PRINTED MATTER

Orbit

Hamilton Centre RASC
BOX 1223
Waterdown, ON L0R 2H0

Orbit

January 1997 Volume 30, Issue 1

The Official Publication of the Hamilton Centre of the Royal Astronomical Society of Canada

CR399: The Coathanger

Yes, everyone's favourite cluster actually has a designation. Many will have seen the famous Coathanger in Vulpecula when looking for M27 or other deep sky delights.

Photo by David Lane

Contents:

Editorial

On behalf of the Hamilton Centre of the RASC, I would like to extend a hearty welcome to the many new members that have joined in the past few months. Personally, I am pleased to see so many of you getting involved with observing sessions, workshops, and sending me the occassional article. Welcome Aboard!

This month, we are trying a new format for Orbit, it is a little bolder, and there are some layout and organization changes. We are interested in knowing whether you prefer this format, the old format, or would be interested in a standard full-page newsletter, instead of the small book fold that we have been using for the past couple of years. Please pass your thoughts along. Due to the ever increasing workload that the folks that bring you Orbit have been facing in the last few months, we have been a little late getting it to you. On behalf of the team, I would like to extend our apologies.

There is a lot of work that goes into the production of each issue of Orbit. It all starts off at least 10 days before the next meeting. Usually, I send out a reminder to get articles in, and then as we get closer to press time, I send out another one indicating the deadline. Usually, that is when the articles start coming in. On average, I get contributions from about 5 to 10 members, either in the form of an article, or in the form of notices of upcoming events. Next, I layout the issue, and try to fit the articles into the available space. The contributors generally submit by email, diskette, or occassionally on paper. So, sometimes I have to get them to edit or translate their files into something I can work with. After the layout is complete, I produce a test copy, and check for errors, layout problems, etc. After final corrections, it is off to be duplicated. Duplication is done either by myself, John Kezys, or another volunteer. After copying, they get stapled together, sometimes at the meeting. Any copies left after the meeting go to Robin Allen. Sometimes, Bob Speck delivers them to Rob when he is unable to attend due to his work schedule. Les Nagy, our treasurer, supplies the updated membership list to Rob, in order to do the mailing labels. Rob then shrink wraps the Orbits, applies postage, mailing labels, and then delivers them to the post office. From there, it is left to Canada Post. As you can see, there are a lot of steps in the process. Next time you have an opportunity, you may wish to thank some of these individuals for the work that they do.

On another note, a number of us have been hunting for Comet Hale Bopp in the wee hours before sunrise, and a few folks have reported the beginnings of a tail, perhaps 0.5 degrees or so. But everyone is in agreement that it is getting quite bright, with the brightest estimates I have heard (and believe) running between around Mag 5.0 to Mag 3.8. Personally, I have been getting up too late ☹ to see it, or it has been cloudy ☹ when I am up early enough.. - *Colin Haig* ☆

Membership Application

Application for Membership in the Hamilton Centre of the RASC. Annual membership officially commences October 1. We welcome people of all ages, skills, and interests in things Astronomical. Please make your cheque payable to: "RASC Hamilton Centre" and mail to the Treasurer c/o the address on the back. Associate membership is for those in other Astronomy Clubs. Please state the club. Full members receive: The Observer's Handbook ($20 value), Journal of RASC ($70 value), SkyNews ($22 value), and many other great privileges, including discounts on popular magazines, supplies and cool stuff. There is a Free 3 month Trial available - send no money! Info: Leave a message at: (905) 689-0266. ☆

MEMBERSHIP INFORMATION	
NAME:	
ADDRESS (1/2):	
ADDRESS (2/2):	
CITY:	
POSTAL CODE:	
DAY PHONE:	( )
EVE PHONE:	( )
E-MAIL:	

PAYMENT OPTIONS		
ADULT	**@ $49.00**	
ASSOCIATE	**@ $30.00**	
YOUTH (under 21)	**@ $35.50**	
VOLUNTARY DONATION:		
TOTAL:		
Circle one:	**NEW Member**	**RENEWAL**

Hamilton Centre Info

and Calendar of Events

Monthly Meetings are held by the Hamilton Centre at McMaster University Medical Centre Ewart Angus 1A4 8pm.
Feb. 6 - Speaker: Tim Griffis - The Role of CO_2 in Planetary Atmospheres
Upcoming Speakers
Mar. 6 - Bruce Collier - The Aurora and AIr Glow
Apr. 3 - Dr. Dennis Shaw - Is (Was) There Life on Mars?

Observatory Directions: From Hamilton or Guelph:

- Hwy 6 N of Hamilton, take Concession 7 East eastbound, cross Centre rd.
- Continue on 7E, keep going past the rail tracks, proceed to near the end.
- Our gate is on the south side on the last lot (south west).

