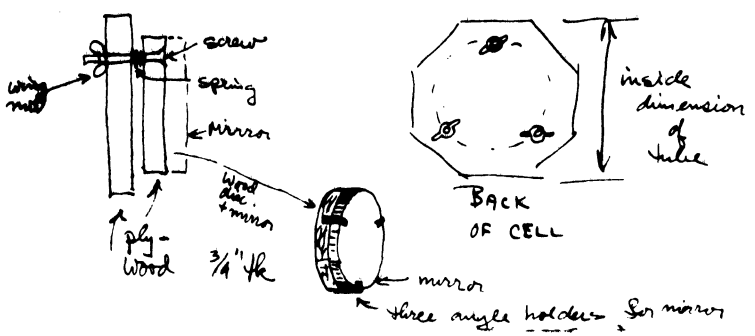
Tube: Square and wood.



MIRROR CELL: WOOD

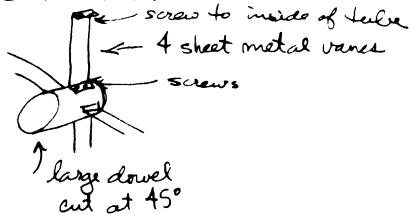


BETTER MIRROR CELL: ADJUSTABLE

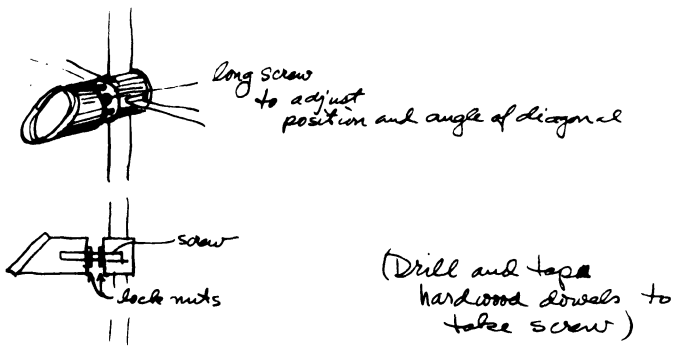


L. Bogan

DIAGONAL HOLDER:



BETTER DIAGONAL HOLDER: ADJUSTABLE

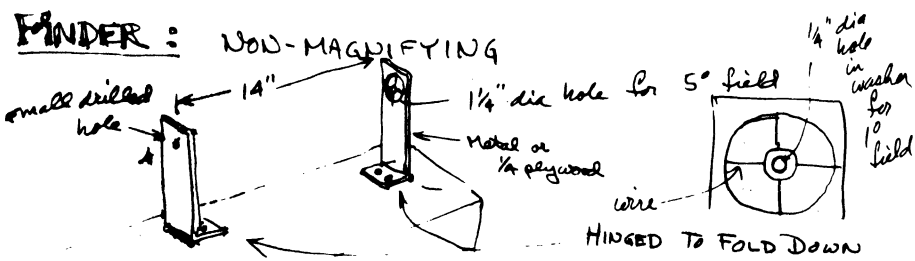


EYEPIECE HOLDER:

BUY ONE!

Good ones are too difficult to make without a machine shop.

FINDER: NON-MAGNIFYING



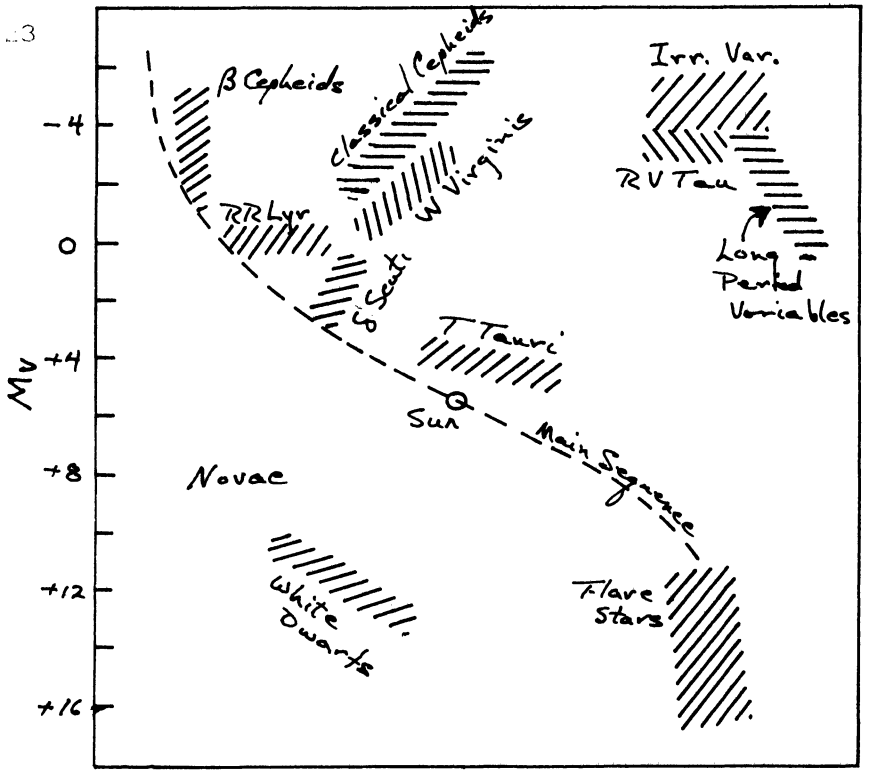


Fig 1.

