ASTRO-CHAT

Newsletter of the Chatham Kent Astronomy Club

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President
Mike Flegel

Editor
Ray Rogers

P.O. Box 191
Chatham Ont
N7M 5K3

Deadline for April issue is Mar. 21st.

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Upcoming events

Feb.	24th.	Full Moon
Mar.	7 & 8th.	Observing
	10th.	New Moon
	14 & 15th.	Observing
	20th.	Vernal equinox, hurrah
	21 - 23rd.	Observing at Eagle Point (see page 4)
	26th.	Full Moon

* *

March promises to be a very busy month, astronomicaly speaking. First off, we have observing on the weekends of March 7 & 14th. If we have clear skies that will be an event in itself. Then we have been invited to Eagle Point for the weekend. If you havn't seen Halley's Comet yet then this may be one of your last chances before it begins fading away. Actually, one problem with this weekend is that it is only 4 days away from full Moon. To view the comet you would probably do better to come to our observing on the previous weekend. The night of the 21st is also the night when all but one of the Messier objects can be observed. But there is that problem of the Moon.

In an earlier issue it was mentioned that the Chatham library was interested in hosting a Halley seminar. The library has yet to come through with even a definite maybe, so Mike Flegel is trying to organize one for March 7 or 14. This is to be held at the Civic centre, tentative speakers will be, Mike himself, Peter Jedicke from the London club and Jaymie Matthews. Jaymie is an astronomer at Western University. A small fee ($2 or so) may be charged for entry to offset costs. So it is in the clubs best interests for every member to come and to bring as many people as possible.

* *

NEWS FLASH: The Halley seminar is go for the 7th. at the Civic centre, 7-30pm. This will be held in place of our regular meeting for March.

THE CHATHAM — KENT ASTRONOMY CLUB
P.O. BOX 191, CHATHAM, ONTARIO N7M 5K3

NEMESIS - THE DEATH STAR

No,this not a science fiction short story or a manuscript for one of those awful Saturday morning kids' shows, but one theory about the extinction of dinosaurs and other life at seemingly regular intervals.

This theory was recently brought out in Sagan's newest book 'COMET' and this little capsulization of that part of his book is in place of what normally may be called a 'book report'.

It seems that scientists have discovered that life forms on earth have a habit of disappearing on a regular basis, roughly every 26 million years. It just so happens that the dinosaurs sudden absence from the earth happened during one of these cycles. As well, the surviving craters on the earth have been catalogued and aged and guess what? Yup, they seem to have come in groups spaced about 26 million years apart. Now that's not to say there are exceptions; there are, lot's of them, but there seems to be alot of evidence saying that not all collisions on earth were sporadic encounters.

What some scientists have been trying to come up with is an answer to the question, "What does the earth do that follows a 26 million year cycle?". Well, the theories presented suggest that it may or may not be something the earth does, but what another body may be doing.

One theory suggests that the Sun (and the earth with it) travels around the Milky Way in its orbit not in a perfectly straight line, but with a 'bob' in its orbit, if you can imagine the Sun bouncing up and down with one of these bounces lasting 60 million years. Well, during one these bounces the Sun would pass through a denser part of a gas cloud of the Milky Way twice, once on the way up and again on the way down. This encounter would be sufficient to knock a considerable amount of the comets hovering in the Oort cloud out of their stable environment and send them hurtling towards the inner solar system. A couple of million years later it is possible we could then be in the midst of a great shower of comets, and thus the likelihood of a major catastrophic collision with the earth is possible.

The other theory has it that the Sun is not a solitary star, but the principle member of a double star system, with the secondary star a very small and faint object with an extremely large orbit. The theory suggests that this star (nicknamed NEMESIS) has an orbit which would take it within the Oort cloud during its closest encounter with the sun. Passing through this cloud would send millions of the comets towards the inner solar system with the same results as before. Naturally the period of the star would be in the order of 30 million years.