From Mississauga or Milton:

- Britannia Road past Hwy 25, Guelph Line, Cedar Springs to end
- South 1 block on Milborough TownLine to Concession 7 East.
- Our gate is on the south side on the last lot (south west)

Hamilton Centre Observatory 43° 23' 26" N 79° 55' 22" W

NAME	Phone	Email Address
Observatory	689-0266	http://ad-here.com/RASC/
Astronomy emailing list	subscribe	bigbang@ad-here.com
Past President: Roger Hill	878-5185	roger@ad-here.com Fax: (905)878-3974
Secretary: Dave Coulson	634-4436	
General: John Kezys	648-5542	kezys@operatns.mohawkc.on.ca
Education: Carmen Martino	643-7283	
President: Rich Petrone	547-2589	petrone@ physun.physics.mcmaster.ca
Councillor: Les Nagy	387-0690	lnagy@netaccess.on.ca
1st VP:Mike Jefferson	648-8919	
Curator:Ellen Ricks		
Librarian/Recorder: Ray Badgerow	692-4184	667883@ican.net
Editor: Colin Haig	577-4074	chaig@vizbiz.com

The President's Monthly Report

Well have we all had our fill of turkey, and food in general by now? I hope everyone had a great holiday season, which obviously excluded any observing off of the internet. You are probably getting tired of me complaining every month about the miserable weather and lack of clear skies. I feel that I must, however, continue to whine every month until the weather improves so that I can actually write about some observing. Given the lousy weather, new members and keyholders must be eagerly awaiting some clear skies so that they can get out to the observatory and start using the facilities that they are supporting. For that matter, I am beginning to forget what the place looks like myself. Maybe that radio astronomy stuff really is a good idea for the club, weather wouldn't be stopping us there.

While on the topic of the observatory, I'll make my token reminder to new and old members to get out and use the place. Since equipment is constantly being changed and upgraded, its a good idea to keep using the place to keep abreast of what is being used and how to use it. New members, as well, should be reminded that key are here for the taking. All that is required is a paid membership (associate, youth or RASC), $20 fee and a very brief training session to obtain a key. For those who do not want a key but still want to use the site, just give our observing hot line or observatory a call, of phone myself or any other board member, to find out when there will be someone there with a key. Now would be a great time to come out and learn what we have and how to use it for the upcoming, and the oh-so quickly approaching, apparition of comet Hale-Bopp. Anyone interested in helping out with our participation in NASA's comet watch should talk to Colin Haig or Roger Hill. This should be done soon so that they can offer you a crash course in the use of our CCD camera before the comet.

How to Get a Key to the Leslie V. Powis Observatory

Become a member RASC, Youth, or Associate

Get trained on the facilities

Pay $20 for the key

Observe Any Time

An active winter season is well underway for the club, despite the lousy weather. Doug Welch of McMaster University is our speaker for our January general meeting. Doug will be talking about variable stars. This is an area in which the Hamilton Center was once very active. We have our own solid state photometer, which is very easy to use, and numerous telescopes and binoculars as well as all the necessary star charts and resources available to make this very interesting part of the hobby accessible to everyone. Perhaps after hearing Doug's talk interest in restart a variable star section in the centre will be rejuvenated. For our February general meeting, we will have a colleague of mine, Tim Griffis also from McMaster University who will be speaking on the importance of

carbon dioxide in planetary atmospheres. March's general meeting will have Bruce Collier once again bringing his light show to the centre to speak about upper atmospheric phenomena (such as the air glow and aurora). Anyone who hasn't seen Bruce speak before should not miss our March meeting, its usually a spectacular show. For our April meeting we will be returning to our Mars theme, with Dennis Shaw of McMaster University. Dr. Shaw is a meteorite expert with the Department of Geology and Meteoric society who speak on the possibility of life on Mars (Past, present or future) and the Martian meteorite. Saturday, January 18 there will be a discussion group at the observatory on "Weather Prediction for the Amateur Astronomer Using the Internet". In February, there will be a workshop at the observatory on astrophotography, which will focus on the basics needed to get started, just in time for Hale-Bopp. Yes, CCD imaging has not killed photography yet, not by any stretch. This promises to be a great workshop with some old great names in astrophotography helping out. The date for this workshop will be in the next issue of Orbit.

The club is still looking for a couple more volunteers to help out with our public education program. We need people to help out with show at the observatory and at the planetarium at McMaster. Experience is not necessary since we will do all the training. Also, the club could use someone to help out with PR and advertising. All that this will require is a couple of faxes sent out once a month to the local TV stations and newspapers, and help with our posters. Anyone interested in helping out with either of these two jobs should contact myself or see me at one of the meetings.

An important note for the next couple of months, is that our meetings will no longer be held in Room 1A6. From January to June, 1997, we will be in Room 1A4 (across the hall from 1A6). For those who have been around for a couple of years, this is our old meeting room. However, starting in September 1997, we will be moving our general meetings from McMaster to the Hamilton Spectator Building auditorium. As the time approaches, we will put detailed directions for the new location in Orbit.

Well, I've talked for too long. I hope to see you at the meeting and discussion group. Remember to hang by your thumbs and happy observing!

