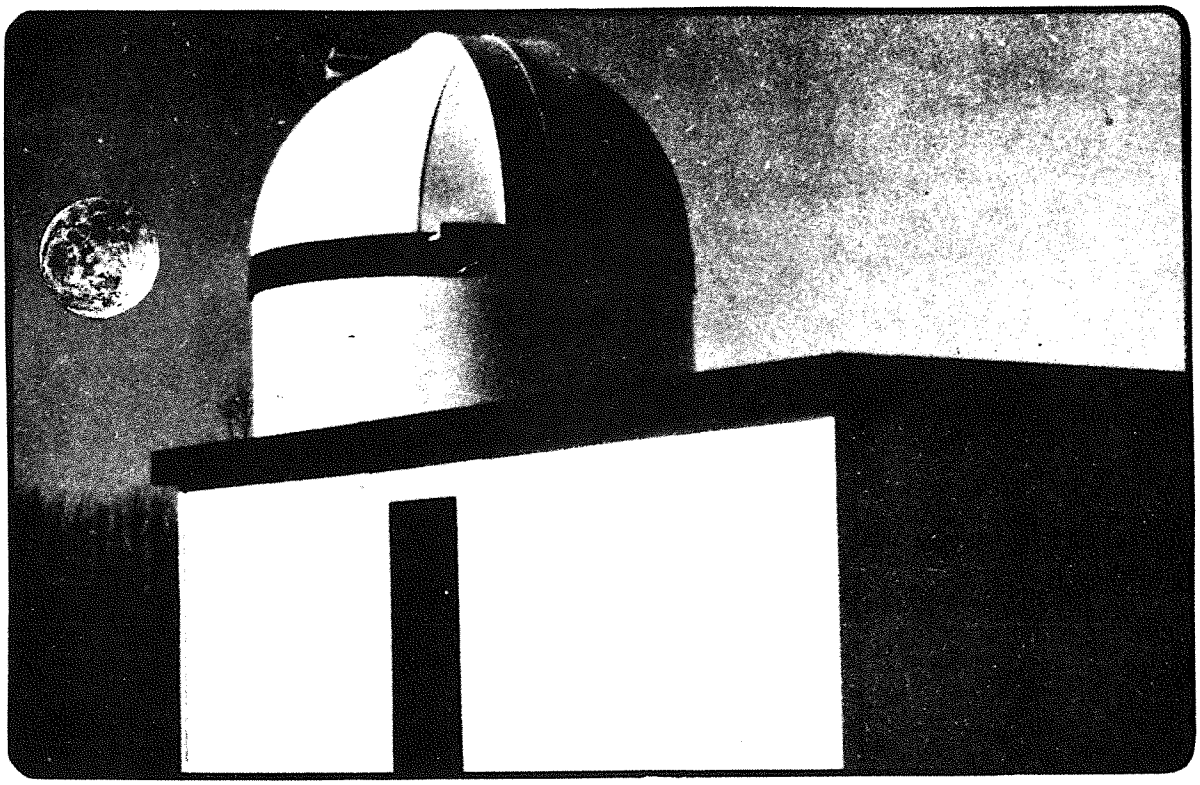
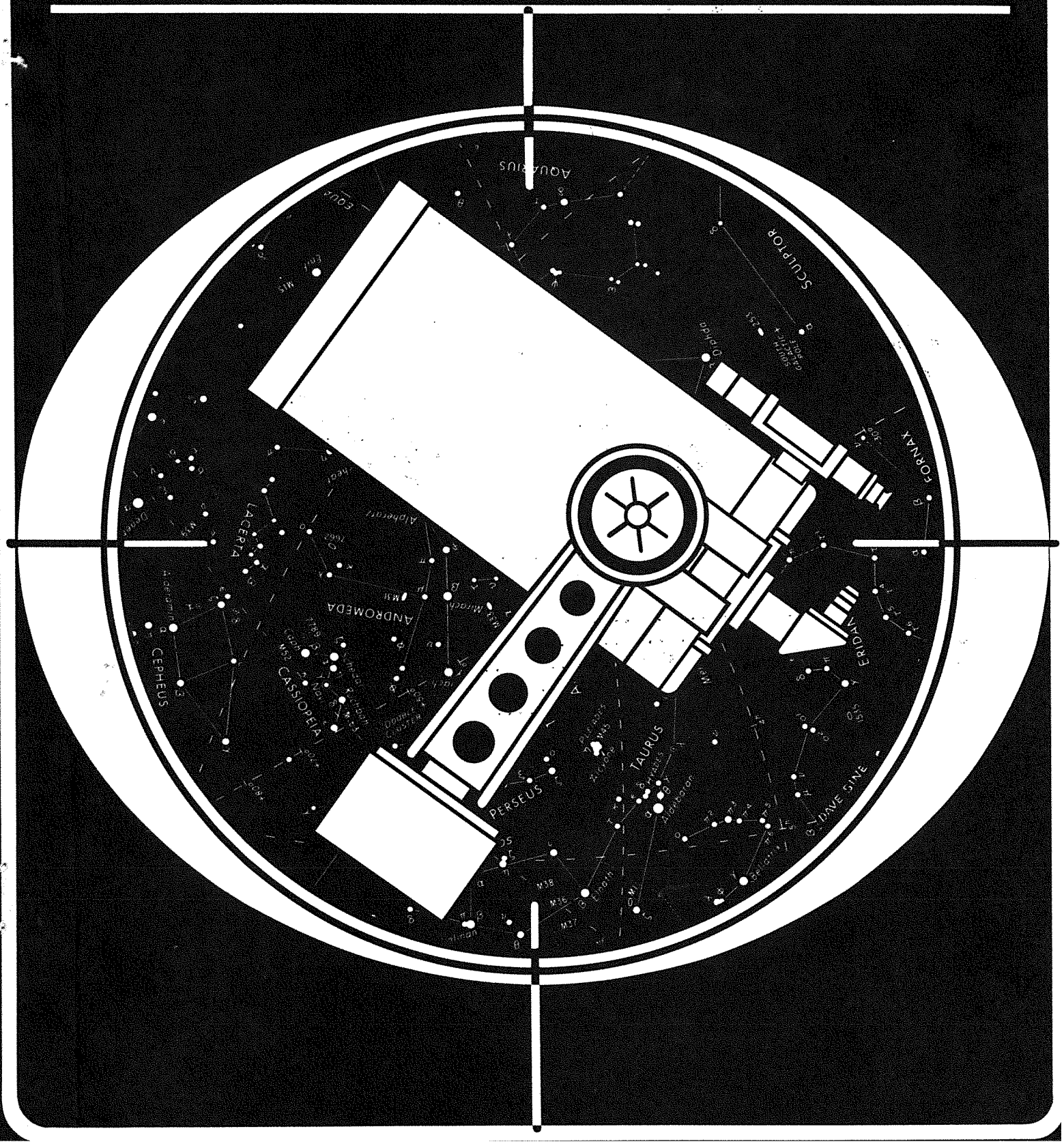