Two notes should be taken that are important. One is that both these theories are pure speculation and that as of now there is no observational evidence to support these. The other is that at present we are midway between this 26 million year cycle, and that's a relief!

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SOLAR ECLIPSES FOR CHATHAM

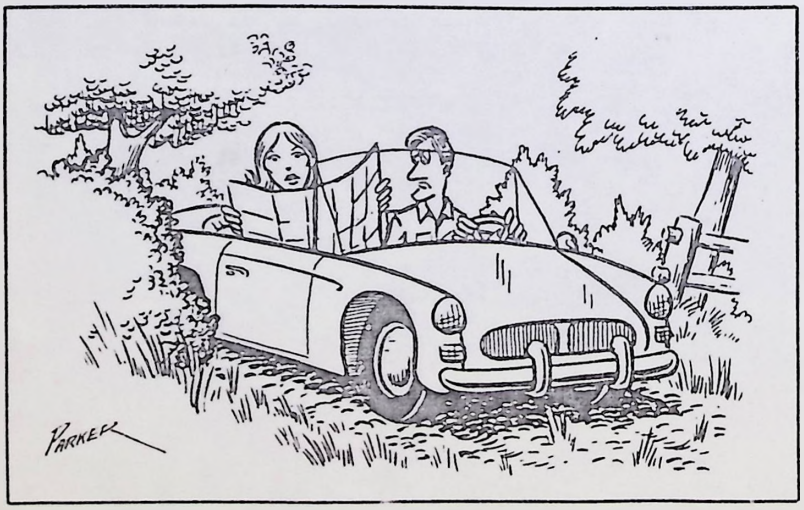
The next 50 years does not hold a lot of promise for Chathamites as far as solar eclipses go. Other than the odd partial eclipse Chatham has not experienced a total eclipse for some time. However there are two good opportunities for us in the next fifty years,and for those who are very impatient there are plenty more around the world. Here is a brief summary of what we can expect in the years to come.

On May 10, 1994 (only 8 years from now) Chatham will experience a fine annular eclipse. An annular eclipse is one where the moon is too far away from the earth to totally obscure the sun, hence a small 'annulus' or ring of sunlight is visible around the moon. The size of this ring is determined by the distance of the moon from the earth at that time. The eclipse path starts in the Pacific ocean, crosses the central U.S. and then skims Southwestern Ontario and heads east through Nova Scotia and into the Atlantic ocean. About 90% of the sun's disk will be covered and the sky should dim somewhat, but many people will still be unaware of anything unusual.

The one to look forward to is on April 8, 2024. Many of us will still be around , I hope, to view a wonderful total eclipse which should last about 4½ minutes. The path of totality is very similar to the annular eclipse described above, however Chatham lies right on the edge of the path, so the duration of totality will be extremely short. A short drive to the lake Southeast of London should get one very close to the centre-line.

If you are too impatient to wait 38 years, then you probably won't mind waiting 5 years to travel to Hawaii to see one of the best total eclipses of the century. In fact, the path of totality crosses Mauna Kea, one of the world's major astronomical observatory sites. Actually, most people don't need any excuse to travel to Hawaii, but this one isn't bad.

M. E. Flegel
354-9677



"Either we re halfway between Sirius and Procyon or you brought the wrong map folder."

The Windsor Centre of the R.A.S.C.
C/O Matt Bourdeau,
Director of Observing.
10870 Eastcourt Dr.,
Windsor, Ont.,
N8R 1E8

Scheduled Observing
Session Date:
March 21-23

Place: Eagle
Conservation/
Campground
Area.

Dear Astronomy Club,

You may not of heard, but the Windsor Cente is hosting an observing session to give interested groups a chance to get a good view of Halley's Comet and have a good time. The observing site is a conservation/camping area located about 45km. South of London. The map which accompanies this letter should provide you with all the necessary directions.