Cheers,
Richard Petrone
547-2589
petronrm@mcmail.cis.mcmaster.ca

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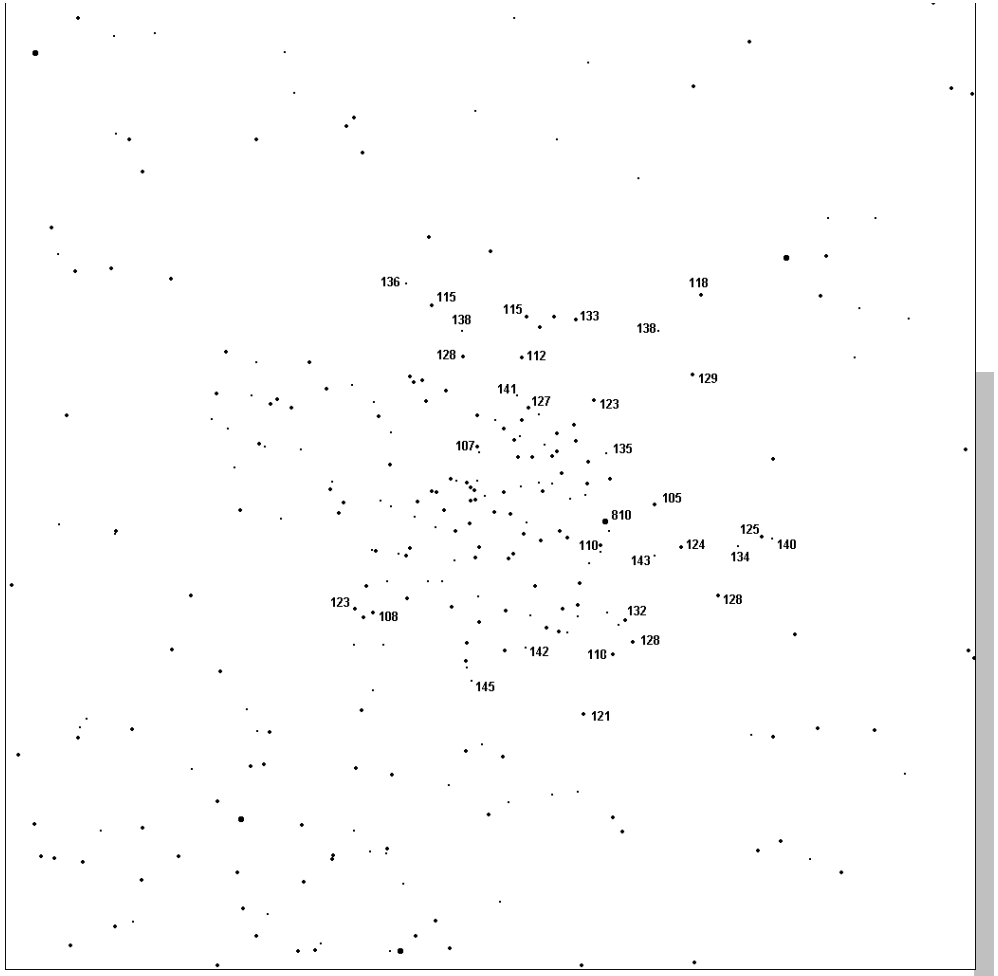
no decimal points are used. So, a star designated in the chart with a value of "56" is of Magnitude 5.6. Stars designated "143" are Magnitude 14.3.

- Editor ☆

Figure 2: M52

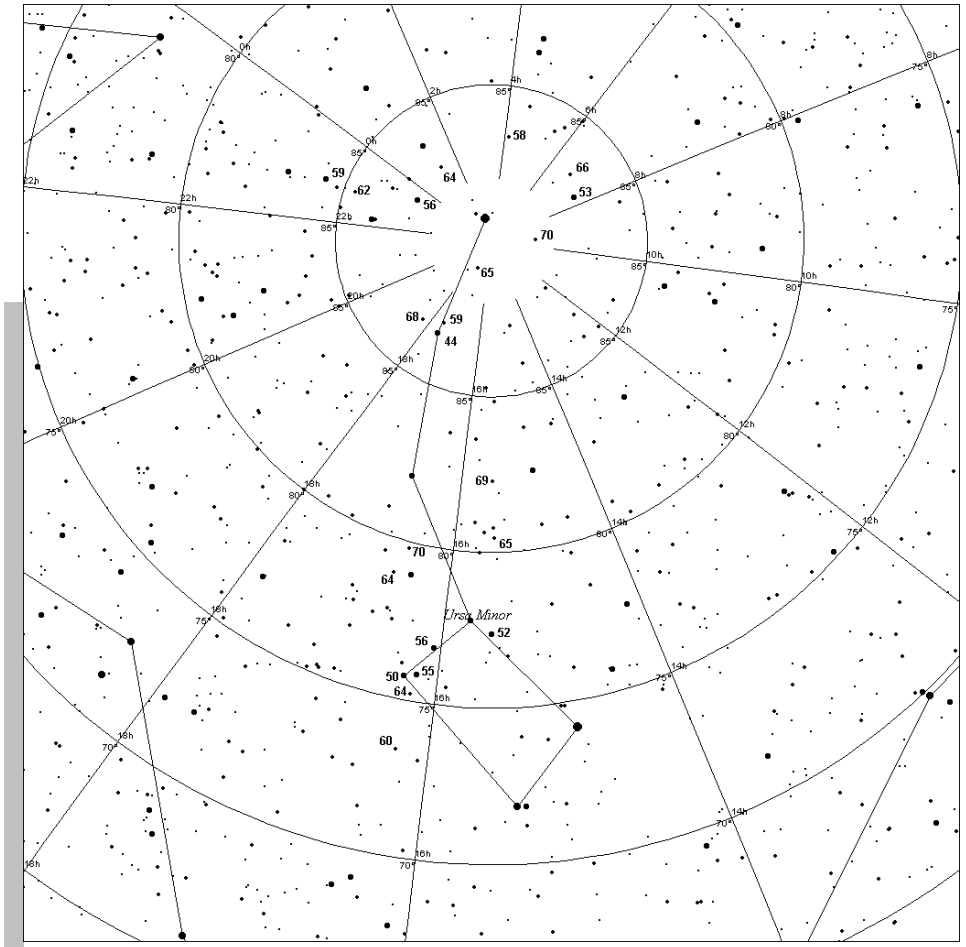


Limiting Magnitudes

Les Nagy brought us a great article a couple of months back on the whole issue of visual acuity, and limiting magnitudes. Printed below and on the opposite page are larger versions of the charts that Les had supplied.