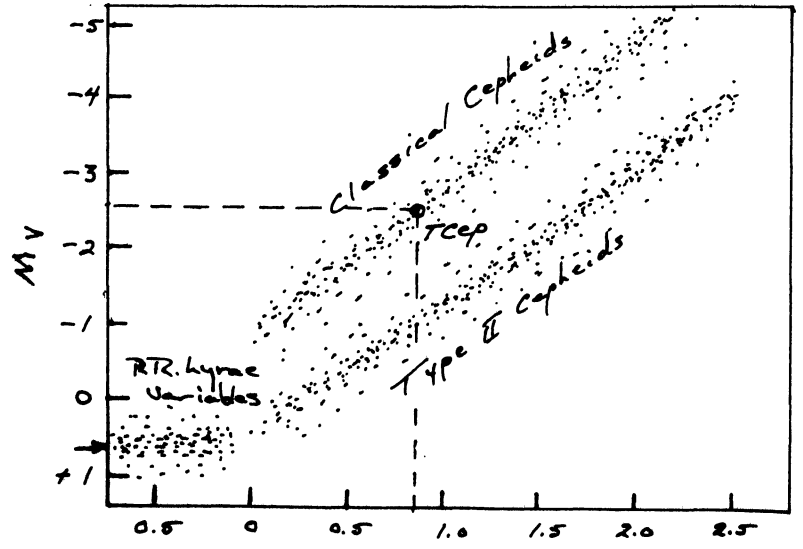
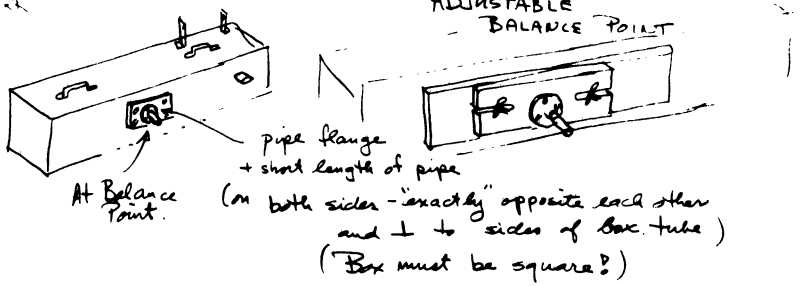
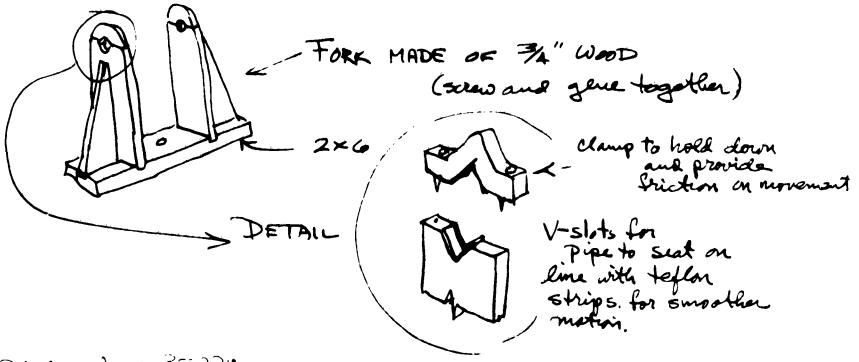


Fig 2.

