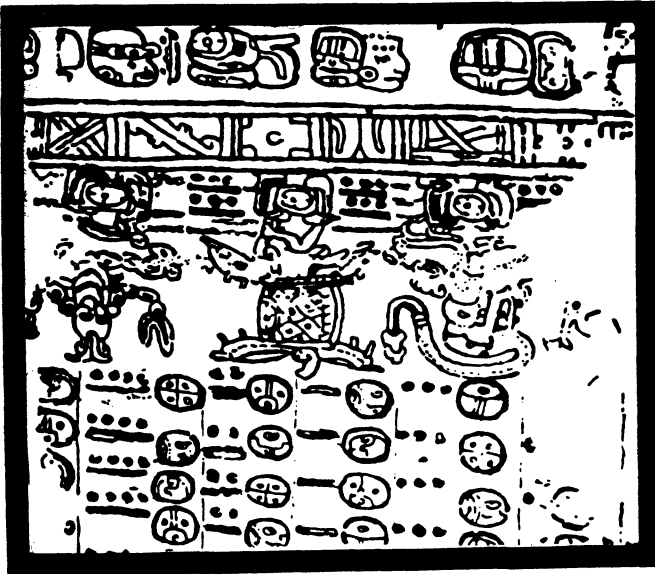


# NOVA NOTES



Halifax Centre



Jan-Feb 1985  
Volume 16  
Number 1

1985 Halifax Centre Executive

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NOTICE OF MEETINGS

Date: Friday, January 18th : 8:00 P.M.

Place: Nova Scotia Museum: Meeting to be held in the lower theatre. Access from parking lot & side entrance

Topic: The film "Starlife" will be shown and accompanied by a talk on stellar evolution by our newly elected President, Dr. Norman Scrimger.

\*\*\*\*\*

Date: Friday, February 15th : 8:00 P.M.

Place: Nova Scotia Museum: Meeting to be held in the lower theatre. Access from parking lot & side entrance

Speaker: Gordon Hawkins and David Chapman of our Observers Group will describe how to take simple astronomical photographs with common equipment. Examples to be presented include pictures of planetary conjunctions, star trails, constellations, meteors and the Milky Way

\*\*\*\*\*

REFRESHMENTS WILL FOLLOW BOTH MEETINGS !

\*\*\*\*\*

About the cover: The cover this issue is of an apparent Maya zodiac. The illustration, taken from the Paris Codex, is a parade of 13 animals that hang from a band of sky. Though some creature are effaced from the fifteenth-century document, a scorpion, a serpent and a tortoise are easily visible

## THE 1985 BURKE-GAFFNEY AWARD

The Burke-Gaffney Award was established several years ago to promote the development of the writing skills of non-professional members of the Centre. The award also acknowledges the contribution of the Centre's first Honorary President to the formation of the group and to his long and tireless efforts to educate the public in the mysteries of astronomy. This years contributions for the award must reach either the President, Editor or the third person of the Judging Committee by February 15th, 1985.

### RULES

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

2. Presentation: Articles should be no longer than 2500 words, written in proper grammatical form and presented typewritten and double spaced. Diagrams should be complete and ready for drafting and photographs should, if possible, be submitted with the original negatives.

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

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

Halifax Executive.

5. Prize: The award will be given once annually. The winning contribution then becomes the Halifax Centre's official entry in the Simon Newcomb Award competition which is held annually on a nation-wide basis. The winner of the Burke-Gaffney award will have the choice of one of several prizes offered.

6. Submission of Entries: Entries will be received anytime until February 15th, 1985. You may direct inquiries concerning the rules to the President.