Magnitudes are indicated beside their corresponding stars. Note that

Figure 1: Ursa Minor



Minutes of December General Meeting

Richard Petrone opened the December 5, 1996 meeting at 8:08 pm in McMaster Medical Centre Room 1A6,and commented about the cloudy weather. There was a good discussion group about Mars. There will be an introductory CCD session Sunday, December 22 at 2 pm. Doug Welch from HAA told us that they will have Dr. Derek Ford next Friday talking about the surfaces of Mars and Venus. Our January meeting is the 2nd Thursday, Jan.9 the speaker will be Doug Welch on Variable Stars. We have Rm. 1A4 from February to June, and then go to the Spectator auditorium in the fall. Another workshop will be held at the Observatory at 8pm on January 18th, on the Internet and Weather Forecasting for Amateur Astronomers. Ray Badgerow will sell back issues of Sky and Telescope after meeting. Curator, not here but doing an inventory. Our main speaker was to be Doug George, but he could not make it so we have Les Nagy and Doug Welch instead. Les talked about Telescope Collimation and other fun stuff. He remarked that the only person to use the observatories voice mail was Bert Rhebergen. Les showed the effects of poor collimation ,with special attention to Newtonians since more problems happen to them. He explained that collimating SCT's is difficult since the parts are glued in,and finished off with aligning binoculars, and asked about doing a collimation workshop. To contact Les for details call at **389-9028 Dial #111#**. Les was greeted by thunderous applause,and answered people's questions. Doug Welch brought a slide set called The Sun in Action,and also answered questions during his talk. Richard thanked both Les and Doug for their talks. Mike Ricks mentioned 2 star parties in Florida. He will send an application to a Tampa Star Party for anyone interested. Dave made up some new membership packages. Steve Barnes,a new member is opening a new astronomy store in Burlington. Pick up some brochures at front. The meeting was adjourned at 9:45pm. - *Ray Badgerow*☆

Checking your Secondary Mirror

Les Nagy found this handy program for checking or designing the secondary mirror for Newtonian telescope:

http://webspace.com/markv/files/newt20.zip

Return to Mars

The year 1996 represents a new beginning in our study of the Red planet Mars. This is being done in the light of possible extinct life on the planet,and an international commitment to explore this planet prior to any human landing there in the next century. During the current launch window (Nov.5-Dec.5) 3 probes will be

sent to Mars to study its surface,climate,atomsphere,and interaction with the Sun. There is a plan to send at least one orbiter/lander combination to Mars at each launch window every 25-26 months until 2005. The earliest sample return mission will not be until 2003. Here are details of the three spacecraft leaving for Mars this year.

Mars Global Surveyor

The *Mars Global Surveyor* will be launched from Cape Canaveral, Florida aboard a 7925 Delta 2 rocket November 6,1996. It will arrive at Mars on September 16,1997 and will enter into a highly elliptical 48 hr orbit about the planet. For about 6 months thereafter the spacecraft will dip into the planet's upper atomsphere to slowly shrink its orbit into a circle(400 km,188 min,polar) above the Martian surface. MGS is the replacement for the ill- fated *Mars Observer* and will carry 5 of the 7 instruments. These include the
Mars Orbital Camera(mapping the surface),Thermal Emission Spectrometer (measure atomspheric temperature/pressure,surface composition),Magnetometer/ Electron Reflectometer (search for and measure any Martian magnetic field), Laser Altimeter (measure surface topography), and the radio transmitter for gravity measurements and probing the atomsphere. In addition,MGS will serve as a radio relay for Russian and American landers. The mission is scheduled to last for 1 Martian year or 2 Earth years. For more details go to the *Mars Global Surveyor* web site at **http://mgs.www.jpl.nasa.gov/.**

Mars '96

The *Mars '96* probe will be launched from the Baikonaur launch site in Kazakstan on November 16 aboard a Proton rocket to explore the red planet. This mission consists of an orbiter,and the 4 descent modules it will carry to the Martian surface:2 small automonous landers and 2 penetrators that will pierce the surface. Its purpose is to study the processes responsible for the evolution of the martian surface, atomsphere, and climate. The spacecraft at launch will have a mass of 6,700 kg of which 3,000 kg will be fuel and 550 kg will be scientific instruments. For comparison, *Viking's* mass at launch was 3,530 kg. The orbiter carries 12 different instruments to study the martian surface and atomsphere, plus 6 instruments to measure the plasma enviroment and solar wind;there are also 4 astrophysical experiments.
The 4 small stations and penetrators will each carry up to 10 tiny instruments. The spacecraft will take approximately 300 days to reach Mars,and will make three orbital maneuvers before settling into a highly elliptical 43.09 hr orbit on September 10, 1997. Some 3-5 days before reaching orbit, the two 75 kg small stations will split off and hard land on the surface. They will take pictures and examine the surface. The 2 penetrators will remain attached to the orbiter for another month before being released. They too will study seismic activity and magnetic fields as well. For more in-

Bob's Comet Thoughts

Back in about April or so, I was quite content to sit back and reflect on how great comet Hyakutake was. Now as Hale-Bopp is "going on sabbatical", there's a chance to sit back and reflect for a little bit.

