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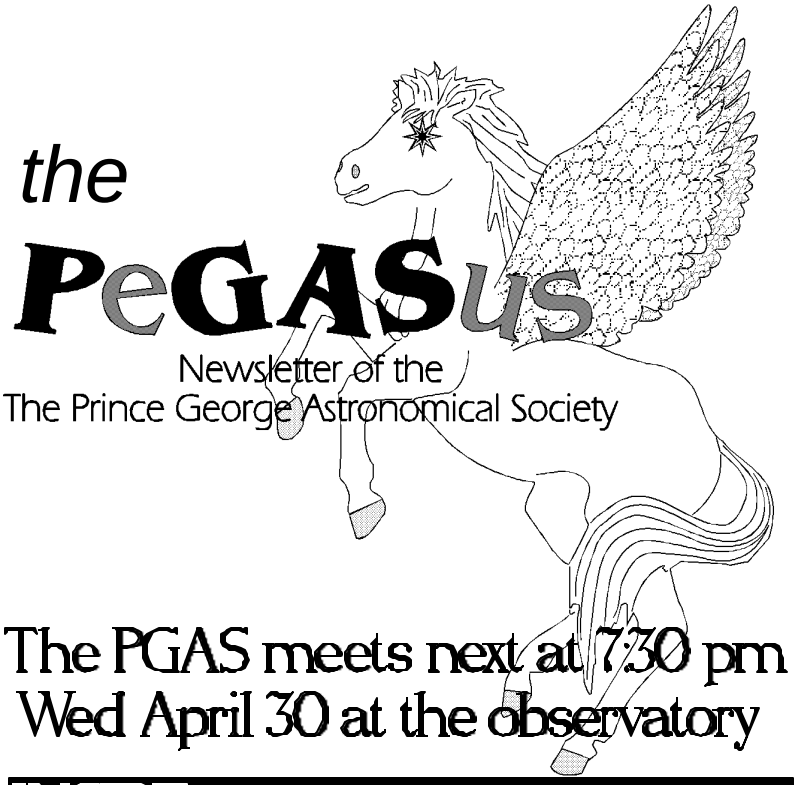

the PeGASus

Newsletter of the
The Prince George Astronomical Society

The PGAS meets next at 7:30 pm Wed April 30 at the observatory

INSIDE :

the PeGASus is published monthly by the *Prince George Astronomical Society*. Contributions to the newsletter are welcome.

Deadline for the next issue is May 16

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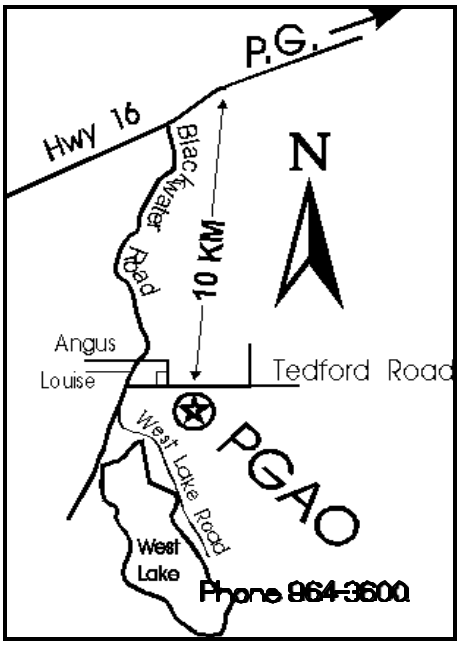

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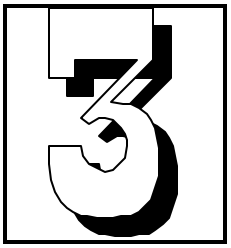


Editorial

by Gil Self

It seems to me that I often use this space to ask for your help, well here I go again. But this is an easy one. The PGAS executive, in our collective wisdom, plans meetings, club events, improvements and many other details central to operating our organization. Over the last several weeks, while talking to some members, I have heard many great ideas and several different opinions. Do we need to get into more basic material at our meetings, do we need to get into more advanced material at our meetings-- should we increase our focus on public involvement or look for other ways of promoting ourselves in the community. Shall we offer public courses --to mention a few . The executive can make these choices, but we can make better choices if we hear from you !