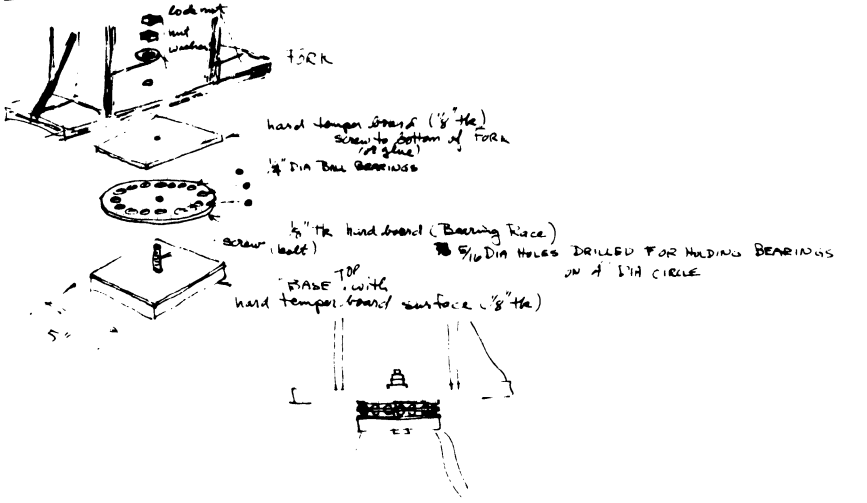
MOUNTING

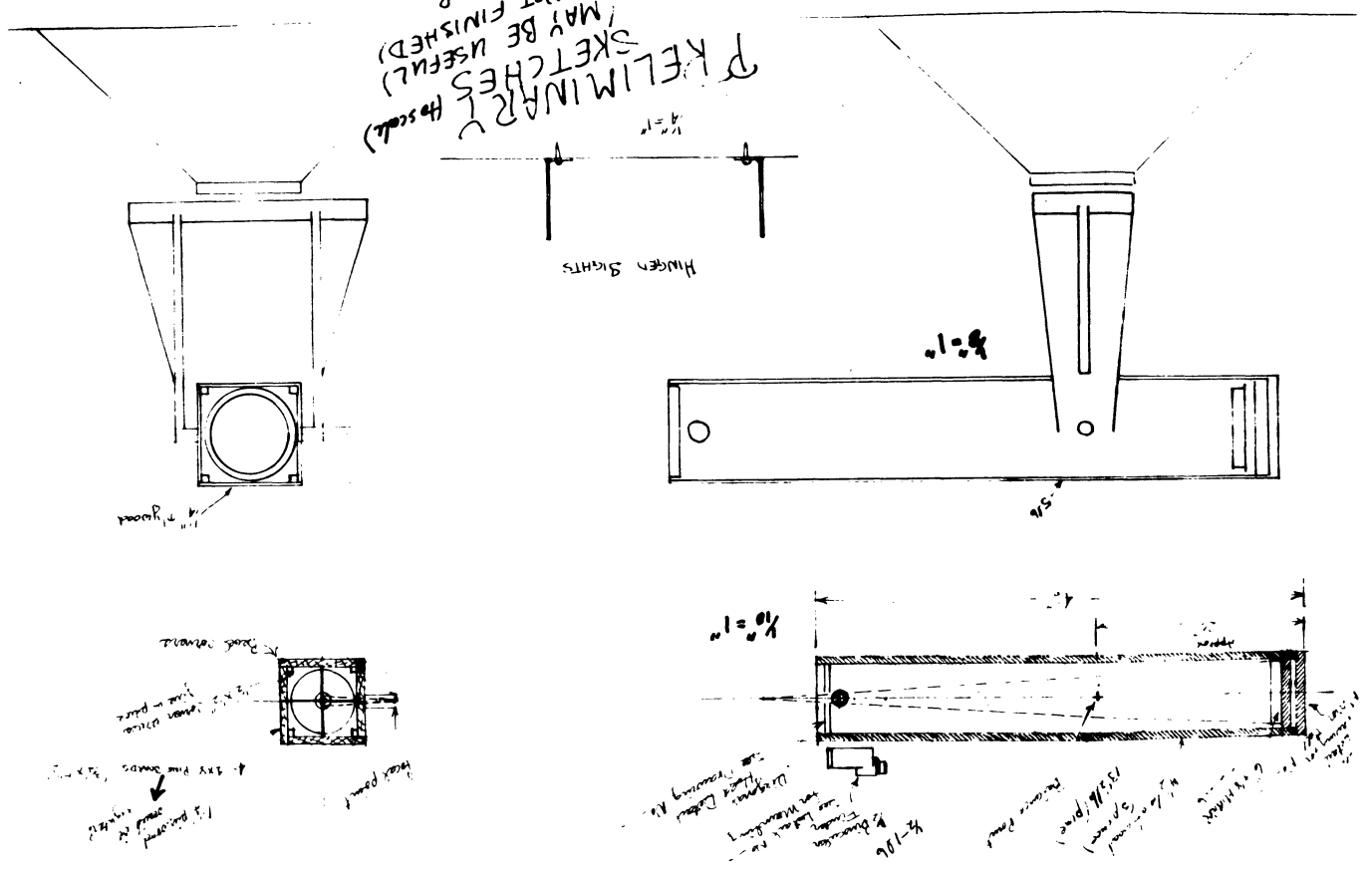
L. Bogan

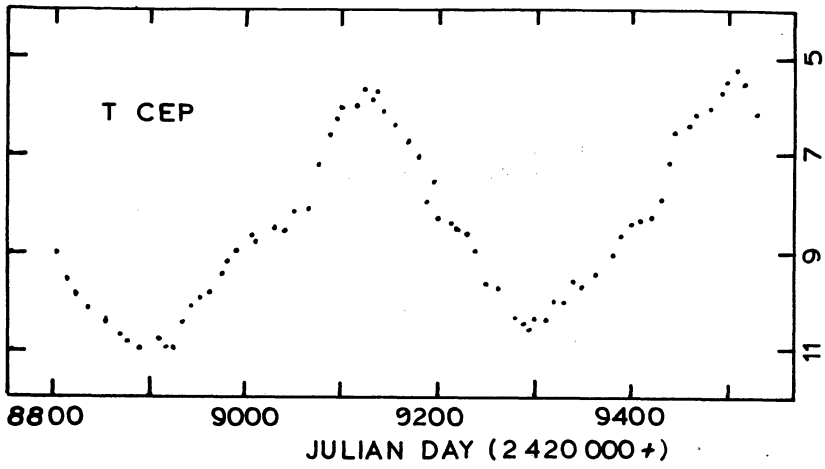




VERTICAL AXIS BEARING



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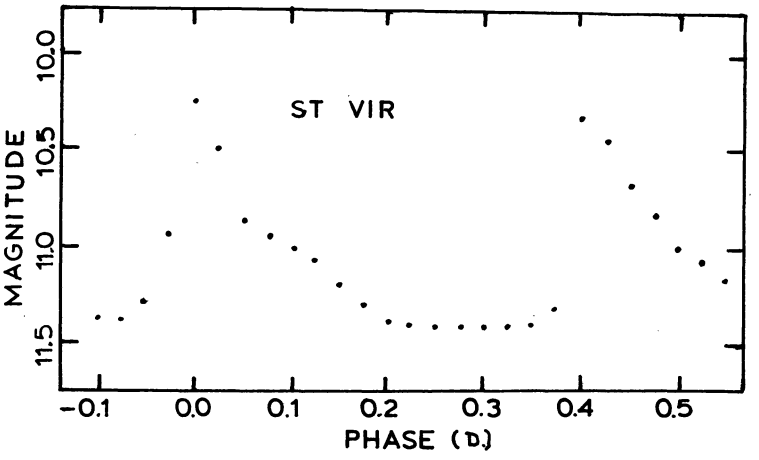
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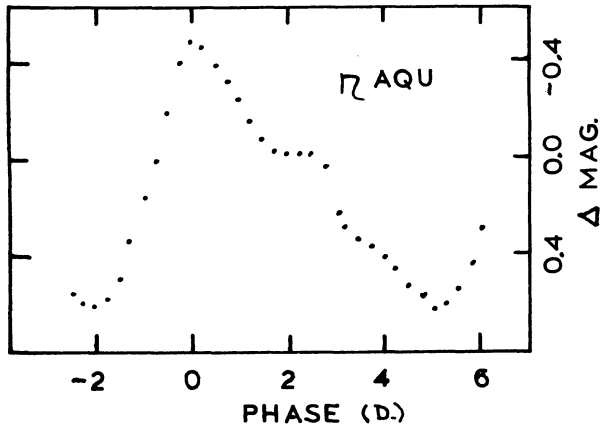
PHASE (D.)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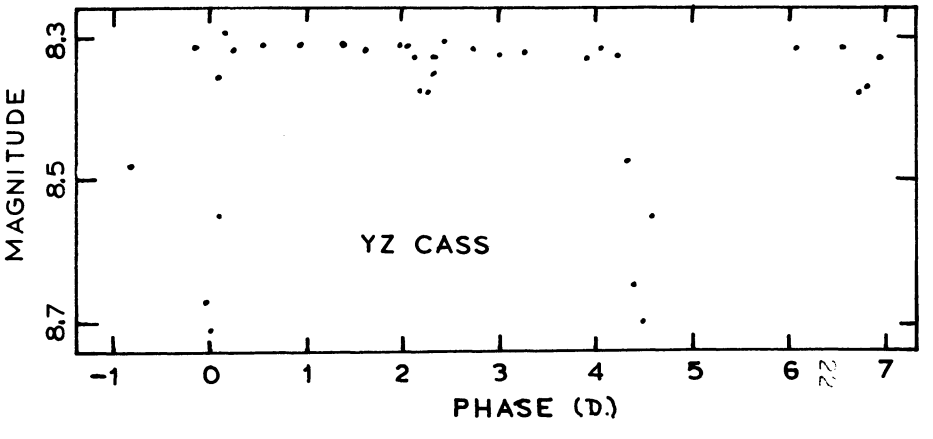
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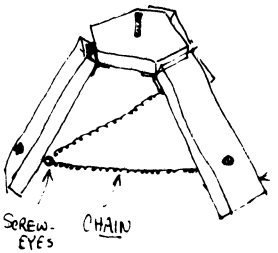
PHASE (D.)