WINNICENTRICS
P.O. BOX 174
ST.JAMES P.O.
WPG., MAN. R3J 3R4

# WINNICENTRICS

OFFICIAL PUBLICATION OF THE R.A.S.C. WINNIPEG CENTRE.



Vol 22, No. 2

# W I N N I C E N T R I C S .

1983
March/April

WINNICENTRICS is the bi-monthly publication of the Winnipeg Centre, R.A.S.C. It is compiled and printed by members and friends of the centre. Please send all articles for inclusion in the magazine to the centre address below. All articles for publication must meet certain standards of veracity, language, and good taste. Any length of article may be submitted, but the staff reserve the right to condense or serialize if necessary. Deadline for articles is the 20th. of odd numbered months.

CENTRE ADDRESS: Winnipeg Centre, R.A.S.C.
P.O. Box 215 St. James Post Office.
Winnipeg, Manitoba, R3J 3R4.
Canada.

ooOoo

HONORARY PRESIDENT: Dr Gary Mechler, Kitt Peak National Observatory, Arizona.
PRESIDENT: Mr Guy Westcott.....Ph 269-1499.
1st. VICE-
PRESIDENT: Mr Andrew Lawless.....Ph 269-4845.
2nd. VICE-
PRESIDENT: Mr Dave Sine.....Ph 261-0431.

TREASURER: Mr Bud Fairley.....Ph 269-0034.

SECRETARY: Mr Stan Runge.....Ph 632-4038.

COUNCILLORS:

| | | |
|---|---|---|
| Miss B Belkin | Mr T Cairns | Mr W Jaworski |
| Dr R Bochonko | Mr L Gamache | Mr L Mlodzinski |

Librarian: Mr C Rutkowski, Assistant Librarian: Miss B Krosney.
Observatory Director: Mr A Lawless. All use of the observatory site must be booked and cleared through the Observatory Director, Ph 269-4845.
WINNICENTRICS STAFF: Mr Guy Westcott, Mr Andrew Lawless, Mr Dave Sine, Miss Brenda Belkin, Mrs Giselle Runge and Mrs Barbara Westcott.

ooOoo

MEETINGS & MESSAGES, EDITORIAL SPOTLIGHT.....Page 1.
CENTRE SCENE & GENERAL MEETING MINUTES.....Page 2.
A NEW BLACK HOLE by Terence Dickinson.....Page 3.
SPACE UPDATE.....Page 4.
BOOK REVIEW & SINE LANGUAGE.....Page 5.
NEW PRODUCT REPORT by Guy Westcott.....Page 6.
ASTROPHOTOGRAPHY - RECORDING AND STORAGE.
by Stan Runge.....Page 7,8.

SKY NOTES .....Page 11.

## EDITORIAL SPOTLIGHT.

I got my copy of "STARDUST" this week and was very sorry to see that a cutback in funds has adversely effected this good publication. The same fate could come to the WINNICENTRICS as funds are very tight this year. We are cutting back wherever possible, ie. less pages in WINNICENTRICS, handing out the newsletter at the monthly meetings, this will result in a saving to the centre of about $20 an issue. Despite all the cuts we are still running the centre on a very tight budget. Any suggestions on how to cut and save, or even to gain extra funds would be greatly appreciated. The top of the pier was repaired by centre members at a saving of about $175. You will also notice that WINNICENTRICS is now being laid out columnar this saves space and is more convenient as in the near future it will be laid out by computer. Hopefully we will all survive this depression.

ooOoo

# MARCH & APRIL MEETINGS

MARCH 11, 1983. Friday.....8:30pm.

ROOM 217, LOCKHART HALL, UNIVERSITY OF WINNIPEG.
PROGRAMME: Mr Hans Thater, Past President of the Winnipeg Centre will be giving one of his famous lectures. This presentation called "The Missing Chapter - An Incomplete History of Earth" the lecture will be accompanied by a visual display.

APRIL 15, 1983. Friday.....8:30pm.

ROOM 217, LOCKHART HALL, UNIVERSITY OF WINNIPEG.
PROGRAMME: Centre member Mr Bill Krosney will be giving a lecture and demonstrations about his pet topic "Astrophotography. Easy and Hard."

ooOoo

MAY 13th. Meeting:Planetarium Show at the Lockhart Planetarium, University of MANITOBA. More details and a map will be provided at a later date.

JUNE 10th. Meeting: Dave Sine and Brenda Belkin will be giving a visual lecture. This will be accompanied by two half hour films about the Southern Skies. Details to be announced at a later date. There will also be free refreshments and sandwiches and for those who wish there will be an observing session out at Glenlea after the meeting.

ooOoo

NOTICE TO OBSERVATORY USERS..... It is hoped to have the Glenlea Observatory back in full operation before mid February. The new pier cap has been made and now only awaits drilling and fitting. The telescope will have to be realigned to the pole, so there's a job for all you enthusiastic astrophotographers.