Did you know that executive meetings are open to any members that want to attend ? Did you know that there is always room in the newsletter for your comments or suggestions? All executive member's phone numbers are published each month in the newsletter, and most have access to e-mail.

We have many active, enthusiastic members, including several with special skills they share with us but we could be better.

Don't sit back and think you're not needed. Sometimes there is only one small step needed to make it all come together and you may have already thought of that idea.

As I saw at the comet weekend there is an energy created by involved people doing what they enjoy. You might be next year's president or you might have an idea clicking over in the back of your head or an area of special interest. That special interest will probably make you our expert on that subject, but speak up and let everyone know what you are in to.

We all profit from your involvement.

GS

PS. our next issue of the newsletter is the diamond anniversary issue

Coming Events

If you are involved with any astronomical or otherwise scientific activity on behalf of the PGAS, please list the activity here.

Every Friday evening until the end of May we are open to the public

May 2nd and 3rd (One more open house)
Last Chance for Hale-Bopp

The Night Sky for May '97

by Bob Nelson, PhD

Hello, fellow sky watchers. As the great comet fades into the evening dusk, we look for other things to observe. The following information is calculated for May 15, but should be approximately valid all month.

MERCURY, in Pisces, is a morning object. Mid month, it rises about 20 minutes before the Sun. In spite of the fact that it is some 23.6 degrees (elongation) from the Sun, it is an extremely difficult object for northern observers owing to the fact that the ecliptic (along which the Sun travels) makes a shallower angle with the horizon than do the lines of constant declination, plus, more importantly, Mercury also lies a few degrees below the ecliptic (it reaches its greatest southern extent on the 30th). This makes for a real challenge locating the planet in the morning dusk.

VENUS, lost in the solar glare since February, reappears in the evening sky (in Taurus). Mid- month, it is about 10 above the horizon at sunset and sets about an hour later. It is a featureless blob 10 arc seconds across near the full phase. It will be visible in the evening sky for the rest of the year -- watch its phases while it grows in size to a 55" crescent by year's end (inferiorconjunction is 1998 Jan 16).

MARS, in Leo is still with us in the evening sky but gets smaller as Earth leaves it behind (it has shrunk to a featureless -- for us -- disk 10" across). At sunset, it is on the meridian (i.e. due south) and at altitude 41 deg (above the horizon); it sets at about 3:30 A.M. On the morning of the 16th, the gibbous Moon gets quite close to Mars; it passes about 5 deg south of Mars just before sunrise.

JUPITER, in Capricornus, rises some three hours before the Sun and dominates the morning sky.

SATURN, in Pisces, is low in the southeast just before sunrise. It should be easier to see than
Mercury, but that's not saying much! Another challenge object.

URANUS and NEPTUNE, in Capricornus, are low in the southeast (some 15 deg above the horizon) at sunrise and should not be too hard to see for us northerners (but not well placed for serious observation).

PLUTO, in Ophiuchus, reaches opposition on May 25. At 11 P.M. on that date, it is in the southeast at some 22 deg above the horizon. At magnitude 13.6, it should be visible in my 13" telescope (and best in the 24" telescope) provided you know where to look. We will run off finder charts and leave them at the observatory. Perhaps we could get some CCD images, possibly over a range of nights to show its movement.

Comet HALE-BOPP, in Taurus, is still with us (just barely). At sunset on the 15th, it is some 7 above the horizon in the west-northwest. It sets about an hour after sunset and therefore will be pretty well lost in the glare of the Sun until it sets. Another challenge object in May.

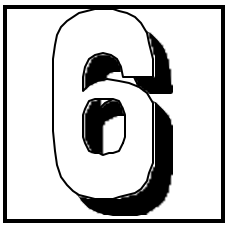
Well, what else is there? As I gaze onto my computer screen at Guide5's rendition of the sky for May 15th at 11 P.M. (and consult Norton's Star Atlas, a more traditional reference), I see that the Milky Way is largely out of the picture in our southern sky, and that means galaxies. Almost due south, and at an elevation of 60 , lies the north galactic pole (NGP). About 15 deg south of the NGP lies the Virgo cluster of galaxies, the nearest moderately rich cluster. It contains several thousand galaxies including many Messier objects. One of these is M87, a giant elliptical which is also a radio and X-ray source. Within a few degrees are many spirals as well as ellipticals. This concentration of galaxies is at a distance of about 50 million light years and has a diameter of about 5 million light years. It has been much studied by professional astronomers as they try to unravel the motion; most objects -- including perhaps our local group of galaxies -- are falling toward the centre. Until the motion is fully understood, the exact value of the Hubble constant remains beyond reach.