The best way to get to the site is by way of the 401. You should have no problems with finding the Town of West Lorne which is located at the 137 Interchange and once you arrive in this town, you may wish to pick up a few things at the Becker's store there. Also, once you reach West Lorne, you would be wise to use the hand-drawn map which I provided with. This map will help greatly in finding the Eagle site. There will be a sign with the inscription " Windsor Centre RASC " posted at the entrance gate to the conservation/camping area to let you know that you have the right place. I should warn you that you may have a problem finding McKillop Road, especially if you are arriving at night. The sign showing the entrance to this road is fairly inconspicuous and if you're not paying attention, you may miss the road, which, by the way, is a dirt road.

When you get to the gate at the campground entrance, you may have to stop and just honk your horn to let someone know that you need to get through because the gate may be locked to keep-out any week-end picnicer's. It may be open during the day, but it will probably be locked at night.

What time should you arrive? The best time is during the daylight hours, but if you plan to arrive on Friday, you should be there no earlier than about an hour or so before sun-set. Observing will be done Friday night,(March 21) and on Saturday night (March 22). Sunday has also been reserved to give you a chance to sleep-in late and take your time in packing up.

If you plan to observe both nights, which I suggest you do, you may sleep in one of 2 small, heated cabins. These cabins should be able to accomadate at least 6 people and the heaters should keep you warm throughout the night. If there is more people than the cabins can hold, then you may stay in the main bunk-house, which has a bathroom, private bedroom, stoves, sink and electricity. If you desire, you may want to sleep in this bunk-house instead of the cabins, but whatever you do sleep in, you must bring a sleeping bag or something along that line so you can be comfortable. If any women wish to attend, they may use the private bedroom in the bunk-house which is quite comfortable, but, you will need sleeping bags for this room.

I hope that you plan to attend this observing party under the very dark skies of this area. You will not regret coming to this party! If you have any questions at all, you can call me at (519) 735-9023. Thank you.

Matt Bourdeau



STS

What Went Wrong?

Robert Cattrysse

As the explosion of the Space Shuttle Challenger is still in our mind, the investigation into what caused the catastrophe continues. On February 3 President Ronald Reagan formed a special panel to find out "how it happened and how it can be prevented from happening again." Chairman of the commission is former state secretary William Rogers. Members include former astronaut Neil Armstrong, astronaut Sally Ride, and former test pilot Chuck Yeager. The interim board, which is working with NASA investigators, has 120 days to issue a report to the President.

Photographs show a plume of flame at or near a seam on Challenger's right rocket booster develop about 59 seconds after launch and grow in size until the fiery explosion which destoyed the Challenger and killed its seven crew members. A solid rocket booster (SRB) is put together in four segments. A seam where the segments are joined contains two synthetic rubber seals called O-Rings. Once ignited the solid fuel in the 45-metre long SRB burns from the top to the nozzle at the bottom. When the rocket is fired, the rings must expand in a fraction of a second. Otherwise, leaking gases from the booster could become a blowtorch aimed at the Shuttle's main tank. The two O-Rings in the lower seam are suspected of burning through, thus causing an abnormal flame to appear on the side of the SRB. This flame is said to have caused the 1.9 million litres of fuel in the the huge external tank (ET) to explode. The leak may be possibly due to several hours of subfreezing temperatures on launch day. Aviation Week and Space Technology, a space industry magazine, reported earlier that the flame caused the bottom of the SRB to veer out. Then the top of the booster rocket moved inward and crushed the top of the fuel tank which then exploded.

NASA has had troubles with the O-Rings since 1982 but did little to correct them. Since then the primary O-Ring has failed on 12 previous flights but the secondary O-Ring has always held out. NASA said it was no major problem because even if the primary failed there was always the secondary. Documents released by the agency showed that the reliability of those seals--even under normal temperatures--had worried NASA since 1982.

The seals could be ruptured by movement during a launch, the documents said. That meant they could not be classified a true back-up safety feature, as they had been originally.