One of the fun things that HB has which Hyakutake apparently missed, is the nutters that have crawled from the woodwork. This recent nonsense about the 'mystery object' has been quite entertaining, and I've taken a few whacks at the heathens myself.

One person posts that he sees no reason why alien craft couldn't position itself in front of the comet. He also accused people of jumping to conclusions and closing the book on the object being anything other than a star. Seeing that he obviously had first hand knowledge of the capabilities of this alien craft, I asked if he could possibly share some of his knowledge of interplanetary travel with us. I might have made reference to John Q. Gullible's predilection for following the conspiracy theory of the moment, and I really don't recall if I mentioned that only the simplest country rube could be sucked in by such a lame ploy as this.

I might have also made mention that most of us assume that a stellar displaying a spectral signature of its type is exactly what we assume it to be. I added that until we see evidence that HB's "companion" is anything other than what we expect it will be...well you fill in the rest.

"Just more scientific Drivel" was the reply. Isn't astronomy fun? Anyone on BigBang got any favourite whacko stuff they want to pass on for posterity ? I'm actually looking forward to looking back on this period... a time like 'back in the good old days', when da bruddah's was sellin' comet pills to Huck 'n Jed.
- *Bob Botts* (bob.botts@ghbbs.com)☆

tians today is that the divine intent of Genesis was not to communicate natural science, but to teach the fact that the God of Scripture is Creator and absolute Sovereign over the Cosmos.

John Kezys
kezysj@operatns.mohawkc.on.ca ☆

Buy, Sell, Swap

Members and Friends of the Hamilton Centre may advertise personal items for buy, sell, swap at no charge. A $2-$5 donation to cover postage is appreciated. Businesses and Organizations may purchase a Business card ad for $20, or larger ones by contacting the editor.

For Sale: From Joe O'Neil, London Centre

There's a refractor out there with my name on it..Can't get it out of my mind. However, my wife has made it clear to me that "no more toys" untill I clear out some of my existing stock. So here's a list of stuff I have for sale. Canadian dollars, shipping extra, bottom line price, no haggling. If I have to sell it for less, it's not worth selling, and I hate haggling anyhow.

Coulter Dob - 8 inch, F4.5 with rack & pinion focuser. About 7-8 years old, in good shape, taken it everywhere from Algonquin park to the Blue Ridge mountians. $350

Parks 8x50 wireless illuminated finder scope. $150

Celestron Ulitma 12.5mm, 1.25" eyepice, with rubber eyecup. Excellent shape - hardly used. I bought a 12mm Nagler about 6 months after I bought this, so it just collects dust. $100

Thousand Oaks Solar Filter - fits C90 Hardly used. $80

VE Digitrack 12V DC converter to 110 V AC (1.5 amp) use 120 V off a car battery $50

Omcon RV Visual Equitorial Mount It has 4" ID mounting rings on it, will handle realistically a 6" newtonian $100

I have discounted the prices on everything form what I originally paid for them. For example, new Coulter 8" is $399 US plus conersion plus shipping plus GST, etc,etc.

Drop me e-mail or call voice. Joe O'Neil
joneil@obs.empath.on.ca
(519) 679-8840

For Sale:

TeleVue Genesis 4-inch f/5 fluorite, 2-inch focuser 26mm Plossl, 22mm Panoptic Barlow Interface Dual drives, 2-inch barlow, photo-adapter tubes StarBeam finder, Piggyback camera mount

Worth over $6K new. Asking $3800.

Contact: Jack Whorwood, (905) 525-9140 x24181

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formation on this complex mission go the *Mars'96* web site at **http://www.iki.ru/mars 96/mars 96hp.html** . *[Ed. Note: The Mars '96 probe failed to escape earth orbit shortly after launch due to the failure of the rocket booster stage. The probe came crashing back to earth, the mission a failure, repeating Russia's bad luck going to Mars]*

Mars Pathfinder

On December 2,1996 the *Mars Pathfinder* spacecraft will take off for Mars on its way to a landing next July 4th. This 850 kg spacecraft will be the first since *Viking* actually land on the planet and deploy an automated rover. MPF is the second of NASA's Discovery program and to keep costs down it will reach the surface directly rather than going into orbit. The descent stage will separate from the cruise module 30 minutes before landing, and atomspheric entry will begin followed by parachute deployment. As it descends , the lander will be lowered on a tether beneath the backcover that protected it in space. Just before landing, 3 small rockets on the backcover will fire, protective airbags will inflate, and the tether will be cut. The air bags will absorb the shock of the landing, and will deflate after landing. The lander will then open like a flower righting it and exposing the solar panels. Its rover named *Sojourner* will then take off to explore the Martian surface. The lander carries 3 science instruments (lander imager, alpha proton X-ray spectrometer and atmospheric structure instrument / weather package). The lander can survive for at least 30 sols (martian days; 7sols=7.2 earth days). The rover may last several months. The *Pathfinder* landing site is located at the mouth of a flood channel Ares Vallis (19.5 deg N, 32.8 degrees west, 2 kilometers below Mars datum) about 800 km from the *Viking 1* site. All images from the lander and rover will be available on the internet after reaching Earth. The MPF home page is **http://mpfwww.jpl.nasa.gov/.**