The Virgo cluster remains a good target for photographers and CCD imagers (and just plain visual observers). Close to the NGP is the Coma cluster which is perhaps ten times larger than the Virgo cluster. It lies at a distance of some 440 million light years and is at least 10 million light years in diameter. Although it contains no Messier objects (only NGC objects), it is still a great target for visual observations and CCD imaging with our 24" telescope..

Another thing that we could look for are asteroids. See my article on asteroids elsewhere in this edition.

There are lots of things to do in this post-comet time -- we should get over our withdrawal symptoms with no trouble at all

BN



The Hale-Bopp Party April 1997

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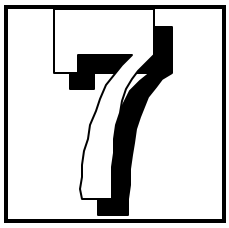
If you build it they will come (Field of Dreams). That's what it seemed like on Friday Sat & Sunday. You could see cars parked on both sides of the street stretched out for about 2 parsec plus or minus a couple comet tails. I couldn't believe the luck we had with the clear weather starting on Friday considering all the clouds we had all week. I really really wanted to take some pictures but that would have been impossible. Of course it clouded up Monday and Tuesday but we did get images on Wednesday, (plus the lunar eclipse night). It's easy to get spoiled , we should thank our lucky stars (no pun intended) all the clear nights that we had, because of the weather our show was a enormous success. And it was a joy to see and hear the reactions from the crowd I never heard anything neg the whole three nights. Once ones eyes where dark adaptive and away from the glowing red lights you could see the tail stretching and touching Cassiopeia. That's got to be at least 20 degrees or better. Its too bad that the tail is inclined to our position on Earth, of course its to bad that the comet wasn't as close as Hyakutake , It's also too bad that I didn't win a million on the loto. (2 comets in a row has spoiled me some what). We took in about $ 859.00 for the 3 nights. Aimee estimates over 3 hundred people showed up on Friday alone. We were not set up to do counting but I think over 1,000 people showed up over the 3 clear sky nights. I wish Orla, Al, and Jenifer were here to see the show , I'm sure they have seen the comet though . I want to thank Gil and Aimee Self(who ran and controlled the crowd with the BIG telescope), Gerhardt and his wife, Bob Nelson, Matthew Burke, Rob Frith, Vince Hogan, Brian Potts, Owen Salava, Mike Hansen, and Jon Bowen (who drove all the way down from Prince Rupert). Please forgive me if I missed anybody but it was dark outside. We also did a Open House Comet show the following Friday unfortunately it started to get cloudy in the afternoon , did that stop the crowd from coming ??? no way .. they came. We made over 2 hundred dollars Thanks again to Gil Self , Donovan Unruh , and Micahel Senger.

A great comet and good weather are not enough for a successful Comet Party..... well done volunteers
Steve Senger treasurer

editors note - The humble Steve Senger forgot to mention that he spent many, many hours every night we were open sharing his enthusiasm with our guests.. GS

ADVANCED X-RAY TELESCOPE MIRRORS PROVIDE SHARPEST FOCUS EVER



Performing beyond expectations, the high- resolution mirrors for NASA's most powerful orbiting X-ray telescope have successfully completed initial testing at Marshall Space Flight Center's X-ray Calibration Facility, Huntsville, AL.

"We have the first ground test images ever generated by the telescope's mirror assembly, and they are as good as -- or better than -- expected," said Dr. Martin Weisskopf, Marshall's chief scientist for NASA's Advanced X-ray Astrophysics Facility (AXAF).

The mirror assembly, four pairs of precisely shaped and aligned cylindrical mirrors, will form the heart of NASA's third great observatory.