In January 1983, the O-Rings were reclassified as an item of "Critically 1," the highest level of potential threat.

O-Ring failure, the reclassification document said, could lead to "loss of mission, vehicle, and crew, due to metal erosion, burnthrough and probable case burst resulting in fire and deflagration (intense burning)." NASA's concern also prompted research into how to improve the reliability of the rings, the documents said. Booster contractor Morton Thiokol designed 40 other solid rocket boosters because they believed the present ones were no good. Thiokol also recommended to NASA many ways to improve the seals. Included was to replace putty, which is over the joints inside the SRB before the O-Rings, with wire mess or teflon tape. During previous launches some NASA officials held their breath because they knew the entire Shuttle could blow up at any time.

The lowest temperature the O-Rings had been tested at was 45 degrees, manager of NASA's booster rocket program Lawrence Mulloy said, while the lowest temperature during 24 previous Shuttle

launches was 51 degrees. The temperature fell to 27 degrees the night before the Challenger launch and was 38 degrees at lift-off.

Physicist Richard Feynman, a member of the presidential commission, has theorized that the cold impaired the resiliency of an O-Ring, causing it to expand too slowly.

But Mulloy said an engineering analysis determined that "should we compromise the primary ring, the secondary would seat." On the basis of that, he said, Thiokol recommended launching.

The presidential commission ended two days of tours and closed-door meetings at the Kennedy Space Center (KSC) on February 14. They looked at rocket boosters, wreckage from Challenger and Launch Pad 39B. On February 13 the commission reviewed videotape and still photos released to the public that day which show a mysterious puff of black smoke curling around the right booster, from the back, at the area of the bottom seam. The smoke may be the putty and O-Rings burnt and blown out just after lift-off. Officials at NASA said the smoke appeared 1.4 seconds after the twin rockets began powering Challenger off the pad, indicating that the spaceship was doomed right at the start of its tenth and final flight.

On February 15 Aviation Week said it would report (next week) that a sensor used 90 minutes before launch found temperatures below safety limits on the right SRB. The magazine said NASA engineers are assessing whether the low temperatures might have been caused by cold liquid hydrogen fuel leaking from the external tank.

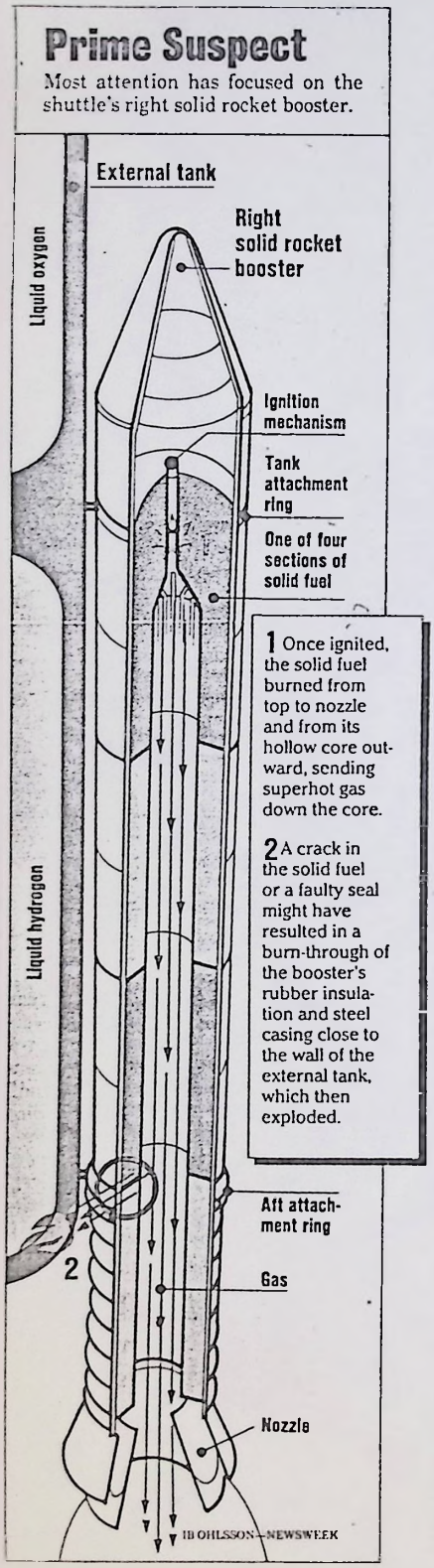
Aviation Week said an infrared sensor used by an inspection team 1½ hours before launch recorded a temperature of about -24 at two points on the right booster. This temperature is below NASA's flight safety limits.