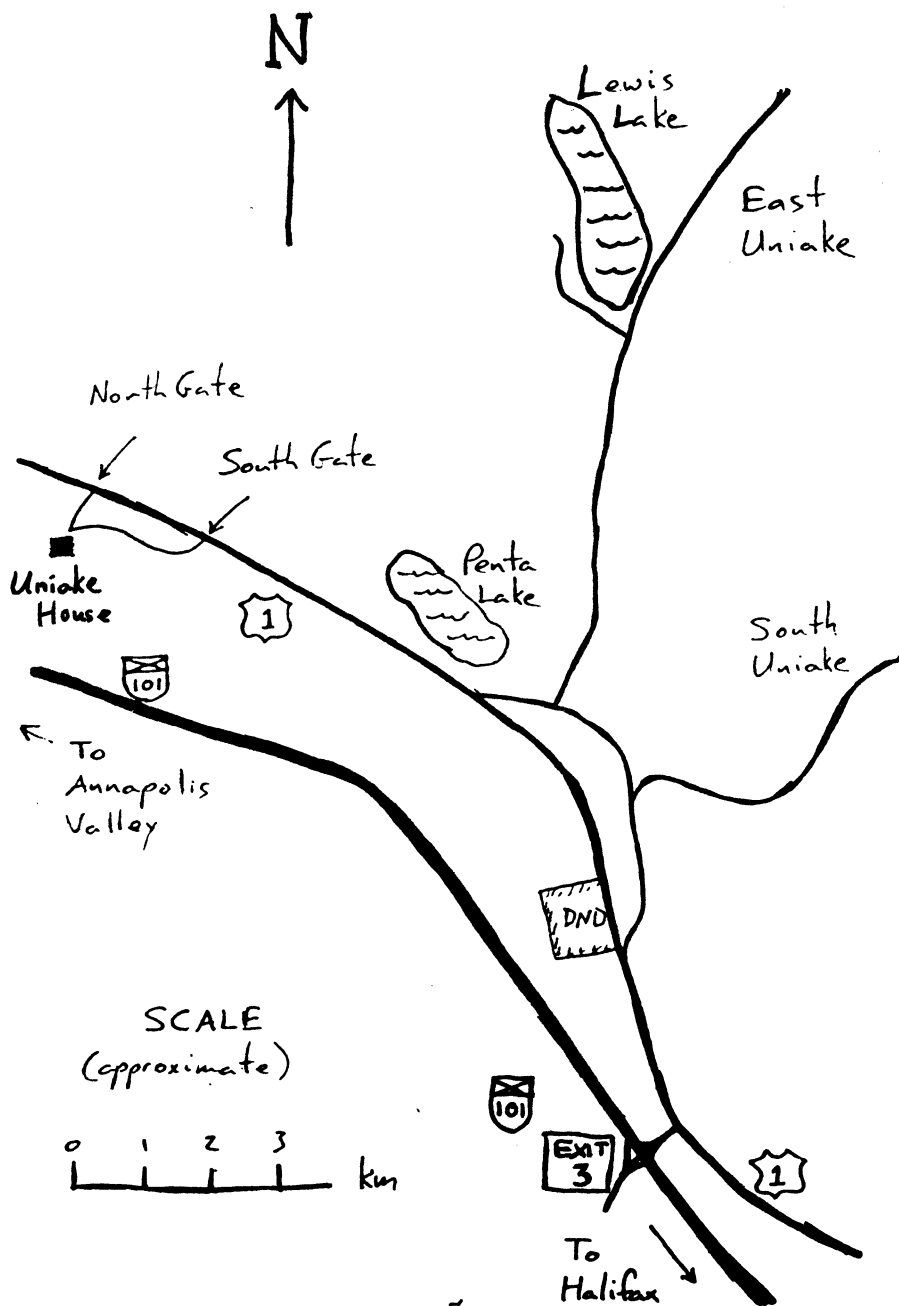
7. Previous Awards: The Burke-Gaffney Award has been won on five previous occasions by: Bill Calnen (1979 and 1980), Dianne Brooks (1981), Michael Boschat (1982) and Jennifer Wells (1983). No award was given in 1984.

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#### ELECTION RESULTS

As a result of having at most one person either being nominated or volunteering for the positions on the executive, there was no election so to speak and all positions were filled by acclamation. The changes to the executive are: Dr. Norman Scrimger takes over the helm as President replacing Kathy Oakley who has served as President for the maximum term of two years. Darren Parker is our new National Representative, having previously been our Bridgewater liason and takes over the post from Walter Zukauskas. Lastly, David Chapman is our new librarian, replacing Laurie Burgoyne and Jenny Wells. It was decided to discontinue the position of Assistant Editor. We would like to thank all of the out-going members of the executive for the time and effort that they have shown in the last year and wish the best to the new members.