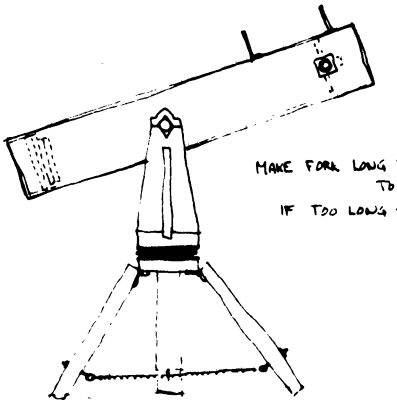
BASE = TRIPOD

HINGED LEGS — HINGES MUST BE TIGHT TO ELIMINATE WIGGLE!



2x4 or 2x3
or maybe 2x2 is sturdy enough

HEIGHT OF EYEPIECE SHOULD BE CONVENIENT FOR AVERAGE HEIGHT PERSON
~ 5FT ABOVE GROUND MAX (?)



MAKE FORK LONG ENOUGH TO ALLOW SCOPE TO REACH ZENITH
IF TOO LONG - ADD WEIGHT TO REAR OF TUBE SO BALANCE POINT CAN BE MOVED BACK.

TRY TO MAKE AS LIGHT - BUT AS STURDY AS POSSIBLE!

SEAL WOOD THEN PAINT

NOVA NOTES ARE PRINTED BI-MONTHLY IN JAN., MARCH ETC, THROUGH THE COURTESY OF THE NOVA SCOTIA MUSEUM. ARTICLES FOR THE NEXT ISSUE SHOULD REACH THE EDITOR BY FEB 18. ARTICLES ON ANY ASPECT OF ASTRONOMY WILL BE CONSIDERED FOR PUBLICAIION.

OBSERVER'S HANDBOOK GLOSSARY

Diane Brooks

Ed. Note:
Many new members may not be familiar with some of the terms used in the Observer's Handbook and may not have references in which to look up the meanings. This has been placed in the centre of this issue with the Library Holdings list and the Planetary Magnitude Diagram so they may be removed and saved for future reference. In this list, the pages on which the terms are used are given or if the term is defined in the Handbook, the page is given.

ABERRATION (8) apparent displacement of a star from its true position due to the Earth's orbital motion.

ABSOLUTE MAGNITUDE (96) apparent magnitude a star would have if seen from a distance of 10 parsecs (32.6 light yrs)

ALBEDO (6) reflecting power of a planet or other non-self-luminous body

ALGOL (58,95) an eclipsing binary star--also used to refer to stars having similar characteristics as Algol

ANNULAR ECLIPSE occurs when Moon is near apogee & appears slightly smaller than the Sun, leaving a ring of the Sun's disc showing

APEX (8) point towards which the Sun's space motion is directed--a point not far from the star Vega

APHELIAN (39,61) orbital position of an object when furthest from the Sun

APOGEE (39,61) orbital position of an object when furthest from the Earth

APPARENT (or visual) Magnitude (7) apparent brightness of a celestial body as seen with the eye

ASCENDING NODE (38) see p. 4

ASTRONOMICAL UNIT (AU) (8) distance between the Earth and Sun (defined as 92,957,000 mi.)

AUTUMNAL EQUINOX (54) time when Sun crosses the celestial equator from North to South (about Sept. 22)

CELESTIAL EQUATOR see pp. 4, 121-126

CELESTIAL MERIDIAN (12) great circle on celestial shere which passes through the zenith and both celestial poles

CELESTIAL POLES see pp. 4, 121-126

CEPHEID VARIABLES see p. 110

COLOUR INDEX see p. 96

CONFIGURATION (37) close alignment of 2 or more planets

CONJUNCTION see p. 4

DECLINATION (DEC or) measurement corresponding to latitude in units of degrees, min and sec of arc (4, 108)

DESCENDING NODE SEE pp 4,38

DIURNAL MOTION apparent daily rotation of the sky from east to west, due to the Earth's rotation from west to east

DOUBLE STARS see p. 107

ECCENTRICITY (e) (6,88) measure of the elongation of an orbit

ECLIPSING BINARIES see p. 100

ECLIPTIC see pp. 4,121-126

EGRESS (37) reappearance of a Moon after an eclipse by a planet

ELONGATION see pp. 4,36,88,52

EMERSION see p. 66 (essentially same as egress

EMISSION REGIONS see p. 114

EMISSION SPECTRUM spectrum consisting of bright lines due to incandescent gases at low density

EPOCH (108) date chosen for reference purposes in quoting astronomical data

EXTENDED COMPLEXES (compl.) see p. 114

FIREBALLS see p. 91

GLOBULAR CLUSTER see p. 116

IMMERSION see p.66

INCLINATION (i) (6,7,82) angle of tilt of an orbit referenced to the line of sight

INGRESS (32) disappearance of a moon into the shadow of a planet

LIBRATION see p. 36

LIGHT CURVE see p. 108

LIGHT-YEAR see pp.8,96,112

LIMB (36,37) edge of the visable disc of an object as seen from a distance

LUMINOSITY CLASS see p. 96

MAIN SEQUENCE well defined band from the upper left to lower right of the Hurtzsprung-Russel diagram

MESSIER OBJECTS (M) (115) various nebulous objects catalogued by the 18th c. French astronomer, Messier--119 objects

METEOR see p. 91

" SHOWER see p. 91

METEOROID see p. 91

METEORITE see p. 91

MINIMA OF ALGOL (37) time of minimum light in the eclipsing binary star Algol. The fainter (secondary) component is in our lign of sight to the bright (primary) component

MIRA CETI VARIABLES see p. 110

MULTIPLE STARS see p. 107

NGC (116) New General Catalogue--compliation by Dreyer of clusters and nebulae (19th c.)--7840 objects

NOVAE see p. 110

OCCULTATION see pp. 37 38 46 64 65

OPEN CLUSTER see p. 116

OPPOSITION see pp. 31 37 88

PARABOLIC (8) refers to orbits with a certain set of eccentricities

PARALLAX (96 112) small displacement of a number of nearer stars relative to the more distant ones--due to the orbital motion of the Earth about the Sun

PARSEC see p. 8 112

PENUMBRA (64) area of partial shadow during an eclipse lying about the main cone of shadow cast by Earth

PERIGEE (39 61) point of closest approach to Earth for a body in orbit about Earth

PERIHELIAN (31 38 61 91) point of closest approach to the Sun for a body in orbit about the Sun

PERIOD (108 110) refers to the time for one complete orbit in a binary star pair &/or the time between sucessive minima in variable stars