- Ray Badgerow ☆

Mars Web Sites

Mars Global Surveyor
`http://mgs.www.jpl.nasa.gov/`

Mars 96
`http://www.iki.ru/mars96/mars96hp.html`

Mars Pathfinder
`http://mpfwww.jpl.nasa.gov/`

Winnipeg Centre Online

To cut down on the ever increasing cost of producing and mailing our Centre newsletter we have produced a online edition of Winnicentrics that is identical in content to the print edition. The idea is that those of us that can surf could recieve the issue electronically and cut down on the paper use, photocopy and mailing expenses. So I ask that you could check out the online edition located at: http://home.cc.umanitoba.ca/~ajacks/winnie.html Thanks, Andora Jackson, Winnipeg Centre

Warped Space

An Occasional Humour Column

The sun is hollow. Recent discovery of short-period pulsing on the surface of the sun, especially five-minute oscillations in which adajacent zones are moving in oposite directions radially, are being studied by the Global Oscillation Network Group (GONG.) This group in their self-named CD album made the point that the sun resembled a percussion instrument and was probably hollow like a drum. The group intends to pursue their application of pop music principles to astronomy in a weekly program called "The Gong Show." They are now working on their next CD, with an explosive hit single called "Big Bang." The album is provisionally entitled "The Music of the Spheres," and dedicated to Kepler.

Astronomers of the main sequence called on the Royal Astronomical Society Hamilton Centre to rebut this bass-less allegation. If the sun was hollow, the shell would have to be very dense to account for all of its mass, perhaps like an inflated white dwarf or an extremely thin-shelled neutron star. Such a shell might be easily punctured by falling objects such as asteroids, if solid matter were not vapourized many miles above the surface. The RASC group approached the United States Government, which spends hundreds of millions of dollars on make-work projects for Russian scientists formerly employed in the Soviet defense industry. Their proposal is a Solar probe made of pure Tungsten, which vapourizes at 5,900C, a comfortable 393 degrees above the temperature of the Sun's surface. This probe is to be designed after armour-piercing antitank ammunition. Launched at the sun and leaving its boosters behind, it will attempt to puncture the solar shell. No large pop on impact would disprove the GONG theory.

The GONG reacted in horror, and decried the "wannabe pop-stars." Main sequence astronomers also questioned the wisdom of injecting a mass of heavy metal into the sun since no-one really knew what reactions were going on in the centre. The GONG responded that heavy metal was in fact central. The Zurich-based world Gallium cartel also objected, saying that if the probe interfered with high-energy neutrino production in the sun the world market for detector Gallium would collapse leaving thousands jobless. The Durand neighborhood group in Hamilton began a petition against the project, recalling ratepayers' experience with falling pices of cargo aircraft, and asking "do you want your house hit with fragments of white dwarf star? A piece as small as a thimble is as heavy as a pickup truck."

Richard Petrone, in a telephone call to Cross-Country Checkup, told Rex Murphy that if the sun was hollow then all the stars probably were, since the sun was considered a "typical" star. Novas and supernovas could be reinterpreted as popping stellar bubbles and white dwarfs and neutron stars as the gummy residue. Black holes could be interpreted as stellar bubbles popping inside-out, with the event horizon similar to the inside view of an intact star. Herbig-Haro objects were stars in the process of being inflated, still leaking at the poles. It was known that in their last stages stars were inflated to Red Giants, with shells larger than Mars' radius, before

Biblical Cosmology

The Existence of the Firmament

In the Bible, the Book of Genesis presents an interesting vision where God said, Let there be a firmament in the midst of the waters and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament. And God called the firmament Heaven, And God said, Let the waters under the heaven be gathered together unto one place and let the dry land appear. And God called the land earth and the waters the Seas. This watery imagery is not unique. Ancient Egyptian Cosmologists described the Nu which consisted of a primordial liquid mass in the limitless depths of which floated the germs of things. Once the sun shone the warers separated into two masses. The one gave rise to the rivers and ocean; the other, suspended above, formed the vault of heaven where the stars were observed to float. The ancient Greek astronomer Thales (624 to 547 BC) claimed that in the beginning there was only the primordial mass of water and over time other matter separated from this sea. Now the earth floats as a flat disk or cylinder.

Biblically, the earth is arched over with a solid firmament. The universe resembles a simple house with the earth as the ground floor and the firmament as the ceiling beneath which God suspends the sun to rule the day and the moon and stars to rule the night. Waters or seas lie both above the firmament and beneath and surrounding the square or rectangular earth. Waters are let down upon the earth by the Lord and his angels through the "windows of heaven." And why not? This model accounted nicely for rainfall and explained why the sky is blue (the colour of pure water).

Indeed it was thought to be a necessary part of the Christian faith to believe in accordance with Genesis that there was a real body of water above the solid sky. So far was the church from questioning this concept of a body of water above a solid firmament that when unbelieving skeptics asked how water could be held in place above a revolving hemispherical firmament, the church fathers came up with apologetic answers rather than change the concept, albeit St. Basil in the fourth century introduced the possibility that there were two firmaments, one below the sun in the form of condensed air with the water above this second firmament being clouds. St. Augustine thought St. Basil's innovation was fine, but nevertheless insisted that there was water above the starry firmament as well.