# CENTRE SCENE.

The schedule of events and other information about the 1983 GA in Quebec are available from Mr Stan Runge or Mr Guy Westcott. The GA dates are Friday, May 20th to Monday, May 23. This should prove to be a very interesting weekend for those atending.

Events for the Centre are always difficult to plan and arrange at the drop of a hat so when a friend offered to host a star party at his house I jumped at the opportunity. So on the weekend of JULY 15 Mr Paul Delaney will hold a star party at PINAWA. It is hoped to travel to Pinawa on Friday night and then hold the party on the Saturday night. There seems to be a dormant interest of astronomy in the Pinawa area so maybe we can arouse some of this interest. Overnight camping should be available at Awani Park but I will be checking into all the fine points and they will come to print in a later issue, a map will also be printed of the local area.

Also please remember that the Centre lectures at Riding Mountain National Park usually on the July 1 long weekend and the August long weekend. We need some volunteers to help with the public lectures. Three people for the July weekend and three people for the August weekend. This will make up lectures with two people for the two days. Subject matter will be of your own choosing.

The Centre has been requested to look into the possibilities of hosting a National Council Meeting sometime this year. Members suggestionsand comments would be welcomed on this topic at the next general meeting in March.

Centre membership is lagging far behind this year. To date we only have about 45 members. Please if you haven't already renewed your membership do so NOW. The centre could suffer serious financial difficulties if the membership ranks are not enlarged. If you know of someone who has an interest in astronomy bring them to our monthly meeting.

CONDENSED MINUTES JANUARY 14, 1983 GENERAL MONTHLY MEETING.

There were 21 members and two guests in attendance.

Mr Westcott called the meeting to order at 8:30. He announce some of the decisions made at the last council meeting.

Mr Lawless the Observatory director then explained why the telescope will be out of use for the next month.

The guest speaker for the evening was then introduced by Mr Westcott. Mr Grant Gussie gave a very enlightening talk on the use and various stages of star's life along the Hertzsprung-Russell diagram. The lecture told about the stars formed from dust clouds in space and how their size was dependant on the amount of turbulence that they experience at birth. Their position on the diagram will then depend on their mass. Mr Gussie further mentioned that star clusters are interesting to observe as they hold stars from various locations on the H-R diagram in different stages of their evolutionary track. The ratio of Red Giants to Blue Dwarfs Helps us to determine the age of the cluster.

After a discussion and short question period the meeting was closed by a motion from the floor at 9:45 pm.

ooOoo

There now appears to be quite a few members in the centre who own their own video recorder and camera. We should now start to make programs on astronomy with which to attract new members from the general public. Scripts for shows should be sent to the centre executive for approval. Now also is the time to get your displays ready for the national meeting in Quebec.

HALKETT/VICTORIA TIMES-COLONIST

*Cowley and Crampton: clues to the universe hidden in a fearsome stellar cadaver*

*SPACE* by TERENCE DICKINSON

# A new black hole

Ever since the first discovery of a "black hole" in 1972, astronomers have searched without success for more of the bizarre gravity whirlpools. When a team of three astronomers, including two Canadians, uncovered a second black hole-bigger and far more remote than the original -scientists were jubilant. The new find, announced last month, lies outside the Milky Way, 170,000 light yrs. from Earth, in a star system called the Large Magellanic Cloud. David Crampton and John Hutchings of the National Research Council's Dominion Astrophysical Observatory in Victoria, and Anne Cowley of the University of Michigan used the largest telescope in the Southern Hemisphere-at the Cerro Tololo Interamerican Observatory in Chile-to zoom in on the phenomenon.

But black holes, in fact, cannot actually be seen. The holes, invisible gravitational funnels slowly sucking in material around them, are thought to be the imploded cores of massive stars-so dense that their gravity overwhelms all other forces and so powerful that not even light can escape.

One teaspoonful of the matter from these stellar cadavers would weigh as much as the planet Earth. They are the stuff of science fiction: eerily malevolent, brooding presences in the Twilight Zone.

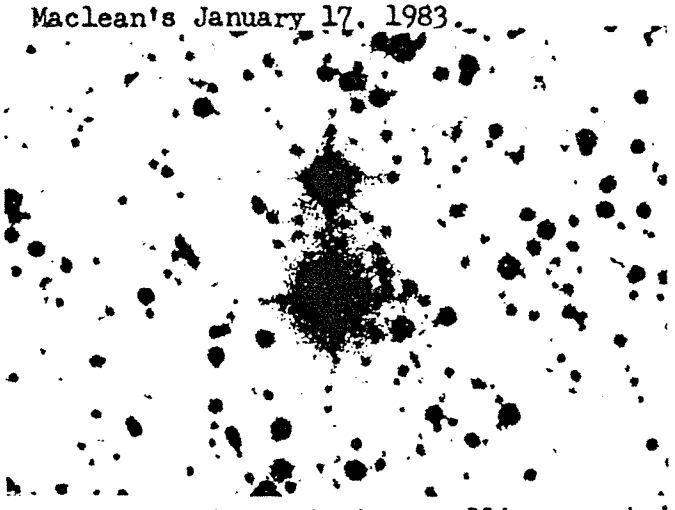
Evidence that the new hole existed in the Magellanic Cloud was actually found in November, when the research trio was observing X-ray emissions in that area of the sky. The emissions are often given off as matter is consumed by a black hole.

The scientists then noticed a faint star that appeared to be orbiting around an invisible object-presumably the black hole region.

The most convincing proof of the hole's existence is its mass. Although the hole is only half the size of Prince Edward Island, it contains 10 times the mass of the Sun. "Something that massive is almost certainly a black hole," reports Cowley. Canadian scientists have played a prominent role in the detection of black holes. In 1972 University of Toronto astronomer Tom Bolton tracked down Cygnus X-1, the only other "known" black hole. Bolton explains: "One of the problems was that any theory for the creation of black holes predicts that there should be lots of them out there. When we had only one, there was always the possibility that we were misinterpreting the observations. The second discovery is a proof of the pudding."