PLANETARY APPULSE see p. 64

PLANETARY NEBULA (pl) see p. 114

PRECESSION (8 94) motion of the celestial poles amoung the stars due to Earth's gyroscopic motions. It causes a slow continual movement of the celestial axis and grid system

PROPER MOTION (96 112) individual motion of a star on the celestial sphere caused by its own space motion

PROTOSTELLAR NEBULA (PrS) see p. 114

RADIAL VELOCITY (96) approaching or receeding motion of a star , galaxy, etc. measured by the Doppler effect in the spectrum

RADIANT see p. 91

R CORONA BOREALIS VARIABLES see p. 110

RED SHIFT (8) displacement of spectral lines toward the red or long wavelength end of the spectrum indicating a velocity of recession

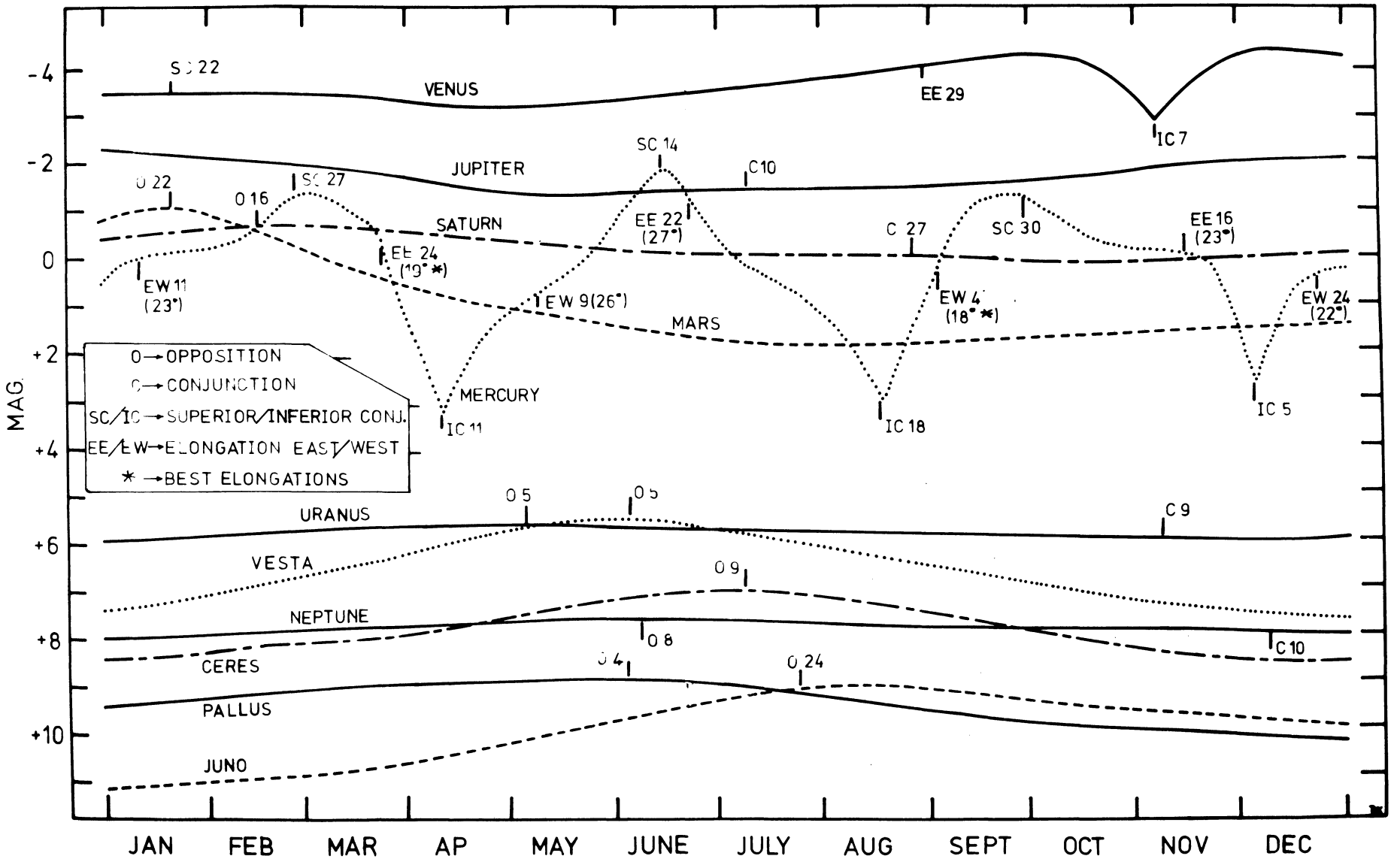
REFLECTION NEBULA (Ref) see p. 114

RETROGRADE (6,7) movement in the sense opposite to that of the Earth in its orbit

RIGHT ASCENTION (RA or)(4 10 12 108) measurement corresponding to longitude and measured from the First Point of Aries, one of the two points where the ecliptic crosses the celestial equator. Units are in hours, min.,sec..

RR LYRAE VARIABLES see p. 110

PLANETARY MAGNITUDES FOR 1978



RV TAURI VARIABLES see p. 110

SELENOGRAPHIC COLONGITUDE see p. 30

SIDEREAL TIME see pp. 8 12

STANDARD TIME see p. 14

SUMMER SOLSTICE (49) time when the Sun is at its northern most point in the sky (about 22 June)

SUPERGIANT (96) star of an exceptionally low density and great luminosity

SUPERNOVA see p. 110

SUPERNOVA REMNANTS (114) remains of stars which have undergone a cataclysmic explosion

SYNODIC (8) relating to the Moon

U GEMINORUM VARIABLES see p. 110

UMBRA (64) main cone of shadow cast by the Earth, Moon or any celestial body during an eclipse

UNIVERSAL TIME (UT) see p. 10

VARIABLE STARS (96 108) stars which fluctuate in brightness from intrinsic or extrinsic causes

VERNAL EQUINOX (4 10) First Point of Aries, the time when the Sun crosses the Celestial Equator from south to north (about 21 March)

WINTER SOLSTICE (61) time when the Sun is at its southern most point in the sky (about 22 Dec.)

Z CAMELOPARDALIS VARIABLES see p. 110

ZENITH see p. 121 126

CENTRE SLIDE SET LOANS

As many of you are aware, the Centre has a number of set of slides on various topics available for loan to members and non-members. Topics are: the Solar System (general); Mars (Viking results); Clusters & Nebulae (star formation & evolution); and Galaxies. These may be borrowed for school or other group use by writing the Editor. $10 deposit required for each set (cheque prefered).