This understanding of the cosmos was enforced by the Church and any deviation from the literal and the established interpretation of the bible was met with censure. Finally, with the introduction of the telescope at the beginning of the 17th century, the cosmological authority of the church met its challenge. Observational evidence was finally accepted and the metaphysics was discarded. Admittedly the position of Chris-

Jan 20 - Comet Hale-Bopp Crosses the Orbit of Mars
* Jan 20 - Asteroid 324 Bamberga at Opposition (10.4 Magnitude)
Jan 21 - Asteroid 1994 PC1 Near-Earth Flyby (0.0651 AU)
* Jan 21 - Asteroid 1542 Schalen Occults PPM 118657 (9.1 Magnitude Star)
* Jan 22 - Asteroid 50 Virginia Occults PPM 156720 (9.8 Magnitude Star)
Jan 22 - 5th Anniversary (1992), STS-42 Launch (Columbia), International Mi
Jan 23 - Iridium-2 Delta 2 Launch
Jan 24 - Asteroid 16 Psyche Occults 7.7 Magnitude Star
Jan 24 - Mercury At Its Greatest Western Elongation (24 Degrees)
Jan 25 - Asteroid 1989 UQ Near-Earth Flyby (0.2286 AU)
* Jan 27 - Asteroid 471 Papagena Occults PPM 073029 (9.5 Magnitude Star)
* Jan 27 - Asteroid 168 Sibylla Occults PPM 156600 (7.8 Magnitude Star)
Jan 27 - 30th Anniversary (1967), Apollo 1 Fire
Jan 28 - Nahuel-1A/GE-2 Ariane 4 Launch
Jan 28 - Galileo, Solar Conjunction Ends
Jan 28 - Mars Occults 7.2 Magnitude Star
* Jan 29 - NEAR, Trajectory Correction Maneuver #4 (TCM-4)
* Jan 29 - Lewis LMLV-1 Launch
Jan 29 - Minuteman III Launch
Jan 30 - Comet 1996 R2 (Lagerkvist) Perihelion (2.4783 AU)
* Jan 30 - Asteroid 24 Themis at Opposition (10.6 Magnitude)
* Jan 31 - Asteroid 48 Doris at Opposition (11.0 Magnitude)
Jan 31 - Possible Mercury Occultation of SAO 187956 (9.3 Magnitude Star)

February 1997
Feb ?? - Hot Bird 3 Launch
Feb ?? - Mabuhay-1 Long March Launch (Philippines/China)
Feb ?? - Intelsat 801 Ariane 4 Launch
Feb 01 - Venus Passes 1 Degree South of Neptune
Feb 01 - Asteroid 20 Massalia Occults 9.4 Magnitude Star
Feb 02 - 20th Anniversary (1977), Burnup of Salyut 4 Space Station (USSR)
Feb 03 - Comet Russell 4 Perihelion (2.23 AU)
* Feb 04 - Mars Pathfinder, Trajectory Correction Maneuver #2 (TCM-2)
Feb 04 - Soyuz TM-25 Launch (Russia)
Feb 05 - 30th Anniversary (1967), Lunar Orbiter 3 Launch
Feb 06 - Galileo, Orbital Trim Maneuver #19 (OTM-19)
Feb 06 - Comet Holt-Olmstead Perihelion (2.15 AU)
Feb 06 - Venus Passes 0.3 Degrees South of Jupiter
Feb 06 - RASC Hamilton Centre Meeting 8pm MUMC 1A4 ☆

they exploded. Studies of meteorites had indicated that space was full of small globules of material created by supernovas, reminiscent of droplets from bursting gum-bubbles. The missing neutrino problem might easily be solved with this theory. Astronomers had been modelling stars as having high-temperature fusion reactions at their cores, the heat from which slowly escaped by radiation and convection to the surface. However if the heat originated in lower temperature reactions in a thin surface, there would be fewer high-energy neutrinos produced. Murphy said the whole thing left him Hertzprung.

Several particle physicists announced that such a theory required the existence of a hitherto unsuspected "sticky force" to hold the thin shell together with incredible surface tension. They pointed out that sunspots resembled leaks emitting solar prominences, but they mysteriously re-sealed themselves. The Maunder minima could be related to fluctuations in this force. Somehow related to magnetic lines in the solar leaks, this force would be manifested in a form of gluon particle. They had applied to Uniroyal for funding to build a detector consisting of 500,000 tonnes of brie inside the cone of an extinct Hawaian volcano.

A Creationist spokesman on CBC Magazine said that finally science had proved the existence of God, because no mortal force could inflate all those billions and billions of stars in only a few days. Another interviewee on the program, representing the Humanist Association, said that he had always wondered who was blowing up the bubbles in his ginger ale. This discussion, the only one to date on the causes of stellar inflation, was stimulating but inconclusive, much like discussions of its earthly counterpart.

(Within a day or two the story had exceeded the attention span of all but 0.003% of the population, and it was replaced in the headlines by the Ontario Court of Appeal ruling on the Gwen Jacobs case.)