The X-ray telescope produces an image by directing incoming X-rays to detectors at a focal point some 30 feet beyond the telescope's mirrors. The greater the percentage of X-rays brought to focus and the smaller the size of the focal spot, the sharper the image.

Tests show that on orbit, the mirror assembly of the Advanced X-ray Astrophysics Facility will be able to focus approximately 70 percent of X-rays from a source to a spot less than one-half arc second in radius. The telescope's resolution is equivalent to being able to read the text of a newspaper from half a mile away.

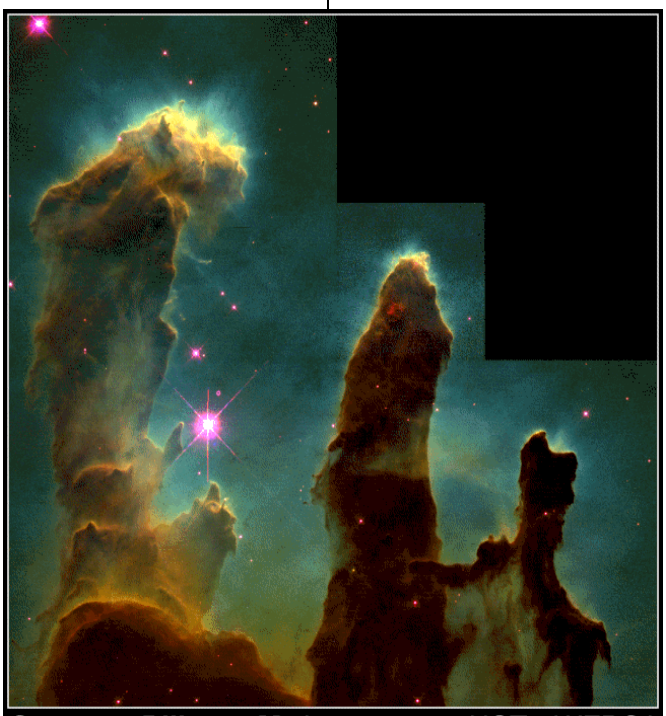
In comparison, previous X-ray telescopes -- Einstein and Rosat -- were only capable of focusing X- rays to five arc seconds. The Advanced X-ray Telescope's resolving power is ten times greater.

"Images from the new telescope will allow us to make major advances toward understanding how exploding stars create and disperse many of the elements necessary for new solar systems and for life itself," "We will observe X-rays generated when stars are torn apart by the incredibly strong gravity around massive black holes in the centers of galaxies," said Dr. Harvey Tananbaum, -- responsible for the telescope's science mission.

" A second phase of testing is now underway at Marshall. Calibration of the observatory's science instruments began in mid-February. "This phase of testing," said Weisskopf, "includes two focal plane instruments and two sets of gratings used to analyze images and energy distributions from cosmic sources seen by the telescope."

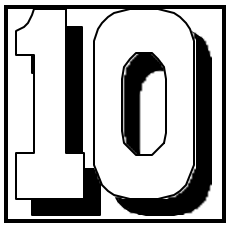
Working around the clock, test teams are taking measurements and studying results. "It is very exciting," said Weisskopf. "With more than 1,200 measurements taken, there is already a tremendous amount of information for study." The calibration process will end around late April.

The Advanced X-ray Astrophysics Facility is scheduled for launch in August 1998 and will join NASA's Hubble Space Telescope and Compton Gamma-ray Observatory in exploring the universe.



Gaseous Pillars · M16 HST · WFPC2

PRC95-44a · ST ScI OPO · November 2, 1995
J. Hester and P. Scowen (AZ State Univ.), NASA



The Light Side of Astronomy

by Orla Aaquist

Keyano College
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Have you had a look at the images of Europa lately? Try the internet address http:\www.nasa.galileo.latest_pictures.and.otherStuff. Europa is that moon of Jupiter with the smooth ice and very few signs of cratering. Of the Galilean satellites, Europa is the second moon from Jupiter, the first being Io. You know, the moon with the active volcanoes?.

Unlike most of the other moons in the solar system, along with the planets Mercury and Mars, Europa appears to be covered with a relatively smooth layer of water ice. Europa is one large mother $&*@#$ of a skating rink, at least down to a resolution of a few hundred metres. What an attractive resort moon for aliens. And, don't those cracks in the ice look a lot like roads?