Although the existence of black holes has been accepted by most astronomers and is naturally bolstered by the new discovery, some scientists, such as MIT physicist Philip Morrison, are not convinced. "Not everything that is extrapolated from Einstein's general relativity theory is going to be real," he says. "My opinion is that black holes have been extrapolated beyond justification." Astrophysicist Kip Thorne, a leading black hole theorist with the California Institute of Technology, counters that it is likely there are millions of black holes in the Milky Way, including a grand one, probably a million times the mass of the Sun, at the core of the galaxy. Says Thorne: "Finding them is just a matter of time."

Maclean's January 17, 1983.



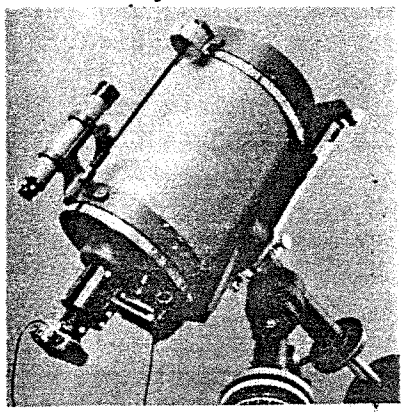
Cygnus X-1 lies within an ellipse containing the brightest star on the above photograph. An optically visible star HD226868 is the brightest star within the X-ray ellipse.

LUMICON, Dept. W, 2111 Research Drive #5, Livermore, California 94550
Complete Catalog $1 "Staffed by Experienced Astonomers" [415] 447-9570

# LUMICON® TELESCOPE SYSTEMS

# NEW LUMICON® PRODUCTS

## HYBRID TELESCOPES
## C-11 System $2995
## C-14 System $4995



**LUMICON Hybrid C-11 System with optional Giant EASY-GUIDER and electric declination. Includes tripod, equatorial mount and drive.**

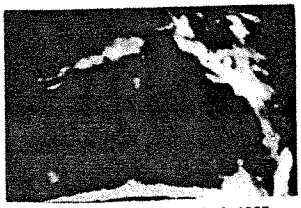
The LUMICON Hybrid Telescope System uses either a Celestron 11" f/10 or 14" f/11 tube assembly with special coatings. It includes a sturdy adjustable field tripod, free permanent pier, heavy duty equatorial mount, precision 7" drive gear (10" for C-14), and a full set of accessories.

**LUMICON Hybrid C-11 System** .....$2995
**LUMICON Hybrid C-14 System** .....$4995

With LUMICON Giant EASY-GUIDER (see photo), highly recommended for unmatched viewing and photography at f/4-f/10 (reg. $359.50) .....add $299.50

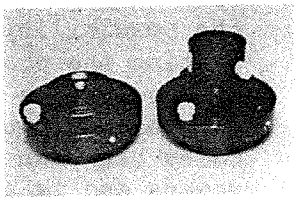
With electric declination and dual-axis drive corrector (reg. $320).....add $275

## SOLAR PROMINENCE H-ALPHA FILTER



**Large Solar Flare of July 2, 1957**

See Solar Prominences, sunspots and flares in the beautiful red of hydrogen alpha emission at 656nm. Filter bandpass is 0.5nm (0.1nm = 1 Angstrom in Deluxe Filter). Wavelength tunable. For both viewing and photography (has T-threads, 1¼" eyepiece adapter).



**LUMICON Solar Prominence Filter for viewing, and with camera adapter attached.**

**LUMICON Solar Prominence Filter** fits 2" diameter focusing mounts .....$299
**Deluxe Solar Prominence H-Alpha Filter**, 0.1nm (1 Angstrom) bandpass for high contrast. For 1¼" eyepiece and photography. State camera and telescope type .....$499
**Deluxe Filter** with 1.5" aperture, for both 2" and 1¼" eyepieces and photography .$695
3" off-axis metal mask for C-8 or Meade 2080 — required! .....$68
**Adapter** for 1¼" or 0.96" systems .....$15
**Adapter** for 2" eyepieces .....$20
**Camera Adapter**, (state brand) .....$12

## "HORSEHEAD NEBULA" FILTER

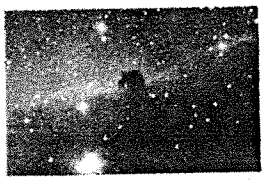
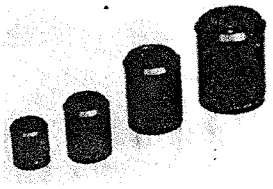


Photo by Dr J Marling 8" f/4.5, 20 min, hypered 2415

This specialized filter has ultra high contrast and is the only filter that allows good visual observation of very faint nebulae, such as the California Nebula or Horsehead Nebula. (For most other nebulae, the UHC FILTER is much preferred.) Filter transmission is 80-90% at the H-Beta 486nm line, bandpass is 9nm.

**1¼" LUMICON H-Beta Filter** .....$69.50
**48mm LUMICON H-Beta Filter** .....$119.50

## NEW TELE VUE™ EYEPIECES



**New wide-field 19, 24, 32, 40mm eyepieces.**

These new Tele Vue eyepieces complement the ultra wide-field Tele Vue Nagler eyepieces, by offering a wide 65° field of view at lower power. Edge correction and sharpness are far superior to Erfle and Konig eyepieces. **The eyepiece is half the telescope — use the best!**

**19mm** wide-field 1¼" eyepiece.....$100
**24mm** widest true field of view in a 1¼" eyepiece "Superb!" .....$115
**32mm** wide-field 2" eyepiece.....$185
**40mm** widest possible true field of view in a 2" eyepiece .....$240
**4.8mm Tele Vue Nagler**, 82° field .....$150
**9mm Nagler** 82° field, "The Best" .....$175
**13mm Nagler** 82° field, 1¼"/2" .....$200

LUMICON DEALERS NEAR YOU.
CANADA: **Guy Westcott, P.O. Box 215, St. James, Winnipeg, Manitoba R3J 3R4**