HALIFAX CENTRE LIBRARY HOLDINGS

ASTRONOMERS - LIVES (925.2)

Stachiewicz, Wanda M., Copernicus and the Changing World

ASTRONOMY - DESCRIPTIVE (523)

Hogg, Helen Sawyer, The Stars Belong to Everyone
Kaufmann, William J., III, Relativity and Cosmology
Serviss, Garrett P., Astronomy with an Opera Glass

ASTRONOMY - GENERAL (520)

Abell, George, Exploration of the Universe (brief edition and 3rd. edition)
Baker, Robert H. & Fredrick, Laurence W., An Introduction to Astronomy
Birney, D.Scott, Modern Astronomy
Huffer, Charles M., Trinklein, Frederick, E. & Bunge, Mark, An Introduction to Astronomy
Inglis, Stuart J., Planets, Stars and Galaxies
Moore, Patrick, The Boy's Book of Astronomy
Motz, Lloyd, This is Astronomy
New Frontiers in Astronomy, Readings from Scientific American (520.8)
Pasachoff, Jay M., Contemporary Astronomy
Peltier, Leslie C., Guideposts to the Stars
Skilling, William T. & Richardson, Robert S., A Brief Text in Astronomy
Zim, Herbert S. & Baker, Robert H., Stars

ASTRONOMY - PRACTICAL (522)

Newton, Jack, Deep Sky Objects

ATLASES (523.89, 524)

Allen, Richard Hinckley, Star Names, Their Lore and Meaning
Alter, Dinsmore (ed.), Lunar Atlas
Becvar, Antonin, Atlas of the Heavens. Atlas Coeli, 1950.0 (524.8)
Atlas of the Heavens-II. Catalogue, 1950.0 (524.8)
Levitt, I.M. & Marshall, Roy K., Star Maps for Beginners (two copies)
Menzel, Donald H., A Field Guide to the Stars and Planets
Norton, Arthur P. & Inglis, J. Gall, Norton's Star Atlas (15th & 16th editions)

BIOGRAPHY - SCIENTISTS (925)

Willard, Berton C., Russell W. Porter: Arctic Explorer, Artist, Telescope Maker

CALENDARS (529.3)

Ottewell, Guy, Astronomical Calendar 1977

CELESTIAL MECHANICS (521.1)

Ryabov, Y., An Elementary Survey of Celestial Mechanics

COSMOLOGY (113, 523.1)

Ferris, Timothy, The Red Limit
McVittie, G.C., Fact and Theory in Cosmology
Sciama, D.W., The Unity of the Universe

DICTIONARIES (520.3)

Rudaux, Lucien & De Vaucouleurs, G., Larousse Encyclopedia of Astronomy

Wallenquist, Ake, Penquin Dictionary of Astronomy

EARTH SCIENCES (550.551)

Spilhaus, Athelstan, Satellite of the Sun

GALAXIES (523.11)

Shapley, Harlow & Payne-Gaposchkin, Cecilia (eds.), Galaxies

HISTORY - ASTRONOMY (520.9)

Berry, Arthur, A Short History of Astronomy
Koestler, Arthur, The Sleepwalkers
Whitney, Charles A., The Discovery of Our Galaxy

HISTORY - SCIENCE (509)

Van Melsen, Andrew G., From Atomos to Atom

LECTURES - ASTRONOMY (520.4)

Bergmann, P.G., Fenyves, E.J. & Motz, L. (eds.), Seventh Texas Symposium on Relativistic Astrophysics
Enzmann, Robert Duncan (consulting ed.), Second Conference on Planetology and Space Mission Planning
Enzmann, R.D. (ed.), Third Conference on Planetology and Space Mission Planning
Millman, Peter M., This Universe of Space

LIFE ELSEWHERE (523.13)

Jastrow, Robert, Red Giants and White Dwarfs
Sagan, Carl, The Cosmic Connection
Sagan, Carl (ed.), Communication with Extraterrestrial Intelligence: CETI (001.50999)
Sullivan, Walter, We Are Not Alone

MATHEMATICS (510-519)

Brink, Raymond W., Spherical Trigonometry
Durrant, J.E., Kingston, H.R., Sharp, J. Norman C., Kerr, James W., A New Analytic Geometry
Niles, Nathan O., Plane Trigonometry

METEORITES (523.51)

Astrophysics Branch, National Research Council, Meteorites

OBSERVING TECHNIQUES (522.6)

Webb, T.W., Celestial Objects for Common Telescopes, Vol. One: The Solar System
Vol. Two: The Stars

PHOTOGRAPHY (522.63)

Mayall, R. Newton & Mayall, Margaret W., Skyshooting: Photography for Amateur Astronomers

PHYSICS - GENERAL (530)

Freeman, Ira M., Modern Introductory Physics
Smith, Alpheus W. & Cooper, John N., The Elements of Physics
White, Marsh W. & Manning, Kenneth V., Experimental College Physics, A Laboratory Manual

PLANETARIA (520.74)

Hubbard Baader Planetarium
King, H.C., The McLaughlin Planetarium

RADIO ASTRONOMY (523.016)

Kraus, John, Big Ear

SATELLITES (629.13882)

Corliss, William R., Nasa Sounding Rockets, 1958-1966
Fishlock, David (ed.), A Guide to Earth Satellites

SCIENCE - GENERAL (500)

Moore, Shirley (ed.), Science Projects Handbook

SOLAR SYSTEM (523.2)

Kopal, Zdenek, The Solar System
The Solar System, A Scientific American Book

SUN (523.7)

Newton, H.W., The Face of the Sun

TELESCOPES (522.2)

Fillmore, Warren I., Construction of a Maksutov Telescope
Ingalls, Albert G. (ed.), Amateur Telescope Making, Book One, Two and Three
Muirden, James, Beginner's Guide to Astronomical Telescope Making
Texereau, Jean, How to Make a Telescope

WEATHER (551.6)

Sutton, O.G., Understanding Weather

In addition to the above books, the Centre subscribs to or has back issues to the following: RASC Journal 1908 to present (some early issues missing); Sky and Telescope 1960 on; Mercury 1977; Griffith Observer 1977; Telescope Making Techniques 1977; Journal for the History of Astronomy 1970, 1971.

Books may be borrowed for one month simply by signing it out at a meeting or, if you live more than 100 miles from Halifax, by placing a request to the Librarian. Books sent by mail must be insured when being returned with the borrower paying this expense. If you have books overdue, please return at the next meeting so others may have a chance to see them.

