NATIONAL NEWSLETTER

April, 1982

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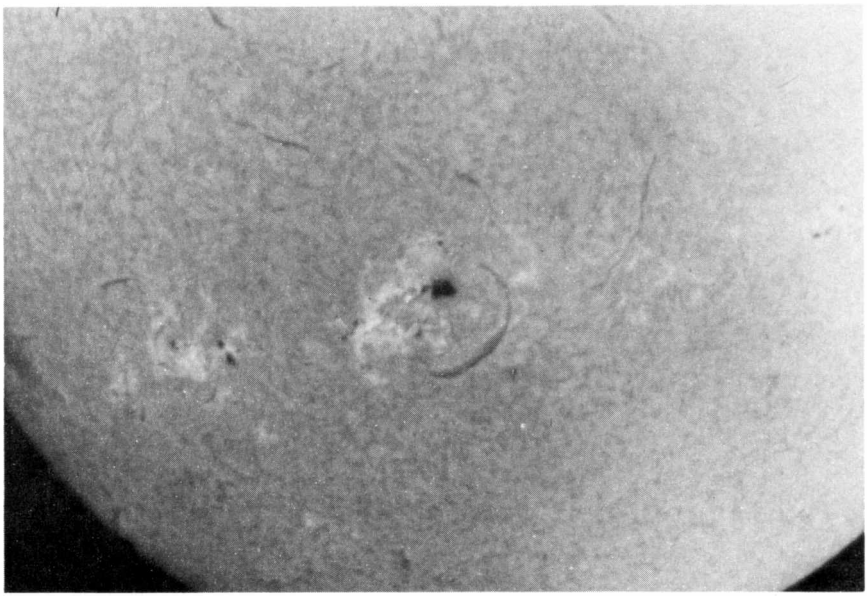

The sun in hydrogen alpha light. This picture shows a flare (the small white spot to the left of the dark sunspot) starting at 2:00 pm 17 October 1981. Compare with photo in *Photographing the Sun in Hydrogen Alpha* on L19 inside taken 36 minutes later.

(*Photo by J. Hicks*)

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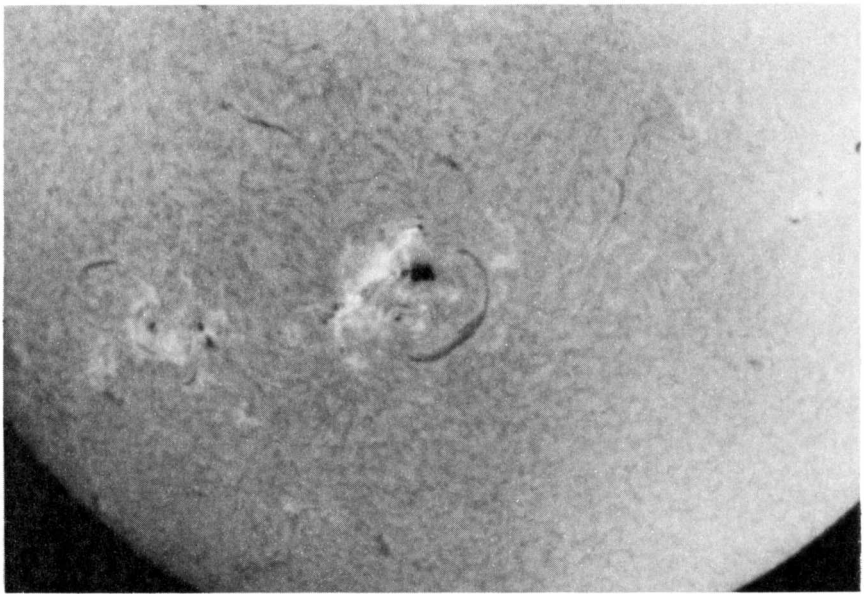
Photographing the Sun in Hydrogen Alpha

by John Hicks
Toronto Centre

The pictured H-alpha filtergrams were taken Oct. 17, 1981 between 2:00 and 2:36 p.m., E.D.T., during very clear air conditions. Using a Celestron 8 telescope coupled to a Daystar 0.8 A ATM filter, and employing Kodak Technical Pan film (2415), these photos illustrate the origin of a massive flare just to the left of the large central sunspot umbra. To the right of the same sunspot lies a dark semi-circular filament. This structure is actually a prominence composed of hot hydrogen gas large enough to contain several earth-size planets.