NASA cautioned that its investigative team "has not ruled out any elements of the Space Shuttle system." It said, however, special emphasis is being placedon the operation of the boosters, the external tank and launch facilities.

"What the data means, you really don't know until all the information is in," NASA spokesman Hugh Harris said February 14. "They have not ruled out anything." NASA says that the failure of the seam may not even be the cause of the accident.

On February 15 it was reported that the computers on Challenger tried to divert the disaster 11 seconds before the explosion. NASA said the computers attempted to place the spaceship back on course but failed. The crew may have known of problems a second before the disaster, it was reported.

The president's commission said that the launch was flawed because engineers did know about the



cold temperatures on the right SRB but did not tell top NASA officials so the launch could be delayed. The presidential commission's conclusion that "...the decision-making process leading up to the launch of the Challenger...may have been flawed," came after a week of embarrassing disclosures. The blame is now being put on top NASA officials including the Program Manager, Mission Director, Launch Director, and Rocket Program Manager. The commission has barred certain contractors and key NASA personnel on NASA's internal investigating team from participating in the investigation. "They should never have been on the team in the first place," said a source close to the investigation to ABC NEWS. "It was not appropriate to have them there." The internal team is lead by Shuttle Director Jesse Moore. Some of his associates will also be affected. It could be 5 or 500.

The search for floating debris in the Atlantic Ocean has been called off and search teams are now scanning the ocean floor with sonar and submarines. On February 16 NASA announced that they believed they had found remains of the right SRB in water 1200-feet (366-metres) deep and 45 miles (72 kilometres) northeast of Cape Canaveral. Retrieval of the right booster may yield new clues as to what caused the Space Shuttle Challenger to explode 73 seconds after lift-off January 28 on its last fateful journey into space.

STATISTICS FOR EACH BOOSTER

THRUST AT LIFT-OFF
11 790 kilonewtons (2 650 000 pounds)

PROPELLANT
Atomized aluminum powder
(fuel), 16 percent

Ammonium perchlorate
(oxidizer), 69.83 percent

Iron oxide powder
(catalyst), 0.17 percent (varies)