# UNIAKE HOUSE OBSERVING SITE



\*\*\*\*\* METEORITES IN LUNENBURG COUNTY!

As announced in the previous issue of NOVA NOTES, the Lunenburg County Astronomy Club will be hosting an exhibit of meteorites at the Desbrisay Museum in Bridgewater.

"Meteorites" is being produced by the Provincial Museum of Alberta and is being made available for several two month displays through out Canada.

The exhibit is geared toward the Jr.-Sr. high school reading level. There are eleven meteorites, fifteen specimens and artifacts such as shatter cones and Inuit knives, and over sixty photographs and illustrations. Pamphlets on meteorites and impact structures will be available from the Dept. of Energy, Mines and Resources.

"Meteorites" will be at the Desbrisay Museum in Bridgewater during the months of May and June 1985. For directions, check the March-April edition of NOVA NOTES, or contact me at any meeting of the Halifax centre.

If all goes well, we'll have the Halifax centre down for an observation session during the meteorite exhibit and thus kill two birds with one meteorite! Watch future issues for details.

Good Observing to All!  
Darrin Parker  
(Obseving Chairman, LCAC)

## A RARE PHENOMENON

On November 5, 1984 at 6:40 P.M. while on route to Kentville from Harmony, I saw a rare atmospheric phenomenon. I was not immediately impressed, for living on the South Mountain just southeast of C.F.B. Greenwood, you become accustomed to human induced atmospheric phenomena. Such phenomena include the landing lights of approaching aircraft, and various "base" lights (control tower, runway, vehicle and security) which illuminate the surrounding clouds or valley smog. It soon became apparent that the phenomenon I saw was not of the type mentioned above.

On this particular night the moon was approaching its full phase and shone brilliantly on the crest of the South Mountain. In the valley below there was mist and fog to such an extent that windshield wipers were necessary. As I traveled along the Harmony - Nicholsville highway (which runs parallel to the valley and the North Mountain) I noticed a faint glow with my peripheral vision. The glow formed an arc of white light rising up from the valley floor. My first theory was that of a car traveling up a steep incline projecting its headlights skyward, like a film clip of searchlights at the beginning of a Twentieth Century Fox production. However, this was not the case


Investigating further, I turned full face to view this rare phenomenon. Over my left shoulder I saw a 180 degree semi-circle which touched the valley floor at two points. The closest point was slightly behind me and to the north, appearing to be just over Aylesford. The second point was due west extending just beyond Kingston. I stopped the car and got out to make a more detailed observation. As I stood with my back to the moon, my shadow pointed in a straight line towards the center of the arc. Also at this reference point, the arc's center appeared just below my plane of vision. It then



became obvious that I was looking at a rare atmospheric phenomenon, a night time rainbow created by sunlight reflected off the moon and in turn refracted by the mist below.

Unlike a daytime rainbow, there was an apparent lack of color, although a slight tint of orange did exist at the west end. This, however, may have been due to the amber lights from the base. As I proceeded on my way, this beautiful phenomenon followed me in the same way that the moon raced before me. At last I made my way down the mountain into the fog and mist. The rainbow was gone. Indeed it was truly a rare phenomenon.

Larry Coldwell  
The Boars Back Observatory  
Harmony



### CONSTITUTIONAL AMENDMENT RATIFIED

The constitutional amendment, as proposed in the July-August 1984 issue of NOVA NOTES was ratified at the September meeting by a unanimous vote. Article III of the Halifax Centre's constitutional shall now read as follows:

#### ARTICLE III : MEMBERSHIP

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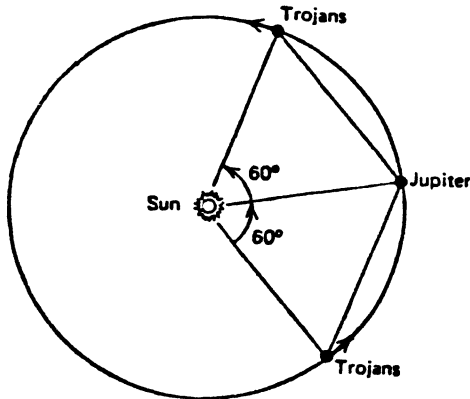
a) Regular, Youth and Life to remain as currently enacted

b) Associate: the Centre shall extend Associate Membership to a family member(s) of a Regular, Youth or Life Member in good standing. The fees for an Associate Member in good standing shall be as set from time to time by the Centre Executive.

## THE "TROJAN MOONS OF JUPITER

Astronomical reading can lead one into many interesting directions. One of these has recently introduced me to the "Trojan" moons. As with most of us, I have heard of them many times before but never really investigated the matter enough to become more familiar with them. Most resource material is quite straight forward and describes them as a group of minor planets that lie in the vicinity of the two Lagrangian points in the orbit of Jupiter around the sun.

That explains a little but then leads me to wonder what a Lagrangian point is. With some more reading I discover that each point occupies one corner of an equilateral triangle with the sun and Jupiter at the other corners. That description and the following diagram helped to explain what I was reading about.



The Trojan asteroids.

More reading and I discovered that beginning with the first Trojan to be discovered Achilles in 1906, most of them have been named after heroes from the two sides of the Trojan wars. The Greeks had many heroes, so for a time the naming will go on.

The possibility of such a group was already known by the eighteenth century, when Lagrange demonstrated mathematically that if a small body were placed in a circular orbit around the sun in such a way that it, the sun and Jupiter formed an equilateral triangle, then it would stay in position, moving at the same rate around the sun as Jupiter. That's what Lagrange said or something very close to that. Here the gravitational effects of Jupiter become very important. Also perturbations by other planets mean that each member of the group oscillates considerably in position, mainly in longitude along the orbit of Jupiter, from its stable Lagrangian point. It is likely that perturbations and collisions between them cause the total number of members of the group to change with time.

Recent surveys suggest that more than 1000 Trojan group members may be bright enough to be seen from the earth but less than 2% of these have yet received official minor planet designations. Another point of fact is that they are also all exceptionally dark bodies.

It all seems simple enough up to this point but Lagrange found that there are five stable positions within a system, like those of the earth and the moon or the sun and a planet, in which two bodies revolve about a common center of gravity. These Lagrangian points, referred to as L1, L2, L3, L4, and L5, have the same orientation in all systems. However, it has been calculated that L1, L2, and L3, called the collinear points since they are all on the same line that intersects the two bodies, are more unstable than the L4 and L5 positions.

The instability of the Lagrangian points is affected by the gravitational pull of Saturn and other bodies such as asteroids passing in the vicinity.

Present evidence indicates that most of the asteroids are covered with material of low visual albedo having flat, nearly featureless reflection spectra. This large group of asteroids accounts for a progressively larger element of the minor planets as one goes from the inner to the outer regions of the asteroid belt. The interpretation from this evidence is that a decrease in effective condensation temperature in the original solar nebula with increasing distance from the proto-sun promoted larger asteroid formations further out. It has also been suggested that the very low albedos as already mentioned, can be explained by the presence of kerogen-like organic compounds. This also suggests that materials containing these types of carbonaceous substances, rather than those found in the more familiar carbonaceous chondrite matrix, may have been the primary rocky condensate in the outer solar system and can therefore be typical of the rocky component of comet nuclei.

Astronomers who have been active in this field of research have even gone so far as to divide the asteroids that precede Jupiter and those that follow Jupiter into Greek and Trojan camps respectively. They have even placed a Greek and Trojan spy into the opposite camp. Anyone having a further interest in these interesting objects can easily find ample reference material and may find the pursuit of Lagrangian dynamics very interesting indeed.

Peter Steffin

### References

- Illinguorth, V. "Trojan Group," in The Anchor Dictionary of Astronomy. Garden City, New York: Anchor Press/Doubleday, 1980, Pages 446-467.
- Gradie, J. and Veverka, J. "The Composition of The Trojan Asteroids," Nature, February 28, 1980, pages 840-842.