Diane Brooks

Librarian

ASTRONOMY FOR YOUNG RASCals--VARIABLE STARS

In the last issue, you were given the date from which to plot the light curve of the 4 stars. The light curves are plotted on the next page. YZ Cas is an eclipsing binary star and was included to demonstrate the difference between it and the other intrinsic variables. Between the dips, this Algol type star is constant in brightness. The dips (at 0 and 4.4 days) are due to the brighter star being eclipsed by the fainter and the dips at 2.2 and 6.7^d due to the brighter star coming in front of the fainter star and represent primary and secondary eclipses. In the case of YZ cas the light variations are simply due to geometrical effects of the binary system and it is therefore considered an extrinsic variable.

T Cep, ST Vir and η (eta) Aqu are intrinsic variables with the light variations in time due to periodic internal changes in the star's structure. The number of variable stars is numbered in the tens of thousands with many being discovered yearly. In fact it is possible that every star is variable to some extent and as a star evolves it may pass through several stages and types of variability. Fig.1 shows the position of some variable types on the Hertzsprung-Russell diagram.

So what can we learn about a star by making the series of observations necessary to construct a light curve? T Cep has a period of some 400 days, ST Vir only 0.4^d and η Aqu a period of 7.1 days--a very wide range! The difference is one of the clues to identify it with a particular type of variable class. Other clues are the shape of the curve itself and the amplitude of the light variations--1.2 mag. for ST Vir, 1.1 for η Aqu and an incrediable 6 magnitudes for T Cep!

T Cep is a MIRA type variable, so called because the prototype, Chi Cygni (known as Mira), varies in a similar fashion. Mira type variables are mainly of spectral type M, R, S, and N indicating surface temperatures of 2000° to 2500°K. Each star of this type is oscillating in surface temperature from about 1900 to 2600°k when it is brightest. To describe the light curve, it is theorized that the star is pulsating with 'hot fronts' moving outward through the star eventually reaching the surface. As the waves dissipate in the upper atmosphere

of the star, droplets condense which veil the photosphere or visible surface of the star until they evaporate.

ST Virginis and η Aquilae are pulsating variables of the RR Lyrae and classical Cepheid types resp. They are useful distance indicators because they are both bright and because we know the absolute magnitude (brightness a star has when placed at 10 parsec or 32,6 light years) within certain limits. Fig. 2 is a graph which shows M_V or absolute magnitude, as a function of the log of the period. The RR lyr types ($P \lesssim 1d.$) have constant luminosity with the average M_V about +0.7 (bright compared to the Sun, M_V=+4.7). It is interesting how M_V is related to increasing period in the Classical and type II Cepheids. This relation was noticed by Shapley in 1913 and calibrated by Baade in 1952. Cepheids are easily detected at great distances due to their intrinsic luminosity and because of the distinctive light variations and are used to determine the distance to star clusters and to nearby galaxies such as M31 and the Magelanic Clouds.

The relation between observed and absolute magnitude is well known and easy to apply. It is:

$$\text{Log } r = \frac{m - M + 5}{5}$$

and gives the distance in parsecs (pc). As an example lets consider η Aqu. From the light curve we know it is a cepheid with p = 7 days (log 7 = 0.85). From Fig 2 we find that M_V (for log period = 0.85) is about -2.5 which is the absolute magnitude at maximum brightness. The observed magnitude (from the Observer's Handbook 1978 p.109) is +4.1 mag. Therefore we have all the information to estimate the distance to T Cep.

$$\text{Log } r = \frac{4.1 - (-2.5) + 5}{5} = 2.32$$

Therefore r = 208 pc or 680 light years

You should be aware that this is not quite correct because we have omitted the effects of interstellar dust which makes it necessary to make a small adjustment to the above formula. However, that is of secondary importance here and can be left out.

If for ST Virginis, m = 10.3 and M = +0.7, can you find r?

BK

ASSOCIATING WITH 81 AND 31

Consider the role of 81, or three to the fourth power. M81 is a well-known galaxy which lends its name to a galactic cluster near our own local group; Jupiter's speed in solar orbit is 8.1 miles per second; and in 1963 Bykovsky orbited Earth 81 times.

Apart from astronomy and space, 81 has many associations: Agatha Christie had written 81 novels by the age of 81; Captain Cook's Endeavour had an 81-foot keel; a swan has been known to live 81 years; the commonest automobile compression ratio is 8:1; and the longest word in the Bible is found in Isa, 8:1 (it has 18 letters, and 18 turns into 81 if reversed or rotated 180°).

The number 31 is equally noteworthy. The Great Andromeda Nebula is M31, and the escape velocity from Mars is 3.1 miles per second.

Apart from astronomy, we note that: seven months have 31 days; Houdini died on Oct. 31 (Halloween, an appropriate time for a magician to die!); the USA's Pledge of Allegiance has 31 words; the 31st president of the USA (Hoover) was the first Quaker to hold that office; and in recent years, Secretariat captured the Triple Crown when he won the Belmont Stakes by a record 31-length lead; and Bob Rimmer made a case for group marriage in his novel, PROPOSITION 31.

Did you say you wanted advice from a numerologist? Well, for astronomers there is the $31 package ...

Rod Vaughan

MEASUREMENT OF THE AETHER DRIFT

In 1887 Michaelson and Morley preformed a very precise experiment to measure the drift of the supposed interstellar aether. The aether was believed to exist in space with its prime purpose being the propagation of light waves through the vacuum of space. At the time, light was thought to vibrate in order to propagate and in order to pass through space the aether was invoked as the medium in which it vibrated--much like sound in air. Failure of the experiment to detect the aether (see any physics book for the description of the experiment) eventually led to the theory of relativity.

As you are probably aware, we now believe the universe began with a catastrophic explosion 15-20 billion years ago, refered to as the Big Bang. According to the Big Bang theory, we should expect to detect the remnants of the explosion in the form of microwave radiation visible in all directions. It is indeed observed and corresponds to a temperature of 2.7°K (absolute degrees). All radiation--light, light from quasars, radio waves and even microwave radiation all show the Doppler effect or 'reddening' of electromagnetic radiation due to motion of either the emitting or receiving body. With this idea firmly established, it is obvious that an experiment could be carried out to measure motion of the Earth relative to the 2.7°K microwave emission. Failure to detect the effect would result in problems and rethinking of the theories of relativity and the Big Bang.