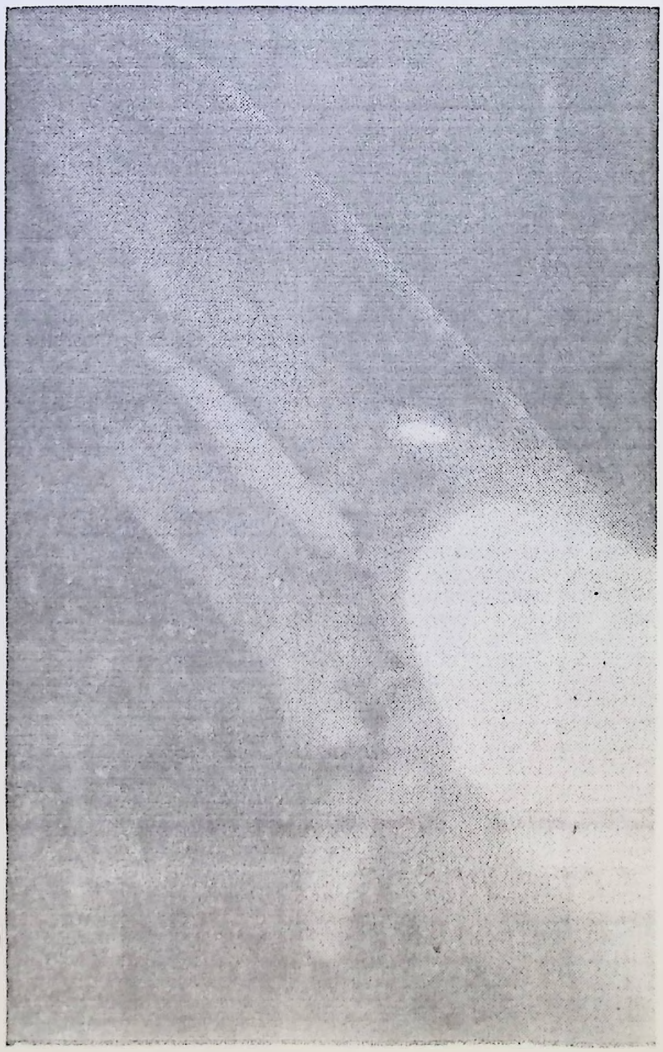
Polybutadiene acrylic acid
acrylonitrile (binder), 12 percent
Epoxy curing agent, 2 percent

WEIGHT

Empty:	87 550 kilograms (193 000 pounds)
Propellant:	502 125 kilograms (1 107 000 pounds)
Gross:	589 670 kilograms (1 300 000 pounds)

THRUST OF BOTH BOOSTERS
AT LIFT-OFF
23 575 kilonewtons (5 300 000 pounds)

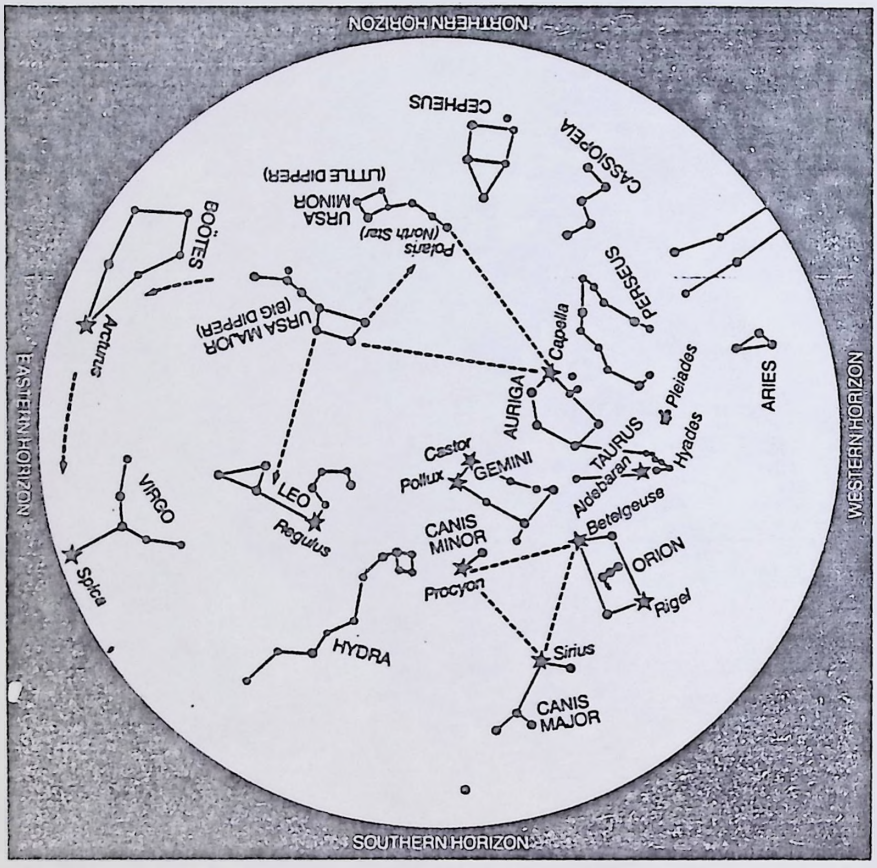
GROSS WEIGHT OF BOTH BOOSTERS
AT LIFT-OFF
1 179 340 kilograms (2 600 000 pounds)



A jet of flame shoots from ⟶
Challenger's right booster rocket.