Roads for alien vehicles!

I think this idea has some merit. Think about it. Have you ever read in Sky and Telescope, or any NASA news release, that these markings bear a strong resemblance to roads? No, you have not! To me, this smells of a cover up.

According to the latest news release (NASA News Release #12345789) Europa is thought to have more water than all of the oceans of Earth. Water is necessary for life (personal experience), so alien beings will have a need for water. Moreover, after travelling through space for hundreds of years, spending much of their time in suspended animation, they are probably ready for a little exercise (interview with an alien abductee), like skating on the mother of all skating rinks.

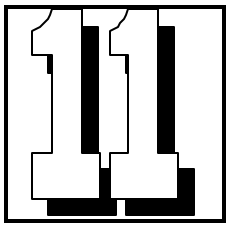
"Impossible!" you exclaim. "The low temperatures makes skating impossible. The pressure generated by a typical skate will not be large enough to melt the ice beneath the blade. It would be like skating on cement. Can't be done."

"Wrong!" I say. "It can be done, and it tells us something about the alien creatures as well. Namely, they must be very massive creatures."

The first piece of evidence in support of this are the large roads. The roads are at least 1 kilometre wide, super highways along which 100 meter wide vehicles travel. The creatures which drive these vehicles must be of comparable size. No wonder these creatures don't land on Earth. They would be crushed against the ground by the gravitational force. Can you imagine a creature 100 metres tall trying to walk on the earth. The largest dinosaur never rivalled this size (Brendan, my son,1997).

How did such large creatures evolve? My hypothesis is that they were once like us. As their technology developed, they spent more and more time watching television
and eating junk food. Some creatures grew to be so massive that they could no

longer get out of bed. The richest of these creatures avoided going on a diet by taking up residence on an orbital space station where they could gain as much weight as they wanted without having to worry about supporting their ever increasing body mass against gravity. These massive, space-bound creatures began to breed until there were too many for the mother planet to support. They left in search of other worlds.



Yes, I know that this leaves a lot of questions to be answered, but if I explain it all now, there will be nothing left for future papers on this subject. Don't blame me! Blame the publish-or-perish attitude of the academic community. Also, Gil desperately wanted some copy for the newsletter.

In order to examine this theory further, the properties of ice at near absolute zero must be investigated in order to see what kind of pressures it can be subjected to before shattering under the weight of giant ice skaters. Then we must ask if this pressure is sufficient to melt the ice so as to reduce the friction between the skates and the ice. If not, we can then hypothesise that the skates have some sort of heating mechanism which raises the local temperature of the ice to sufficient value for melting to occur under the pressure of the aliens' blades. These questions will be examined by the author in a future PeGASus Newsletter (PeGASus issue 100, in preparation).

O.A.

Editors note: subtext of future article-If there is ice and if there are ice-skates, than there must be hockey. If there is hockey, What do they use for hockey sticks??

Galileo update

The Galileo orbiter makes its third close pass of the giant Jovian moon Ganymede on April 5th at 7:10 Universal Time. This flyby will be at a distance of 3,100 km, and the trajectory will put the moon's northern polar regions in Galileo's view.

During previous visits last year, the spacecraft discovered that Ganymede has a metallic core and its own magnetic field, so these polar studies may yield unexpected surprises. The encounter also includes scrutiny of neighboring Callisto and Europa, as well as acquiring a map of Jupiter's auroral displays in ultraviolet light.

And don't forget there are less than a thousand shopping days until the end of the millennium. (until the year 2000 if you want to get technical, since the new millennium does not start until 2001) ,but do you want to bet 95% of the rest of the world calls it Jan !st 2000.

Asteroids

by Bob Nelson, PhD

The countdown continues.

The term ‘asteroid' (meaning starlike object) is certainly correct as far as the appearance of one is concerned but completely misleading as to its nature. Asteroids, of course, are minor planets orbiting the Sun mostly between the orbits of Mars and Jupiter at semi-major axes (effective radii) of 1.5 and 5.2 astronomical units, resp.; the asteroids in the ‘belt' mostly lie at orbital radii between 2.1 and 3.3 AU. [One astronomical unit, or AU, is the mean distance of the Earth from the Sun = 149.6 million kilometres.] For astronomers two hundred years ago, something called Bode's ‘law' was used to explain and predict the spacing of the known planets. There was, however, an unexplained gap between the orbits of Mars and Jupiter. (Today we know that Bode's ‘law' is just a coincidence that reflects some kind of even spacing of planets.)