## METEORITE CONTAINS SOLAR SYSTEM CLUES

A meteorite which crashed to Earth in Jiangsu Province this summer contains clues to the birth of the solar system, say astronomers from the Zijinshan Observatory of the Chinese Academy of Sciences.

The meteorite, about the size of a tennis ball and weighing 529 grams, landed in Nantong County, Jiangsu Province at 11:35 A.M. June 15. Witnesses said they heard a noise similar to a motorcycle engine as the meteorite passed through the northwest sky over Shaxi village. The noise grew louder, becoming almost like thunder, and then the meteorite hit the earth and people could feel a quake.

Yi Junquan, who was working in a nearby field, found a trumpet shaped hole some seven metres away from where he had been standing. He put his hand into the hole, which was 70 centimetres deep and felt something warm and solid. He dug it out and found it was a piece of yellow, purple and blue stone. He then washed it in a nearby stream and it turned black. Yi and a dozen other witnesses then sent the stone to the observatory.

Astronomers discovered in their initial examinations that the stone contains many ball-like grains one millimetre in diameter. These grains, they believe, are the primitive materials that existed when the solar system was born 4.6 billion years ago. The meteorite therefore contains important information about the birth of the solar system.

Statistics show that an average of five meteorites are collected on earth annually. Jiangsu Province, the province where the most meteorites have been recovered has collected six meteorites since 1949.

reprinted from "Beijing Review"

## Some Winter Messier Objects

The southern evening skies of January and February are dominated by the constellation Orion, the Hunter, which is probably the best-known grouping of stars next to the Big Dipper. The winter Milky Way stretches diagonally across the sky above Orion, from the southeast through the zenith to the northwest. There are several bright, easy-to-find, Messier objects to be found in this region of the sky, mostly open clusters. You must be made of stern stuff to brave the cold in order to observe, but the time you spend outdoors can be minimised by a thorough study of your star charts before you start. Try to memorise the principle stars near the desired object and its position relative to them. The binocular observer has an advantage over the telescope-user since no time is spent setting up - you can just nip outside for a few minutes' observing and nip back in when your toes begin to turn black and feel as if they're about to drop off.

Here are some objects ideal for these months:

M42 "The Great Nebula in Orion" This is an easy one to start with - every RASC member who can't immediately point out this bright naked-eye nebula should turn in his membership card. For the beginners, it is found within Orion's sword below the three stars of his belt. If you want more of a challenge try for M78, a supernova remnant between the easternmost belt star and Alpha Orionis (Betelgeuse).

M36, M37 & M38 Three open clusters in Auriga. These clusters lie in an arc within the Milky Way across Auriga between Perseus and Gemini. M36 and M38 can be resolved into stars in binoculars, but M37 appears nebulous, since the stars are faint and closely packed.

M35 Open cluster in Gemini. This easy cluster appears to the northwest of the feet of Castor, one of the twins, whose name is applied to Alpha Geminorum. This is one of your Observing Chairman's favorite Messier objects.

M50        Open cluster in Monoceros. This inconspicuous constellation occupies the region of sky east of Orion and north of Canis Major. M50 can be found about one-third of the way from Alpha Canis Majoris (Sirius) and Alpha Canis Minoris (Procyon). You may also want to try for the Rosette Nebula and associated cluster, NGC 2244, which lie a little to the south of the point one-third of the way between Betelgeuse and Procyon.

M41        Open cluster in Canis Major. This cluster is about 4 degrees south of Sirius, the brightest star in the sky.

M46 & M93        Open clusters in Puppis. These clusters are a little harder to find since there are no bright stars nearby. M46 is large and faint in binos; it lies south of Procyon and east of Sirius. M93 is bright and condensed; it lies about 10 degrees south of M46.

M79        Globular cluster in Lepus. Lepus is a small constellation south of Orion, containing two fairly bright stars. M79 appears about 4 degrees south of the lesser of these.