In hydrogen alpha light when prominences are seen *against* the disk of the sun they appear dark, and are then called filaments. Although this may seem confusing, the actual form of the excited gas is indeed "filamentous". On the edge or *limb* of the sun, the prominences appear as bright surges, puffs, or loops, and often dislodged fragments against the blackness of deep space. All these features are shown in the eyepiece in the deep ruby red of Hydrogen alpha wavelength at 6562.8 Angstrom. Had the filament described above been seen on the limb rather than against the disk, it would have been a spectacular sight indeed. The bright flare (photo B), fading through only another 30 minutes or so, is large enough to have caused considerable auroral activity on the night of the 17th and possibly radio interference. Did anyone observing witness an aurora that night?

For interested photographers, the H-alpha light is particularly faint through the filter, and coupled with the ASA speed of Tech Pan 2415 (only 100), requries a long exposure. In order to reduce vibration, the camera's shutter *cannot* be used, necessitating the insertion of an external-to-telescope shutter between sun and objective (a black disk and a limber wrist do the job very well). In taking the



Taken 36 minutes after the photograph on the front cover, this photograph (or filtergram) shows the solar flare fully developed.

picture (or filtergram, as it is properly termed), the decision of when to expose the film is tricky. The observer is caught between at least three variables: clouds, periods of rising air cells producing scintillation and image distortion, and optimum placement of the sun in transit. On top of these items, one must maintain excellent tracking, good focus, and keep accurate notes. The importance of records is paramount, as often a photograph cannot be duplicated at a later date unless one knows all the variables under which it is taken. An hour or two can pass quickly as one concentrates on another world and awaits opportunities to capture it on film.

For those night viewers who feel they are satisfyingly overfamiliar with Messier objects etc., the solar disk is never predictable and each day presents a different arrangement of phenomena. Since the mechanism for our continued life is largely a secret of the sun, why not try to understand the mysteries of the nearest star? Besides, as an added bonus, one gets a good facial tan, even in winter.

(*Reprinted from 'SCOPE*)

R.A.S.C. News

Astronomy Day

Once again 1 May 1982 has been designated Astronomy Day in North America. Many local astronomy clubs, including most Centres of the RASC, will observe the occasion with Star Parties, special lecture programmes and shopping mall displays. Plan now to participate in this year's Astronomy Day.

National Office Telephone Number

Members are reminded that as of 15 March 1982, the National Headquarters of the RASC has a new telephone number: (416) 484-6383.

RASC Ham Radio Operators

Bob McAllister of Rossland, B.C., a member of Victoria Centre and a ham radio operator, has supplied a list of ham/astronomers in hope of widening contacts with this group.

Don Fallows	Ladysmith, B.C., VE7 DY1
Jere Felten	Seattle, Washington, W7 TVA
Richard Linkletter	Bremerton, Washington, N7 ABP
Bob McAllister	Rossland, B.C., VE7 ERQ
Bert Widdop	Pierrefonds, Quebec, VE2 WD
Jim Wright	N. Vancouver, B.C., VE7 BXL

General Assembly Travel Grants

R. Peter Broughton
National Secretary

The National Council has authorized a limited number of travel grants to assist members planning to attend the 1982 General Assembly at Saskatoon, Saskatchewan. Applications for these grants are due at the National Office by 30 April 1982. Members are reminded that any application for these grants must be approved by their Centre's council prior to submission to the National Office. Unattached members should make their applications directly to the National Office. Priority for these grants is given to members who plan to contribute to the proceedings at the General Assembly (e.g. papers sessions and displays).