The discovery of 1 Ceres in 1801 by Piazzi was hailed as this missing planet. However, it was soon followed by 2 Pallas in 1802, 3 Juno in 1804 and 4 Vesta in 1807. [Asteroid are always designated by a number followed by a name.] Recently, it was calculated that there are over 100,000 asteroids that could be detected by an 18" telescope (my Guide 5 CD-ROM contains a catalogue of over 30,000 entries!) Most are located in the asteroid belt, but there are other orbits (including those of the Earth-crossing Apollo asteroids).

The brightest asteroid is 4 Vesta; it reaches magnitude 6.4 in October when it is at opposition (but we can't see it at this time of the year). The others of the ‘original four', at magnitudes from 9.1 to 10.1, are also awkwardly placed for us at this time of year. However, here is a list of asteroids that are visible in the evening sky in May and that reach magnitude 11.7 or brighter.

#	Name	a	P	Mag.	Diam.	Alb.	Type
29	Amphitrite	2.554	4.08	10.0	219	0.16	S?
7	Iris	2.385	3.68	10.1	20	0.21	S
42	Isis	2.44	3.81	10.5	107	0.12	M?
13	Egeria	2.554	4.08	10.7	219	0.16	S?
18	Melpomene	2.296	3.48	11.4	148	0.22	S
114	Kassandra	2.675	4.37	11.6	103	0.084	C?
110	Lydia	2.731	4.52	11.6	89	0.17	S?
259	Aletheia	3.145	5.58	11.7	185	0.037	C
16	Psyche	2.922	5.00	11.7	264	0.10	M?
511	Davida	3.171	5.65	11.7	337	0.053	C
64	Angelina	2.681	4.39	11.9	192.7	0.040	M

Here, quantity "a" is the semi-major axis (effective orbital radius) in AU, "P" is the orbital period in years, "Mag." is the visual magnitude, "Diam." is the diameter in km, "Alb." is the albedo or the fraction of sunlight that is reflected, and "Type" refers to the composition.

The composition is easily determined by the infrared spectrum, expressed as percent reflectivity vs wavelength. In the visual region, the "C" type or carbonaceous asteroids have carbon (soot) -type surfaces that reflect only around 6% in the visual (like a asphalt parking lot!). Higher in brightness are the "M" or metal type (the definitive test is the reflectance of radar waves -- metals reflect radar strongly). M-types reflect around 10% in the visual range. Brighter still are the "S" or silicate (stony) type. As the name implies, these are solid rock; their reflectivity is around 20% in the visual. Brighter still is Vesta, which is almost in a class by itself; it reflects around 30-40% in the visual in a complex IR spectrum that matches that of certain meteorites that are actually thought to have come from Vesta!

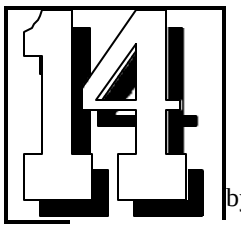
The diligent reader may have noticed that 29 Amphitrite and 13 Egeria have similar orbits and albedos. This is just one example of the many groupings or families of asteroids. Asteroids of a given family are thought to have originated from one asteroid that broke apart by some ferocious impact millions or billions of years ago. Another thing to note is that tiny 7 Iris, which is an S-type having albedo 0.21, outshines by over 1.5 magnitudes 259 Aletheia which is almost ten times bigger (but is a C-type having an albedo of only 0.037).

At magnitudes between 10 and 12, these asteroids should not be too difficult to find. Guide 4, which is on the PGAO computer, will give you the coordinates and detailed field. In addition, we will print out finder charts for all these asteroids and leave them in the dome. It would be an interesting project to take CCD images spaced over several nights to show the motion.

Let's see what we can come up with!