**Perceptor,** 1048½ Kingston Rd, #5, Toronto, Ontario M4E 1T4

| Stock Telescopes | Tube Assembly | Telescope & Drive | Complete Systems* |
|---|---|---|---|
| C-8 or Meade 2080 | $549 | $749 | $919 |
| 10" Mead 2120 | $1298 | $1689 | $1898 |
| Celestron-11 | $1395 | $1893 | $2583 |
| Celestron-14 | $3190 | $4890 | $5580 |

**Includes telescope, wedge, tripod. Special coatings: C-8, 2080 add $79; C-11, M-2120, add $140; C-14, add $215*

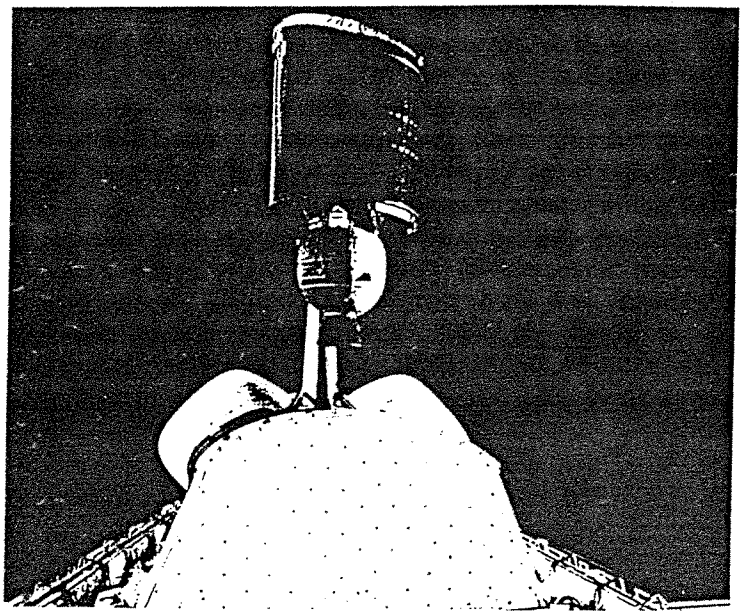
"Staffed by experienced astronomers." Come to the experts for competitive prices and knowledgeable answers to your astronomy needs. LUMICON carries a complete line of stock and custom Celestron and Meade telescope systems.

All above prices are in U.S. funds. An exact price quote on all LUMICON, CELESTRON & MEADE products is available by writing to Mr Guy Westcott, P.O. Box 215 St James, Winnipeg, Manitoba, R3J 3R4. or by phoning Area code 204 269-1499 after 6pm local.

## SPACE UPDATE

The first operational space shuttle STS 5 was launched on time from the Kennedy Space Centre on November 11, 1982. This is the first time that NASA has sent up four astronauts in the same spacecraft, and the first time that satellites have been launched from a shuttle already in orbit.

Two satellites literally sprung into space from their cosy housing in the shuttle's cargo bay. The satellite is first rotated on a turntable up to 50 RPM. It is then pushed away from the shuttle by a giant spring mechanism. Once the satellite is far enough away, its onboard engine is fired boosting it into a higher more stable orbit. A few fine adjustments and bingo , a new eye in the sky!

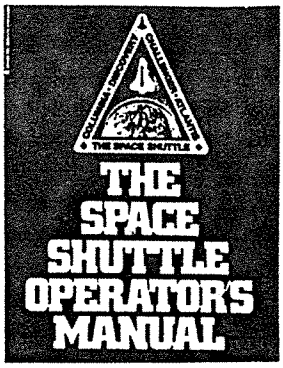


The Telesat Canada ANIK C-3 communications satellite is seen here being released from its cradle into space. (Photo: NASA S-82-39800)

# BOOK REVIEWS

THE SPACE SHUTTLE..A Complete Kit in a Book.

If you would like to build your own space shuttle and hire it out for trips around the block, this book is a must for you. A lot of cutting and pasting and you will be able to see a two foot (that's 60 cm) model of the space shuttle. The kit is fully detailed and the landing gear really works. If you are into scale model making this will really take your skill. Try modifying it to take a couple of model rocket engines, and then watch the baby go.
ISBN 7736-1115-0 Wayne McLoughlin. Published by General Publishing in Canada at $8.95.




THE SPACE SHUTTLE OPERATOR'S MANUAL

From Ballantine Books in New York. An excellent book but somehow I can't see astronauts climbing into the space shuttle with this strapped to their knee, but if you are an armchair shuttle pilot, this is your book. broken up into sections the book takes you on a flight of fancy through checklists from launch to landing, from frilly undies to the dirty sundries. It tells you how to wear them, and when to wear them. This is one book that will certainly let you know what the space shuttle astronauts are doing ever minute of the day.
ISBN 0-345-30321-0 by Kerry Mark Joels and Gregory Kennedy. $9.95.

SINE SIGNAL

# PRODUCT REPORT

by Guy Westcott.

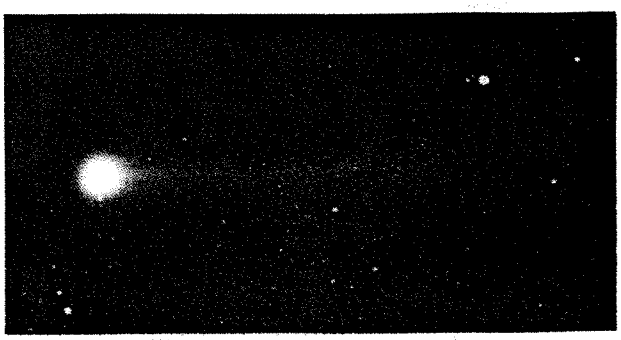
## NEW SOLAR PROMINENCE FILTER

Enjoy daytime use of your telescope! The changing faces of the sun can be examined both visually and photographically with the new Lumicon Solar Prominence Filter. It shows you Solar Flares and Prominences in the beautiful red light of Hydrogen-alpha emission at 656nm. You can also see sun spots and watch the sun change hourly and daily.