Four Years and Counting

by Roy L. Bishop
Halifax Centre

An icy mountain of dust and rock comparable in diameter to Bedford Basin now hangs in the void beyond the orbit of Saturn. As it rotates slowly with the dim light of the distant Sun playing over its cold surface, it silently falls, each second bringing it nearly ten kilometres closer to the inner solar system. At magnitude 24 and brightening, it will soon be detectable with the largest telescopes. Four years from now its fall will culminate in a high speed pass well within the orbit of Venus. By then the Sun's radiation will have boiled off an immense luminous tail, and for the fourth time men on Earth will look skyward for a glimpse of that fabled apparition which they call Halley's Comet.

The return of Halley's Comet in 1986 is already being called the astronomical event of the decade. Even the popular press, having ignored comets after the refusal of Comet Kouhoutek to abide by their headlines, will once again give a comet front-page coverage. The irony in all of this is that, particularly for people in mid-northern latitudes, during its 1986 apparition Halley's Comet will be no better than Kouhoutek was eight years ago. i.e. Most people will not see it. From southern Canada, at its best Halley's Comet will be a 4th magnitude object within 10 to 20 degrees of the horizon during January and April of 1986. Only away from the light pollution of towns and cities will Halley be a naked-eye object, and then only dimly. The reason for this poor performance is no fault of the comet; it is merely that Earth will be in the wrong part of its orbit to give us a ring-side view. When Halley passes perihelion it will be more than 1.5 AU from us, on the far side of the Sun. Moreover, well after perihelion, as we close to within 0.5 AU of the fading comet, Halley will be heading southward beyond the descending node of its orbit. In contrast, at its last appearance, in 1910, the comet passed within 0.15 AU from Earth and was well-placed for observers in the northern hemisphere.

Why is Halley's Comet so special? Brian Marsden of the Smithsonian Astrophysical Observatory has said: "To the man in the street, the Solar System consists of Mars, the Rings of Saturn, and Halley's

Comet." Comet Bennett of 1970 (see the cover of the 1982 *Observer's Handbook*) and Comet West of 1976 were far more spectacular than Halley will be in 1986, but the news media scarcely acknowledged them and thus few people saw these comets.

The fame of Halley's Comet is due to several factors. It is the only short-period, bright comet, and thus the only significant one (in the popular sense) that can be anticipated. Its returns at intervals of about 76 years tick off the progress of eternity in units of human lifetimes. Many people on Earth have a chance to view this comet once; very few are fortunate enough to witness two returns. This is the comet that has appeared like a celestial exclamation mark to accompany events in recorded history for more than two millennia. It was observed by Kepler (in 1607) and by Newton and Halley (in 1682). This is the comet that Halley recognized first as a returning visitor, its path through the dark described by Newton's mechanics.

Like the gradual growth of a comet' s tail, the first trace of a stream of publicity about the 1986 return has already begun. *Scientific American* has issued an authoritative and informative volume of reprints entitled *Comets* (Freeman and Co. 1981). The science popularizer Nigel Calder has produced an entertaining book with the title *The Comet is Coming* (Viking 1981). The December 1981 issue of the newsstand periodical *Discover* has a stylized comet on its cover and an article on the return of Halley's Comet. The best bargain of all is a detailed ephemeris called *The Comet Halley Handbook*, available free from the Public Information Office, Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91103.

(*Reprinted from Nova Notes Jan/Feb 1982*)

A Dream Come True

by Ulrich J. Krull
Toronto Centre

Many an ardent amateur astronomer will tell you that the subject is fascinating and observing sessions are terrific, but most will also warn that an individual must be dedicated to endure. The hardships which must be contended with when observing in the field have discouraged a significant number of would-be amateurs. Most of us have experienced the brisk breeze which seems to spring to life when the astrophotography camera shutter is opened, the numbing winter cold which has been responsible for more than one eyelid frozen to an eyepiece, and the cool summer evenings during which dew coats optics, soaks star maps and seems to create a bog from a fresh grass-covered field. Such trials, coupled with the lack of easily accessible power sources, convenient lamps, solid dry table space and a firm reliably aligned telescope support, prompted the design and construction of a proper observatory.