So it is indeed comforting to learn that Smoot, Gorenstein and Muller from Berkely have in fact measured the motion of the Earth by means of Doppler shifts in microwave 2.7°K radiation. Their experiment is much more accurate than a 1976 effort to do the same but the results are similar. The motion, measured to be 600 km/sec, is in the direction of mu Hydra. The measurements were made from a U-2 plane above much of the atmosphere and covered 5% of the sky. Future runs will be required to confirm the observation with more confidence but the present work adds a small piece to the puzzle surrounding relativity and the Big Bang. However, astronomers may have to look again at theories about motion of galaxies and clusters of galaxies. (See 3 Nov. Nature; Dec issue of Sci. AM.)

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MAY 19th to MAY 22nd

IT WILL BE A WEEKEND OF FRONTIER FROLIC NOT SOON FORGOTTEN IN THE ANNALS OF CANADIAN ASTRONOMY

(Those of Faint Heart Need Not Apply)

1978 MEMBERSHIP LIST--HALIFAX

Please check that your name is on this list if you paid your membership to the Halifax Centre. If you have not yet received your Observer's Handbook it is because of our trusty Post Office in which case you should inform the Editor.

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FROM THE CENTRE--OTTAWA

INDIAN RIVER OBSERVATORY (IRO)

Rob Dick

IRO came into being on October 8, 1977. About fifteen members and friends crowded into the small 12'x12' hut to avoid the soft drizzle. Therein Dr. C. S. Beals, Honorary president of the Ottawa Centre, cut the ribbon officially opening the observatory.

His opening words praised the efforts and achievements of today's young people. Including the young people of the Ottawa Centre with his examples he told of his experiences with the youth of today which has strengthened his belief that the world will be passed onto strong and competent shoulders.

Thanks were offered to those concerned by Fred Lossing our Centre President and Peter MacKinnon our Centre Vice-President and Chairman of the Observatory Relocation Committee. Although there were no stars to view and the audience was small, those who were in attendance left the short ceremony with respect.

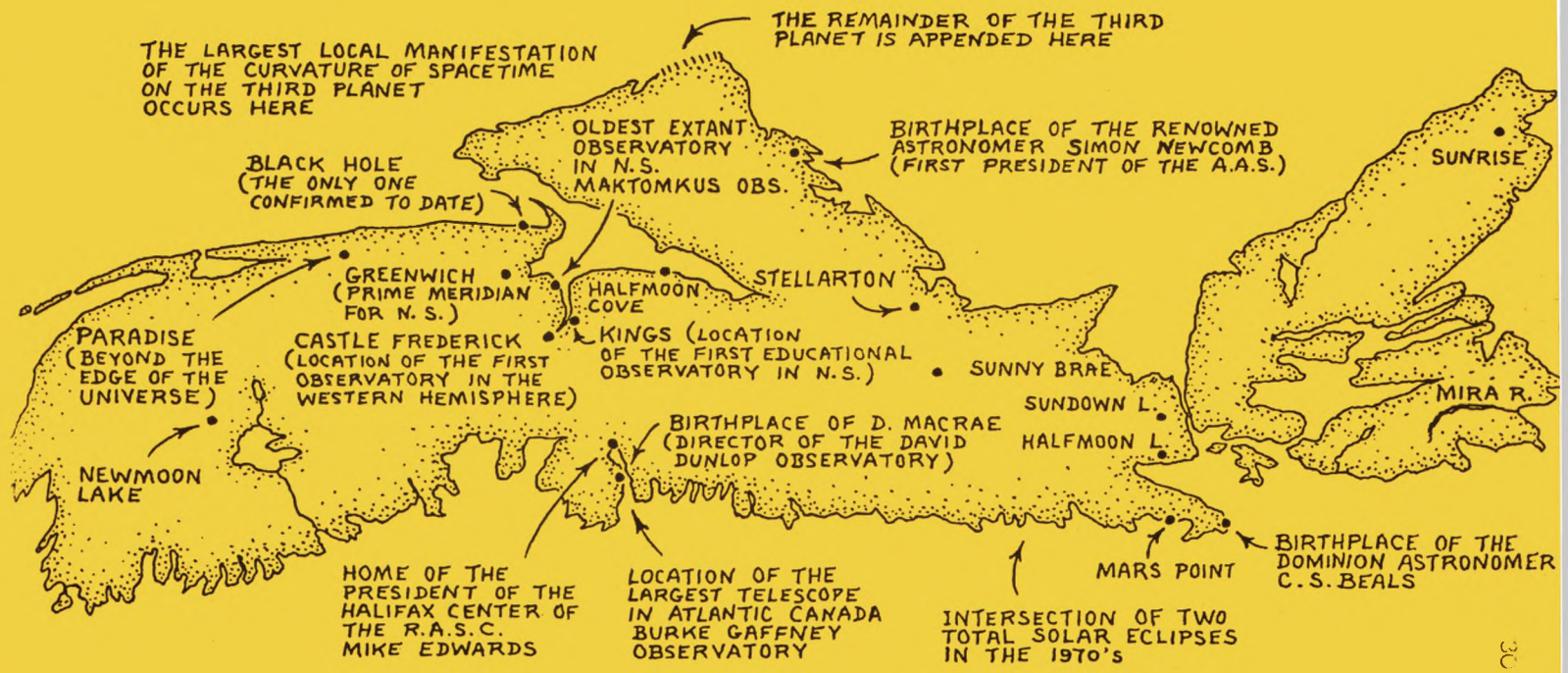
Following coffee, hot chocolate and the cutting of the cake (all supplied by Cathy Hall), those who were not directly involved with the relocation were shown slides depicting the trials and tribulations as well as the work which has occured over the past year. Jon Buchanan and Doug Welch are preparing a movie to be shown* at the dinner meeting in January concerning the relocation.

The next night (October 9/10) faired a little better; it didn't rain. But the clear sky lasted for only ½ hour. Mr. Rivington, our electrical contractor, was the only invited guest to appear. We are sorry the skies didn't let us show hom some sights. We hope the future will be a bit clearer.

* Provided it is finished by then. — ed.

THE BRIGHTEST NOVA

AS SEEN THROUGH THE TELESCOPE OF A RASCAL



RLB
12-77

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1978 HFX Centre Executive: L to R, R. Brooks; M. Edwards; Alan Bent; Jody LeBlanc; Dr. John Percy, November's speaker; and R.L. Bishop. P. Edwards missing. Photo by Lamont Larkin.