This new Lumicon filter has a very narrow 0.5-0.6nm bandpass, which transmits only the H-Alpha Line at 656.3nm. It includes a tuning mechanism by tilting, which allows you to optimize transmission and contrast of the particular features you are examining. The Lumicon Solar Prominence Filter also includes Camera T-Threads for photography. At $299, it represents a tremendous savings compared to the current price of $700-$900 for a comparable Daystar H-Alpha Solar Filter. Telescope aperture must be masked down to below 4" (10cm) for proper operation. Don't forget, improper solar observing can lead to damage to your eyes, eyepieces or telescope. Proper solar observing is both safe and enjoyable.

This filter tried out very well on a 10" Newtonian but has yet to be tried out by any member of the Centre on Cassegrains. It will shortly be up for use with the Centre's C-14. Solar photographers get ready.

NEXT ISSUE THE MEADE 10" MODEL 2120. HOW IT COMPARES.



This photo of Comet Austin is a 10 minute exposure, through an 8 inch f/4.5 on hypered 2415. Jack Marling said that the background contrast increased significantly by using the deep sky filter. The tail of the comet was also easier to see.

## NEW COMET FILTER

The Lumicon deep-sky filter is ideal for comet observation and photography. It has a wide enough visible bandpass (440-530nm) to pass both Comet Swan bands responsible for the bright emissions in the tail of Comets. The Swan bands are due to molecular carbon $C_2$ emission and occur in the blue at 455-474nm, and in the green at 500-518nm.

Veteran observer and comet hunter Don Machholz (discoverer of comet Machholz 1978) tried the deep-sky filter and says, "Period Comet d'Arrest showed much better with the filter than without it. At the time of observation the comet was mag. 10, very diffuse and roughly 10 arc min. across. I observed it from Loma Prieta, which does not have too much light pollution. With it's diffuseness and large size I might have swept over it without the filter; with the filter I suspect I would pick it up while sweeping.

Periodic Comet Ghuryumov-Gerasimenko showed little difference with the filter. Comet Austin was enhanced by the filter when I observed it from my backyard. I'd like to add that I did use the filter on some galaxies and it worked extremely well for viewing as it did for photography. So, this filter is tremendously versatile and improves contrast in comets as well as many deep-sky objects.

# ASTROPHOTOGRAPHY - RECORD & STORE



By Stan Runge.

How many times have you seen an astrophotograph or slide and asked questions about the details of exposure? How many times have you taken the same type of photograph and guessed each time about the exposure? Can you imagine the total amount of experimenting that goes on in order to capture a photo that could be routine? If you're guilty and cringing at the thought, read on, because this article is for you.

This article is designated as the first of a two part venture dealing with the recording and storage of astrophotography negatives and slides. So little time is normally paid to either of these two tasks but their importance can easily be seen at most astrophotographic displays.

In our effort to increase the percentage of "good" photos we take, we must pay attention to an old cliche and "learn from our mistakes". To do so would require us to record our efforts and then evaluate them after we develop the film.

The suggestions made here do not require the purchase of expensive equipment nor the introduction of difficult techniques. You will probably save money by wasting less film while providing a more satisfying product. Furthermore, the time you save will allow you to concentrate more time toward improvement.

Finally, although many articles are available providing broad guidelines for photographing, recording results will provide you with a guideline tailored to your own equipment. Which leads us to the first topic:

RECORDS

For us to be successful as Astrophotographers, we must plan our strategies prior to the first photograph being taken. Pot luck shots very seldom provide satisfaction. We must decide our film type, equipment setup and exposure. Only then should we go outside to attempt astrophotography. Pre-planning is the best point for us to start.

I have found that a small notebook is handy for us to write down any details we'll need on site. We can map out our photographic sequences, writing down suitable exposures for our proposed equipment set ups. By writing it in our booklet, we'll save a lot of time hunting down the information at the site in the dark. Or worse yet, risk turning on our flashlights to read while others are exposing their films. A place should be left in which the actual events and details can be recorded. The items to write down will be discussed a little later in the article.

Now that we're at the site and have our equipment patiently and precisely set up, we'll pull out the notebook (eventually it will be kept in the pocket nearest our heart). We check the exposures values to set the camera and in turn write down some significant details (weather conditions, winds etc). I find the use of a "Pentel" type of pencil advisable, since it doesn't need to be sharpened and it has no ink to freeze.

Now with the notebook close at hand we will write down all pertinent information while we still remember. Individual long exposures or small groups of 2 to 3 short exposures should be done at one time but don't wait too long. We will probably forget if we take a lot of shots and tend to mix up the numbers. Let us save ourselves a headache later and write it down neat enough so we can decipher it after the film is developed. At that time we can write up our formal card.

There are other ways of recording details, such as using a mini-cassette recorder or even a restaurant checkbook for writing it down.

| OBJECT - DETAILS | | | | REFERENCE NUMBER<br>DATE / SHEET |
|---|---|---|---|---|
| EQUIPMENT DETAILS | | | | |
| REF # | FILM # | TIME | EXPOSURE | DETAILS & DESCRIPTION |
| | | | | |
| NOTES | | | | |
| FILM TYPE | ASA | DEVELOPEMENT DETAILS | | |
| LOCATION | WEATHER / SKY CONDITIONS | | | |

THE RECORD CARD

An example of a record card is provided. It is used for single or small groups of similar photographs. After it is a descriptions of what type of information is kept.