You may have noticed that I frequently give directions in terms of degrees relative to stars and other objects: this assumes that the observer is familiar with the major constellations and the proper names of some of the stars. Also, you must develop a good feel for angular measure. Most observers know that the Full Moon subtends an angle of 1/2 degree. The angular field of view of your binos may be printed right on the body; if not, it may be expressed in linear measure at a given range (e.g. 288 feet at 1000 yards). Your high school trig and a calculator will come in handy working out the angular field from that! By the way, new members of the Society may want to pick up their free copy of the Halifax Centre's Messier Object list and reporting form. See the Observing Chairman at the next meeting. Good Observing!

Dave Chapman

## SECRET RESEACH EXPOSED

The following message was recently received and transmitted to the Chairman of the SMU Astronomy Department.

Message:

Mrs. H-K is a retired school teacher from the US who is now living with her family in Truro. She believes that someone from the Astronomy Dept. is carrying out some research supported by a Goddard Research Grant, and that this research is using sub-sonic atomic frequencies which are causing a very loud hum or noise or interference. These sounds are coming from the underground power lines or the sewers, so Mrs. H-K thinks. She says it is causing all sorts of stress in Bible Hill and the surrounding area. She is quite agitated about it. She left the impression that she thinks it is being done on purpose to annoy; she thinks it should be stopped. She went on to say the same thing happened in the US when she was teaching there and the authorities were called in. I think she blamed this on the Germans who, she says, were caught and put out of the country. She is blaming all this on the Astronomy Dept. and she says she hesitates to get in touch with the Monsignor who is or was on the Board of Governors of Saint Mary's.

The Chairman of the department has requested the responsible persons to come forward and admit to this dastardly deed! So far, however, no one has admitted to this irresponsible use of public funds!

### VULCAN FOUND?

Eleanor Helin recently found an asteroid now designated 1984QA. It was discovered using the 48" Schmidt telescope at Mount Palomar during routine patrol work. The object is about 1 km in diameter but the most interesting fact about it is its orbital period around the Sun. The period is 359 days ie. almost exactly a year which means its average distance from the Sun is only slightly closer than 1 AU. 1984QA was 6 million km from Earth approximately a



year before its discovery--16 times the distance of the Moon. It is pulling away from Earth and will disappear from view in 1986 but will reappear about 2040 when it will have again caught up with and lapped the Earth.

#### UPDATE ON THE ISAAC NEWTON TELESCOPE

We reported some time ago that the Isaac Newton Telescope was again in operation after its move from Herstmonceaux, England to La Palma in the Azores. It was suffering, however, from a case of the wobbles which was severely hampering its scientific potential. The primary problem has been identified and corrected. The mechanical gear train was found to be springy thus inducing oscillations into the tracking motion of the instrument. Engineers from the Royal Greenwich Observatory, who are responsible for the facility, have stiffened the mounting by welding metal plates to the offending parts thus allowing astronomers to better utilize the reportedly excellent observing conditions of La Palma. The work of the engineers is not yet complete though. The telescope also vibrates when the dome is rotated suggesting that the instrument is not well isolated from the dome foundations. The cost of the move has been 10 million pounds and counting--the price of a new telescope with twice the light gathering power!

#### MEASURING THE HELIOPAUSE

On 30 August 1983 Voyager 1 measured the edge of the heliopause as it moves away from the Solar System. On that date instruments came alive again after becoming dormant following its departure from the vicinity of Saturn in 1981. About two weeks later, September 1983, Voyager 2 also measured the edge with its less sensitive instruments. The heliopause is the boundary between the outer edge of the solar wind and the material of interstellar space, ie. the point where the gas pressures are equal. The only other measurement had been made using data from Pioneer 10. The latter space craft is moving in the direction opposite that of the Sun through the galaxy

and although only 34 AU's from the Sun, its instruments suggest the boundary is 65 AU's out. Voyager 1, 19 AU's from the Sun, is heading out of the Plane of the Solar System more or less in the opposite direction while Voyager 2 is still in the Plane heading for an encounter with Uranus in January 1986. The data suggest Voyager 1 will encounter the boundary at 46 AU thus giving some justification for the assumption that the heliopause is pear shaped and trailing an elongated tail pointing away from the direction of the Sun's motion in the Milky Way Galaxy.