- *Douglas Monk*
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Texas Star Party

The kind folks in Texas have sent us a note on their upcoming Star Party:

The 1997 Texas Star Party will be held near Leakey Texas on May 4th-11th. We have recently placed color pictures showing some of the facilities of our new site at Alto Frio onto our Internet web-page at: http://www.metronet.com/~tsp/ You can view them directly at: http://www.metronet.com/~tsp/afbpix.html We look forward to seeing you all in May at TSP 97!

- Texas Star Party Staff

Carl Sagan:

Touched Billions of Lives, Dead at 62

[Condensed from an American Press article -Ed.]

SEATTLE (AP) - Astronomer Carl Sagan, a gifted storyteller who extolled and explored the grandeur and mystery of the universe in lectures, books and an acclaimed TV series, died today of pneumonia after a two-year battle with bone marrow disease. He was 62. Sagan, who lived in Ithaca, N.Y., helped transport an ivory tower realm into the living rooms of ordinary people, enthralling millions with his vivid writing and flamboyant television soliloquies.

His achievements included:

- 1978 Pulitzer Prize for Literature for ``The Dragons of Eden: Speculations on the Evolution of Human Intelligence."
- 1980, his 13-part Public Broadcasting Service series ``Cosmos" became the most-watched limited series in the history of American public television, a record since surpassed by ``The Civil War."

Aside from his flair for making scientific ideas comprehensible and exciting, Sagan built up an impressive research record and always insisted that scientific investigation was his top priority. In his early 20s, Sagan deduced from experimental models that Venus, long considered a habitable planet, was actually a foreboding place with a surface heat of about 900 degrees. While teaching astronomy at Harvard in the 1960s, he established that fierce winds that sculpted the landscape, not seasonal changes in vegetation, explained the bright and dark patterns detected on Mars. Harvard never offered him tenure, so when Cornell University in Ithaca asked in 1968 if he would set up a laboratory for planetary studies, Sagan promptly accepted.

Having helped design robotic missions for NASA since the late 1950s, Sagan made use of space-mission data in lab simulations to draw lessons about dust storms on Mars or the greenhouse effect of Venus.

Born in New York City on Nov. 9, 1934, Sagan said he had fully expected to follow his Russian-born father into the garment industry but began to chart a career in astronomy while at high school in Rahway, N.J. He earned a physics degree from the University of Chicago in 1954 and a doctorate in astronomy and astrophysics in 1960. He was appointed lecturer and assistant professor of astronomy at Harvard in 1962. In 1971, he became a full professor at Cornell, where his campus lecture series drew standing-room-only crowds.

Sagan was a firm believer in the existence of extraterrestrial intelligence, noting that organic molecules, the kind that life on Earth is dependent on, appear to be almost everywhere in the solar system. Finding out whether mankind is alone, or not alone, he believed, is one of the world's most important puzzles. ☆

Space Calendar

Courtesy of NASA

http://newproducts.jpl.nasa.gov/calendar/

There's Something Happening Just about Every Day!

[Note: M = Magnitude, Occ. = Occults]

January 1997

Jan ?? - USAF Titan 4B Launch (1st Launch of Titan 4B)
Jan ?? - Indostar 1 Launch (Indonesia)
* Jan ?? - Early Bird Cosmos Launch (USA/Russia)
* Jan ?? - DFH-3 Long March Launch
* Jan ?? - LMLV Launch
* Jan ?? - Iridium-1 Launch
Jan 03 - Earth at Perihelion (0.983 AU From Sun)
Jan 03 - Quadrantids Meteor Shower Peak
Jan 04 - Galileo, Orbital Trim Maneuver #18 (OTM-18)
* Jan 04 - Mars Pathfinder, Trajectory Correction Maneuver #1 (TCM-1)
* Jan 06 - NEAR, Trajectory Correction Maneuver #3 (TCM-3)
* Jan 06 - Asteroid 363 Padua Occults PPM 095207 (7.6 Magnitude Star)
Jan 09 - Jupiter Passes 0.8 Degrees from Neptune
Jan 09 - RASC Hamilton Centre Meeting 8pm MUMC 1A4
Jan 10 - Galileo, Solar Conjunction Begins
Jan 10 - Asteroid 1991 VK Near-Earth Flyby (0.0749 AU)
* Jan 10 - Asteroid 892 Seeligeria Occults PPM 184042 (9.4 Magnitude Star)
Jan 11 - 210th Anniversary (1787), William Herschel's Discovery of Uranus Moons Titania and Oberon
Jan 12 - STS-81 Launch, Atlantis, 5th Shuttle-Mir Mission, SPACEHAB
Jan 12 - Comet Shoemaker-Levy 4 Perihelion (2.02 AU)
Jan 12 - Mercury Passes 2.7 Degrees North of Venus
* Jan 13 - Asteroid 1248 Jugurtha Occults PPM 097898 (9.4 Magnitude Star)
* Jan 14 - Asteroid 656 Beagle Occults PPM 118203 (9.8 Magnitude Star)
Jan 16 - GPS-2 Delta 2 Launch
Jan 16 - Asteroid 3 Juno Occults 9.3 Magnitude Star
* Jan 16 - Asteroid 471 Papagena at Opposition (10.1 Magnitude)
* Jan 18 - Asteroid 1159 Granada Occults PPM 073236 (8.4 Magnitude Star)
* Jan 19 - Asteroid 451 Patientia at Opposition (10.7 Magnitude)