Object - generalize on the object such as Comet, Sun, Moon, Lunar Eclipse, Deep Sky, etc. This column will be indexed later, so keep the number of objects to a minimum.
Details - such as the age of the moon, name of the deep sky object, which phase of an eclipse, or the name of the comet, etc.
Date - preferably local time.
Sheet - number for ease of filing the record card.
Equipment Details - include equivalent focal length, aperture, F-stop, details of projection, eyepiece used, filters, drive unit if used, cold camera, etc.
Ref. # - the individual frame reference number.
Film # - the number beneath the frame on the film.
Time - normally the time of the start of the photograph in local time. If on daylight time state so and on eclipses include seconds.
Exposure - length of exposure, include sec. or min.
Details and Results - could identify any special details of the exposure such as corona, Baily's beads. Include final remarks such as over-exposed, not in focus, trailing, etc.
Notes - here we state the overall results of the series of photos. This means stating starting points for future exposure and the best fram to print.
Film Type - must be included.
ASA - the effective speed of the film.
Development - information of special development, details of hyper-sensitizing.
Location - where taken.
Weather/Sky Conditions - such as hazy, windy, rate the transparency.

If a large number of photos are taken, eventually you will set up an index so you can review previous photo events and determine how to be most successful. After my first record of a lunar eclipse, I anxiously awaited for the next one because I felt very confident of the exposures to use. Only if conditions vary significantly would bracketing be required. With proper preparation, I can go out and best utilize my infrequent chances at astrophotography.

Finally, when the reference number is given to a slide or negative it should be kept nearby. Storage of either of these will be discussed in the second part of this article in an upcoming issue or WINNICENTRICS.

MEMBERSHIP RENEWAL FORM.

THIS WILL BE YOUR LAST OPPORTUNITY TO RENEW YOUR MEMBERSHIP IN THE CENTRE. THOSE WHO HAVE NOT RENEWED BY THE END OF FEBRUARY 1983 WILL BE REMOVED FROM THE CENTRE MAILING LIST.

PLEASE TAKE THE NEXT FIVE MINUTES TO FILL IN THIS FORM AND RENEW NOW. THANK YOU.

NAME.....

ADDRESS.....

.....PHONE.....

INTERESTS AND INSTRUMENTS IF ANY.....

ARE YOU WILLING TO PARTICIPATE IN CENTRE EVENTS?
THAT IS TO HELP PUT THEM ON.....YES.....NO.....

CHEQUES / MONEY ORDERS MADE PAYABLE TO THE R.A.S.C. WINNIPEG CENTRE AND SENT TO THE CENTRE MAILING ADDRESS.

# COMET NEWS

McDONNELL PLANETARIUM, St. Louis / Editorial, Cincinnati


# The Recovery of Halley's Comet

THE NEWS SPREAD quickly: most readers probably picked it up via wire services by radio, television, or newspaper rather than through astronomical sources. Last seen in 1911, Halley's Comet has been recovered, as was announced to the world on 1982 Oct. 21.

Graduate student David C. Jewitt and G. Edward Danielson led a team of astronomers at the California Institute of Technology in the recovery effort. Using an ultrasensitive charge-coupled device (CCD) of the Space Telescope Wide-Field Planetary Camera Investigation Definition Team at the prime focus of the great Mt. Palomar 200-inch reflector, they made five exposures of 8-minutes effective duration on Oct. 16. "Definite images near the expected position and having the expected motion of P/Halley were noted," read the announcement on International Astronomical Union Circular 3737, on which the comet was officially designated "1982i."

Halley's was only 0°.6 west in right ascension from the position predicted by Dr. Donald K. Yeomans in The Comet Halley Handbook — a triumph for modern celestial mechanics and computer modelling. Yeomans' computations allowed for gravitational forces of the sun and all nine planets, as well as for the rocket-like forces of escaping gases acting against the nucleus, and predicted a perihelion time of T = 1986 Feb. 9.66 Ephemeris Time. These "non-gravitational forces" make the comet appear as though it is "delayed" in its gravitational orbit by some 4 days between successive apparitions. The actual perihelion time from the Palomar and other positions is now indicating T = Feb. 9.2-9.3 ET (IAUC 3742). Earlier, Brady and Carpenter (ASTRON. J. 1971;76,728), using less sophisticated and more empirical techniques, predicted T = Feb. 9.39 ET. Compare the accuracies of these 1986 predictions to the best historical ones made for the 1835 and 1910 apparitions (T in error by roughly 4 days owing to "non-gravitational" forces), and the 1759 apparition (Clairaut's T a month off; that of Sir Edmond Halley — the comet of course bears his name because he was first to recognize its periodicity — was off by several months). Yeoman's latest orbit, incorporating the 1986 recovery position, now yields T = 1986 Feb. 9.44 ET.

At recovery, P/Halley was 11.04 AU from the sun, 10.93 AU from earth, and an incredible 3.3 years from perihelion passage. At visual magnitude 24.2 ± 0.2, it by far is the faintest that a comet ever has been recorded. Only Comet Stearns 1927 IV was seen at a greater heliocentric distance, r = 11.53 AU. Halley will surely be under observation for the far majority of this decade, which will be a record interval for any long-period comet.

The comet now has been seen by the Caltech group (Oct. 16.48 UT), Kitt Peak National Observatory (M. Belton and H. Butcher, 4-m reflector with CCD, $mag_V > 24$, Oct. 18.39 and 20.39, IAUC 3742), J. Baudrand et al with the prime-focus electronographic camera of the Canada-France-Hawaii 3.6-m telescope (Oct. 15.58, 17.55, Nov. 15.56, 16.49, 16.58 UT, IAUC 3753), and R. M. West (discoverer of Comet West 1976 VI) on Dec. 10.29 UT using a CCD with the Danish 1.5-m reflector at La Silla, Chile (IAUC 3758; $m_v = 24.7 \pm 0.3$). Previous negative sightings by thise competing groups included 1981 Dec. 18.3 UT (Caltech, IAUC 3688), 1981 Dec. 2-3 (Kitt Peak, $m_v \geq 24.3$; NATURE 1982;298,249), and 1981 Dec. 2-3 (3.6-m Hawaiian telescope, $m_v \geq 25.2$; ASTRON. ASTROPHYS. 1982;113,L1).