MARCH SKY

1986



d	h	(Universal Time)
3	08	Saturn 5° N. of Moon
3	12	Last Quarter
3	20	Mars 4° N. of Moon
8	13	Mercury 5o N. of Venus
10	15	New Moon
11	15	Venus 1°.3 N. of Moon
13	09	Mars 0°.3 N. of Uranus
18	17	First Quarter
20	22	Spring Equinox
26	03	Full Moon
30	15	Saturn 5° N. of Moon

Planets: Mercury may be seen, with difficulty, low in the southwest just after sunset early in the month. At the end of March Venus is very low in the southwest at sunset. Look for Mars and Saturn in the early morning. Saturn rises about midnight; Mars about five hours before sunrise. On the 13th Mars is very close to Uranus and will help to locate the fainter planet. Use binoculars and look for a tiny pale disk in contrast to the points of light of faint stars.

HALLEY'S COMET

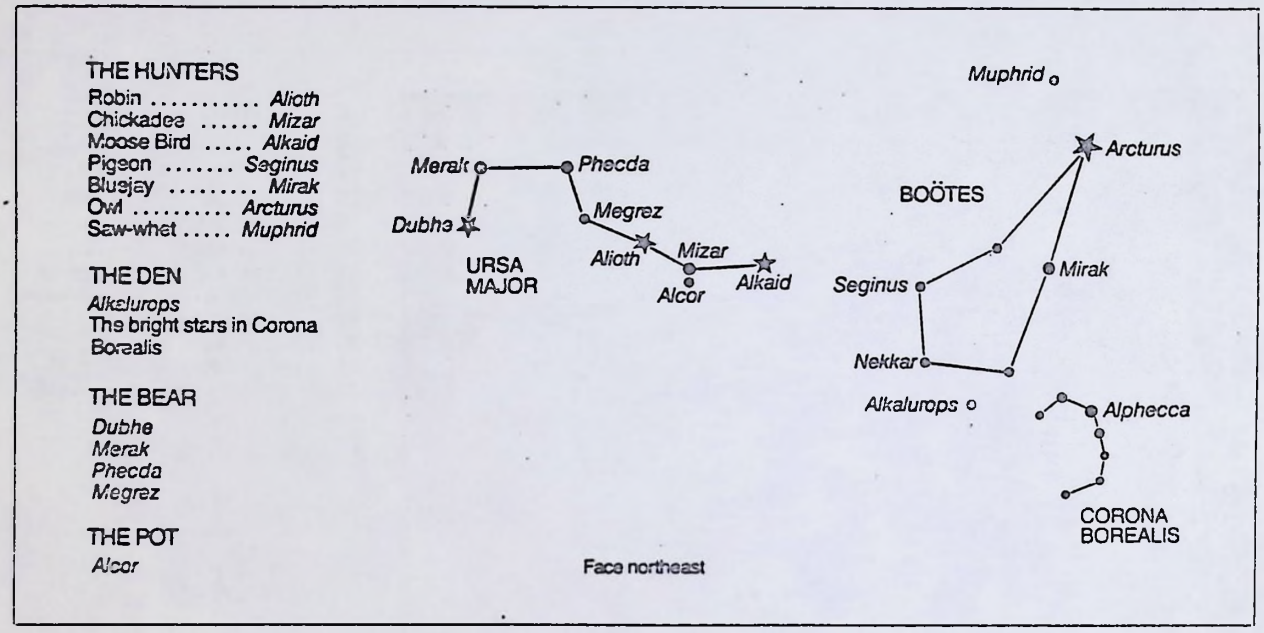
March 1986. The comet is visible low in the southeast before sunrise but our northern latitude is a severe problem. The moon may interfere before the 6th and again after the 22nd. Between these dates one might start looking near the horizon, somewhat north of southeast as early as two hours before sunrise. The tail rises before the comet head, slanting up and to the right, and the comet moves in this same direction as twilight progresses. The improved elevation of the comet above the horizon is gradually counteracted by the brightening sky and the best compromise may be 80 or 90 minutes before sunrise. North of latitude 49° the sky is not truly dark even at this time. In a dark sky there should be a straight bluish plasma tail toward the upper right with a whitish component due to dust, curving off to the left. As usual, binoculars add to the amount of detail to be seen.