Once the decision to construct had been made, the project proceeded rapidly, completion being accomplished within one month. The site of the domed observatory was chosen in the back lot of a Haliburton area cottage property owned by a very generous and interested father-in-law, Stan Walters. After designing the structure, the frame was cut and assembled in a prefabrication format in Stan's Toronto home garage. The design maximized wood use and minimized cost, quickly taking physical form as my wife Carol also assisted. Reassembly and complete construction as the observatory site was accomplished in a ten-day period, a truly satisfying vacation.

An eight sided building was erected on an upright 2- by 6-inch frame which rests on twelve concrete blocks sunk into the earth. A permanent pier was cast by partially submerging and filling a 5-inch sonotube with concrete. This was capped with a machined metal plate which can accept the equatorial wedge of a Celestron-8 telescope. The aspenite walls are 4′ by 4′ in size, topped with two laminated plywood rings, the first acting as a base for eight hard rubber wheels and the other as the base of the dome. Fifteen ribs of ¾″ plywood were bolted in position to form a frame which was further reinforced with plywood spacers. The dome covering consists of custom tailored sheets of $^{1}/_{8}$″ hardboard, the joints being sealed heavily with caulk and then covered with aluminum strips. The dome turns freely on the wheels, maintained in position by a track cut from plywood. The interior is finished with a mosaic of floor tiles on the ½″ plywood subfloor. The walls are covered with recreation room style wall panelling.

Heaven's Gate Observatory, Maple Lake, Haliburton, Ontario

A cloth cover is still to be tailored to seal the ribs from view. A removable dome door was constructed rather than a shutter system due to its reliability with respect to water and wind. The working environment is extremely comfortable with ample shelving and numerous electrical receptacles on the walls and on the floor.

The white domed red building has attracted much local attention and has spurred interest in astronomy. The excellent dark sky location makes for splendid astrophotography. Further work dealing with stellar stectroscopy and FM radio detection of meteorites is also in progress.

(*Reprinted from 'SCOPE*)

Herschel House Revisited

by B. Ralph Chou

Last November, your Editor had the opportunity to take a brief detour from a business trip to the Uaited Kingdom to visit the Herschel House in Bath, England. The balcony overlooking the garden of this four-storey row house in the ancient resort city was the site of William Herschel's discovery of Uranus in 1781. It was purchased by Dr. and Mrs. L. T. Hilliard, the founders of the William Herschel Society, which has restored the house to substantially the state in which it stood during the Herschel family's occupancy. Articles on the House and its museum have appeared in these pages as well as in *Sky and Telescope*.

Dr. Hilliard very kindly opened the House to give me a special guided tour. Furnishings and displays prepared by the members of the Herschel Society have been supplemented with artifacts and displays loaned by the National Maritime Museum at Greenwich. One very interesting artifact was a piece of crumpled newspaper dating to the 1780's which had been used as wall insulation. Discovered in the staircase wall during the restoration, the newspaper's excellent state of preservation speaks well for the soundness of the structure.

Herschel House is the last remaining structure of the three homes occupied by William Herschel

during his stay in Bath. Two others were destroyed by enemy bombs in the Second World War. The William Herschel Society has plans for further acquisition of displays over the next few years. The R.A.S.C. has supported the work of the William Herschel Society in the past, and I hope that members visiting England will come see this important historical site of British astronomy.

The Herschel House Museum is open to the public Wednesday and Saturday throughout the months of March to October. Hours are 2 pm to 5 pm. Special visits can be made by appointment. Write to the William Herschel Society, Herschel House, 19 New King Street, Bath, England.

Welcome Sarnia Centre!

by Ian G. McGregor

In two short years our Society has added two more centres to its strength. In 1980, the Kitchener-Waterboo Centre became our nineteenth Centre and last autumn the Sarnia Astronomical Society became the Sarnia Centre – the twentieth Centre in our Society.

At the National Council meeting in Toronto last January Wayne Crowell, editor of the Samia Centre's newsletter *Urania*, brought along copies of its premier issue and several of us had an opportunity to look at it. *Urania* is a very impressive publication with a bright yellow cover and sixteen pages of typeset articles and diagrams. Congratulations, Wayne on an excellent first issue.