No coma was detected so presumably all the groups were seeing the actual bare nucleus. How big it is depends on its brightness, which is now known, and on its reflectivity (or albedo "A"), which is not. Dr. B. Marsden, assuming A = 0.5, suggested a nucleus diameter of only 2.8 ± 0.4 km (IAUC 3737). That a comet nucleus could be so highly reflective, however, is controversial (see "Ice Under Fire," this issue). Dr. D. Hughes (NATURE 1982;300,318), assuming A = 0.05, gets a 9 ± 1 km nucleus, and Halley would be even bigger if A is less, as some now think.

Halley's is obviously the most important comet of history, so readers will here be spared all those well-known text-book details. Of note, however, is that the orbit recently has been extended with confidence even further backward in history by Yeomans and Kiang (MNRAS 1981; CNS 82-1) to 1404 B.C. The first definitive recorded appearance, however, was not until 240 B.C., and none of the only 16 comet apparitions between 1404 and 240 B.C, chronicled by the Chinese, appears to be P/-Halley. Alot has been made recently by how poor the 1985-86 apparition is supposed to be relative to those of the past, since perihelion occurs on the far side of the sun. This notion may not do complete justice to the truth. It does not seem generally appreciated, for example, how poorly placed Halley's was at its brightest from European latitudes, its close approach to the earth in 1910 notwithstanding. Secondly, purported "total magnitude" data from 1909-1911 — used to derive 1985-86 brightness forecasts — appear to be massively faulty in the direction of underestimation, and thus, the photometric parameters derived from them in all the 1910 brightness studies currently in the literature should be correspondingly anemic. This would make the comet brighter than all these forecasts in 1985-6. In adjusting for this problem, the forecast to be used in COMET NEWS SERVICE — based on a reassessment of the 1910 magnitudes — will have Halley's Comet crossing naked-eye threshold in early November, 1985, for example — almost a month before other current forecasts. Morphologically, if not in brightness, Halley should appear like a "great" comet with an extensive tail, and be a fine reward for professional and amateur astronomers alike.

SMITHSONIAN OBSERVATORY
60 GARDEN ST
CAMBRIDGE MA 02138

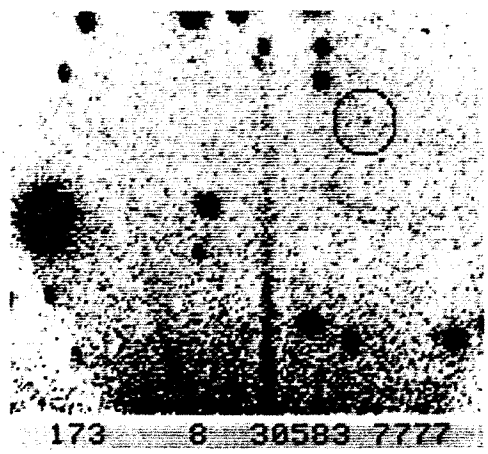
western union Mailgram

1-002946T294-010 10/21/82 TWX ASTROGRAM CAM CINA
01 CAMBRIDGE MA 1982 OCT 21

HALLEY 1982I COMET JEWITT DANIELSON
19502 21016 47569 07110 19/20 93303 /2240 09760 21673
VMAG 24.2 MOTION OVER 80 MIN CONFIRMS PERIHELION 1986 FEB 9.3
PALOMAR MARSDEN 30CT21/1330Z

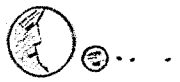
08:44 EST

At 08:44 E.S.T. on Oct. 21, newly recovered Comet Halley received its official designation as Comet 1982i via this coded telegram sent from the IAU Central Telegram Bureau, Smithsonian Astrophysical Observatory. Jewitt and Danielson, Mt. Palomar, are the principal recoverers. The decoded numerical message translates: "19502" – 1950 equinox, accurate position; "21016 47569" – 1982 Oct. 16.47569 UT; "07110 19/20 93303" – R.A. = $7^h11^m01^s.9$, Dec. = +9°33'03"; "/2240" – "2" – nuclear magnitude; "24" – mag. 24; "0" – stellar appearance, no tail. The remaining two five-digit groups are "check sums" of the preceeding groups, used to assure accurate transmission.




Recovery image of P/Comet Halley 1982i on Oct. 16. California Institute of Technology photo.

# SKY NOTES



MERCURY: March 15 R.A. 23h 02m DEC -8° 30'
April 15 2h 38m +17° 39'

In March Mercury is too close to the Sun by mid April though it will reach a favourable elongation about 16° above the western horizon at Sunset.

VENUS: March 15 R.A. 1h 32m Dec + 9° 21' Mag -3.4
April 15 3h 58m +21° 55' -3.5

Venus moves further up in the South West at sunset by April's end it will be setting a good 3 hours after sunset.

MARS: March R.A. Oh 51m Dec. +5° 03' Mag + 1.5
April 2h 19m +13° 46' + 1.6

In March Mars will be closing its gap with the Sun by the end of April it will be too close to the Sun to be seen at all.

JUPITER: March 15 R.A. 16h 37m Dec -21° 10' mag -1.8
April 15 16h 36m -21° 06' -2.0

Jupiter rises just before midnight and is low in the South West by sunrise. On April the 2nd Jupiter will be occulted by the Moon. See Observer's Handbook for more information.

SATURN: March 15 R.A. 14h 09m Dec. -10° 13'
April 15 14h 02m -9° 28'

Rising mid evening it is low in the south west with Jupiter at sunrise.

LUNAR NOTES:

| | March | April |
|---|---|---|
| Last 1/4 | 6th | 5th |
| New | 14th | 13th |
| First 1/4 | 22nd | 20th |
| Full | 28th | 27th |

TIDBIT - Ever wonder where the term "debugging a program" came from? One day in the late 1940's, the mammoth computer ENIAC (used by the U.S. Army) failed for no apparent reason. Nothing was wrong with the computer, but a moth had been caught and killed in the machinery. That dead moth was the first "bug" ever found in a computer, and the term found its way into computer jargon!