National Museum of Science and Technology, Astronomy Division, 1867 St-Laurent Blvd., Ottawa, Ontario K1A 0M8
(613) 991-3077

National Museums of Canada Musees nationaux du Canada

Canada

Stars in the constellations Ursa Major, Boötes and Corona Borealis figure as characters in a legend of the Algonquin and Iroquois Indians - a tale of a Bear pursued by seven hunters. The following version of the legend is from Star Lore of All Ages, by William Tyler Olcott:



"The first hunter was called 'Robin' because that star has a reddish tinge, the second 'Chickadee' because its star is smaller than the others, the fifth hunter the Bluejay because its star is blue. Arcturus becomes the Owl because of its large size, and the star of the seventh hunter becomes the Saw-whet because its reddish hue suggests the brilliant feathers which mark the head of that bird.

"Close behind the second hunter is a little star (Alcor), which represents the Pot which he is carrying to cook the bear meat in. Just above the hunters is a group of smaller stars which represent the Bear's den.

"Late in the spring the Bear,waking from her long winter sleep, leaves her rocky hillside den and descends to the ground in search of food. Instantly the sharp-eyed Chickadee perceives her, and being too small to undertake the pursuit alone, calls the other hunters to his aid. Together the seven start after the Bear, the Chickadee with the Pot being placed between two of the larger birds so that he may not lose his way. All the hunters are hungry and pursue eagerly, but throughout the summer the Bear flees across the northern horizon and the pursuit continues. In the autumn one by one the hunters in the rear begin to lose their trail. First of all the Owl, heavier and clumsier of wing than the other birds, disappears from the chase, next the Bluejay and Pigeon lose the trail and drop out. This leaves only the Robin, Chickadee, and Moose Bird. At last about mid-autumn they succeed in overtaking their prey. The Bear at bay rears up and prepares to defend herself, but the Robin pierces her with an arrow and she falls over on her back. The Robin, in haste to feed upon the Bear, leaps upon his victim and becomes covered with blood. Flying to a maple tree near at hand in the land of the sky, he tries to shake off the blood, and succeeds in getting it all off save a spot upon his breast. 'That spot', says the garrulous Chickadee, 'you will carry as long as your name is Robin'. The blood which the Robin shook off spattered far and wide over the forests of earth below, and hence we see each autumn the blood-red tints on the foliage. The Chickadee now arrives on the scene and with the Robin cuts up the Bear, builds a fire, and cooks the meat. The Moose Bird now appears: he knew the others would catch the Bear and prepare the meat, and wanted only to be on time to share it. Whenever a bear or a moose or other animal is killed today you will see him appear to demand his share. That is why he is called 'He-who-comes-in-at-the-last-moment.'

"Through the winter the Bear's skeleton lies upon its back in the sky. But her life spirit has entered into another Bear who also lies upon her back in the den, invisible, sleeping the winter sleep. When the spring comes around, the Bear will again issue forth from the den, to be again pursued by the hunters. And so the drama keeps on eternally."