Many Centres in the Society exchange newsletters with each other and I am sure Sarnia would be interested in seeing other newsletters. Newsletters should be sent to: Samia Centre RASC, c/o James Townsend, Secretary, Box 1144, Corunna, Ontario N0N 1G0.

From the pages of *Urania* we have the following article by the Centre's president.

Two Interesting Variable Stars

by Zdenko Saroch
Sarnia Centre

This year two interesting long-period eclipsing binaries will reach their minima. The stars in question are Epsilon and Zeta Aurigae, both naked-eye objects in the constellation of Auriga the Charioteer. Their relatively high brightness may indicate that they have been studied quite thoroughly. However, they still deserve the attention of variable stars observers since the minima occur so rarely and some questions still remain unanswered. In Table 1 are the major data for both variables.

Table 1
Main characteristics and ephemeris for Epsilon and Zeta Aurigae.

	ε Aur	ζ Aur
Right Ascension (1950)	$04^h58^{min}.4$	$04^h59^{min}.0$
Declination (1950)	+43°45′	+4l°00′
Visual Magnitude (max.)	3.0	3.8
(min.)	3.8	3.9
Photographic Mag. (max.)	3.34	5.00
(min.)	4.58	5.69
Spectral Type	FOep	K4-B7
Period	$9898^d.5$	$972^d.176$
Duration of Totality	370^d	38^d
Partial Phase	190^d	32^d
Beginning of Eclipse	1982 July 12	1982 July 21
Beginning of Totality	1983 Jan. 11	1982 July 22
Time of Mid-Eclipse	1983 July 12	1982 Aug. 10
End of Totality	1984 Jan. 16	1982 Aug. 29
End of Eclipse	1984 June 25	1982 Aug. 30

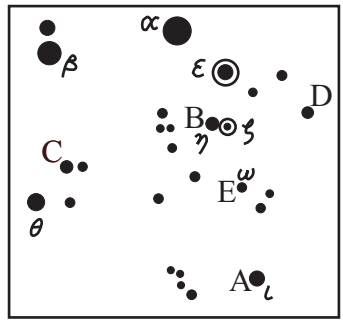


FIG. 1

Table 2
List of Comparison Stars.

Star	m_v	Sp.
A ι Aur	2.9	gK3
B η Aur	3.3	B3
C ν Aur	4.2	gK1
D 58 Per	4.5	G2
E ω Aur	5.0	A0

From the table we can see that the amplitude of Epsilon Aur is 0.7^m, and is sufficiently large for visual observations. Unfortunately this is not the case of the other star, which is a binary system, composed of a K-type giant and a 40-times-smaller blue-hot companion. Due to its size, though much cooler, the K star being over five times more luminous, is the main contributor to the total brightness of the system. During the eclipse of the B-component, the visual magnitude of Zeta Aurigae will fade only by $0.1–0.15^m$, which makes it unsuitable for visual observations. However, observations in the blue or UV range of the spectrum, which can be done photographically using orthoscopic materials such as Kodak 103a-0, will produce an amplitude over 0.6^m by enhancing the light of the blue star and suppressing the K star. Photographic observations of the upcoming minimum of Zeta Aur would be an interesting summer project, requiring only a 35-mm camera and proper type of film or filter. Using a stationary camera, exposures only 30 seconds long with a wide-open lens should be sufficient. The finding chart, Figure 1, shows the location of the variables and comparison stars for easy identification, with their visual magnitudes listed in Table 2.

(Reprinted from *Urania*)

General Assembly 1982

As noted in the February issue of the *National Newsletter*, this year's General Assembly will be held 20 to 23 May at the University of Saskatchewan, Saskatoon, Saskatchewan. The Saskatoon Centre has organised an action-filled weekend for members, including paper sessions, a photoelectric photometry workshop (organised by the IAPPP), and social events. Once again there will be a General Assembly Song Contest and Display Competition. Registration and entry forms can be obtained by writing to the Saskatoon Centre at the address below:

Saskatoon Centre, R.A.S.C.
P.O. Box 317, Sub 6
Saskatoon, Saskatchewan
S7N 0W0