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### ONE NIGHT AT AN OBSERVING SESSION

The 24th of November did not appear to be promising for an observing session. The sky was mostly cloudy with just a hint of clear blue between the clouds. During the afternoon I found myself at David Chapman's house ripping apart an old radio. An hour or so passed and soon the radio was back together with a few modifications. We occasionally stared out the window hoping for clear skies, but to our despair the sky was covered with the white fluffy clouds which seemed to be present at every observing session. A quick call to the weather office was disappointing as the forecast was calling for overcast. But we waited persistently and after dinner I walked outside and to my surprise found that the sky was clear. There was a great rush of gathering equipment (telescope ...check, charts ...check, camera ...check) and then we quickly headed for Mount Uniacke. The sky was clear all the way there except for a small cloud in the southeast but that soon drifted away leaving the sky totally clear as we turned off at the exit to the observing site.

Arriving at Uniake House, we informed the caretaker that we had arrived. After a brief chat with him we turned to see that the sky had totally clouded over and not a star was in sight. We walked back to the car and turned on the heated, and gazed though the windows hoping for clear sky and waited and waited and waited. After about half an hour a truck pulled into the parking lot and Peter Edwards hopped out. We stood outside and talked for a while and soon Peter left but David and I stayed on as a few stars appeared and faded behind the clouds. We waited a while longer and it cleared again and after a little more waiting we decided that it was going to stay clear. The telescopes were set up first followed by the cameras. The first target was M42. As I focused my telescope the familiar object just fitted into my low power field and the hour wait for clear skies proved to be worth it. But this was not to compare with what happened next. It was 11:08 and I was just in the middle of an exposure of Orion and I looked across the sky towards Pegasus and Andromeda and saw a fireball cross the Square of Pegasus, pass through Aries and fade out just before reaching Orion. The fireball was a bright green and lasted from 5-7 seconds, long enough for me to call to David. The meteor's trail was very distinctive against the black sky and looked like smoke. The meteor had varied about three times in brightness and we estimated it to be about -8 or -9 in magnitude. If anyone else saw this object, I would appreciate hearing from you.

Gordon Hawkins

## ANOTHER CELESTIAL LION

While making a routine observation on December 21, 1984 at 8:45 P.M., I noted a phenomenon of constellations which may be of interest to the readers of NOVA NOTES. Looking to the northeast I was briefly surprised to see Leo rising. This, of course, was impossible as Leo would not rise until much later. A quick look solved the puzzle. Stars in the head and shoulders of Ursa Major were forming a "false" Leo.

I enclose tracings from the Atlas Coeli of A. Becvar 1950.0 (reproduced on the facing page). They confirm the field observation, with the three stars of the Big Dipper's bowl comprising the "false" Leo's hindquarters. The illusion may not be so pronounced in the lighter city skies.

John E. R. Devlin

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Nothing exists except atoms and empty space,  
everything else is opinion.

-Democritus

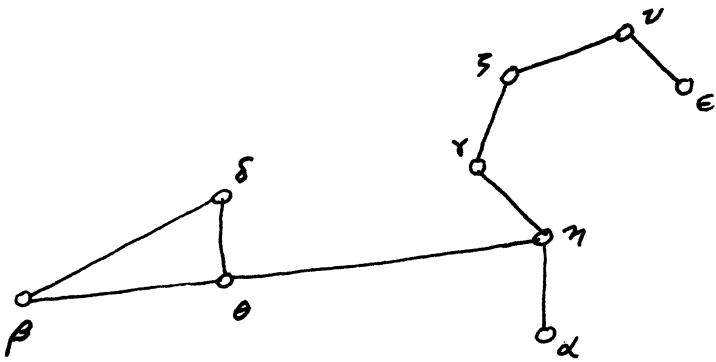
The effort to understand the Universe is one of the very few things that lifts human life a little above the level of farce and gives it some of the grace of tragedy.