PIONEER 10

A 30-year dynasty has come to a close. On March 31st NASA ended its support for occasional tracking of Pioneers 6, 7, and 8, which orbit the Sun between Venus and Mars. Pioneer 6 was in fact the oldest operating spacecraft, having been launched in December 1965. Also shut down were the particle detectors on Pioneer 10, now nearly 10 billion km from the Sun in the outer solar system. Launched in 1972, Pioneer 10 was was the first probe to travel through the asteroid belt and past Jupiter. Pioneer 10's transmissions will continue to be used for training tracking-station operators, but no more scientific data will be returned.



THOUGHT-PROVOKING IMAGERY SHOWS SUN'S PLACE IN THE GALAXY

An action-packed movie assembled from images taken by an instrument aboard the NASA-European Space Agency Solar Heliospheric Observatory (SOHO) has provided a remarkable galactic perspective on the Sun and its place in the Milky Way.

Taken during Dec. 22-27, 1996, the series of images show the Sun drifting in front of the stars of the constellation Sagittarius, as the constant solar wind blows outward in all directions. Soon, a comet passes into view from the south and disappears behind the Sun. Finally, in an unrelated event, a plainly visible giant puff of solar gas is emitted, representing a large mass ejection in a direction away from the Earth.

The remarkable images come from SOHO's visible-light coronagraph, LASCO, which is able to mask the intense rays from the Sun's surface in order to reveal the much fainter glow of the solar atmosphere, or corona. Operated with its widest field of view, LASCO's unprecedented sensitivity enabled it to see the thin ionized gas of the solar wind out to the edges of the picture, 13 million miles from the Sun's surface. Many stars are brighter than the gas, and they create the background scene.

In the movie, north is at the top of the scene, which corresponds with the orientation of the Sun as seen at midday in the northern hemisphere of Earth. SOHO's progress in orbit around the Sun remains in step with the Earth's motion. SOHO travels towards the right (west) in relation to the stars during the period of observation. As a result, the Sun's position appears to shift to the left (eastwards) in front of the stars. In this mode, LASCO observes an area of the sky 32 times wider than the visible Sun itself.

At the time of the observations, SOHO is looking towards the heart of the Milky Way Galaxy, which lies in the constellation of Sagittarius. The Milky Way, made by the light of billions of distant stars, forms a luminous band slanting down and to the right. Dark lanes seen in the Milky Way are real features familiar to astronomers. They are created by dust clouds in the disk of the galaxy that obscure the distant stars.

A doomed comet, previously unknown, enters on the left of the image on Dec. 22. Its path curves towards the Sun and on Dec. 23 it disappears behind the occulting mask of the coronagraph. It fails to reappear on the far side of the Sun. Whether or not its trajectory took it directly towards the visible surface, the comet must have evaporated in Sun's atmosphere. It was one of a family of comets known as sungrazers, believed to be remnants of a large comet that broke up perhaps 900 years ago. Other fragments were responsible for spectacular comet apparitions in 1843, 1882 and 1965.

PGAS CONTRIBUTORS

The PGAS would like to thank the following individuals, corporations and government agencies who, since 1991, have donated money, goods or services to the construction and operation of the Prince George Astronomical Observatory.

Ministry of Adv. Ed. Training and Tech	$25,000
BC Science Council	16,000
BC Lotteries	8,000
Helmar Kotsch (Acme Mas.)	1,932
Northwood Pulp and Timber	1,665
Electrical Services Ltd	1,583
Royal Bank of Canada	1,500
Canfor	1,214
Regional District of Fraser-Fort George	1,000
Prince George Rotary Club	1,000
The Pas Lumber Co	750
A.V. Jay Roofing	600
Xerox Canada	500
Russelsteel	465
Lakeland Mills Ltd	460
Lutz Klaar	200
Carrier Lumber Ltd	160
Art Beaumont	150
Tom's Auto Repairs	150
Pine Drilling	150
Cloverdale Paint Inc	100
Claus Schlueter	100

The greatest contributors to the construction and operation of the observatory are from PGAS members who have generously contributed their time to this project. The value of their contribution surpasses all external contributions.

The PGAS is a non-profit organization dedicated to the advancement of astronomy and science in general in Prince George and the neighboring northern communities. Donations of money or materials to the society are greatly appreciated and tax deductible.

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