-Steven Weinberg

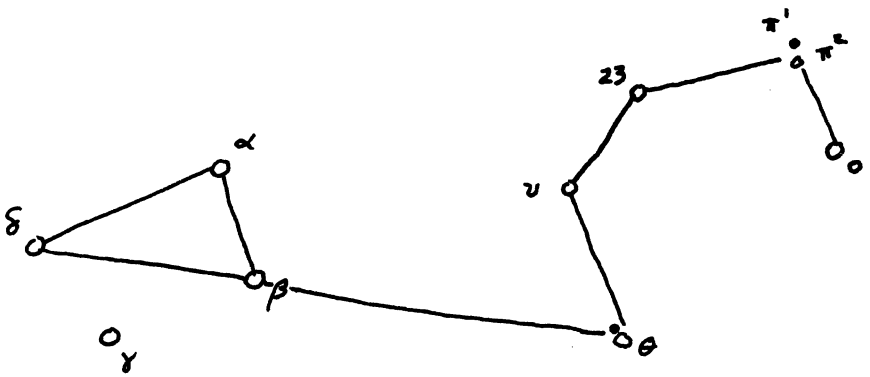
One trouble with making a profession of thinking of things is that occasionally you think of something that makes you recognize your own stupidity.

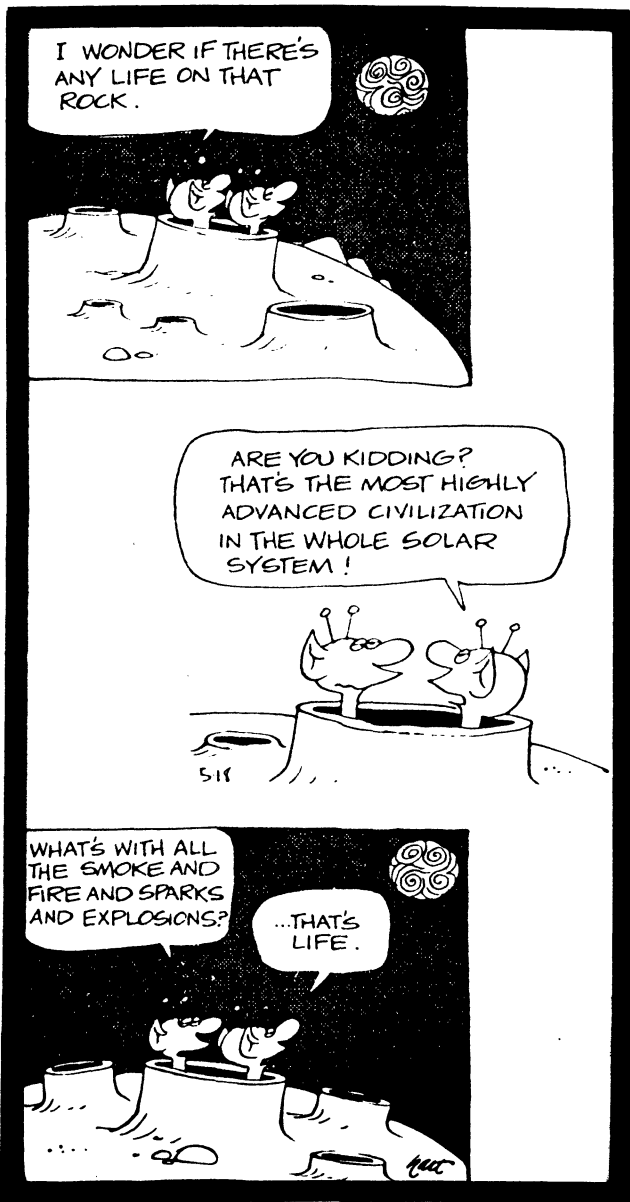
-Isaac Asimov

Leo:



False Leo in Ursa Major





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NOVA NOTES is published bi-monthly by the Halifax Centre of the Royal Astronomical Society of Canada in January, March, May, July, September and November. Articles for the next issue should reach the editor by Feb 15, 1985. Articles on any aspect of astronomy will be considered for publication. The editor is:

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