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## View Saturn at its best

On New Years Eve the planet Saturn was closer to Earth and brighter than at any time in three decades. All month long, everyone can enjoy Saturn at it's finest. A similar opportunity won't come again for another 30 years. On Dec. 31 at precisely 00:00hrs, as the clock struck midnight heralding in the new year, Saturn was opposite the Sun in relation to Earth. That means that from our planet, Saturn will rise as the Sun sets, reaching its highest point in the southern sky at midnight and setting as the Sun rises, that's why it's called opposition.

Saturn takes 29.42 years to orbit the Sun. Its path is not quite circular, and it was just on July 26 that Saturn reached its closest point to the Sun on that orbit, called perihelion. The near coincidence of



Saturn and satellites on 29/12/03 (Mark & Nigel Stronge).

perihelion and opposition dictate that on New Years Eve, Saturn will be closer to Earth than at any time since December 1973. The ringed planet will then be 748.3 million miles (1.2 billion kilometres) from Earth.

It will not come closer again until January of 2034. Contrast this year's event to another opposition, in June 2018, when Saturn will get no closer than 841 million miles, or almost 100 million miles farther away. And there's a bonus. Saturn's rings are not always well tilted for viewing. Sometimes they are edge on, as seen from Earth, and unimpressive. At present, the rings are still dramatically tipped – more than 25 degrees to our line of sight. This allows the planet to be seen in all its glory, and it also accentuates Saturn's brightness. By the end of December, Saturn will be shining as bright as it can ever get, at magnitude  $-0.5$ . Of the stars, only Sirius

and Canopus are brighter. With a simple sky map, Saturn is easy to find. It is currently in the constellation of Gemini, the Twins. Were we to use the popular tracing conceived by H.A. Rey, of "two matchstick men holding hands," Saturn is found between the legs of the twins.

Saturn is the telescopic showpiece of the night sky, thanks to its great ring system in all it's elegance. In small telescopes, the rings surprise even veteran observers with their stunning beauty. Certainly they will delight anyone this winter who might receive a telescope as a holiday gift. Any telescope magnifying more than 30x will show them. Even the most inexpensive off-the-shelf rubbish (sorry!) telescopes should do the job.

Galileo Galilei (1564-1642) was the first to view the rings, in 1610. Although what he saw through his crude telescope left him completely baffled, as Saturn appeared to him not to have rings but rather two smaller bodies flanking it, one on either side. He couldn't make them out clearly and thought that Saturn was a triple body, two small orbs attached to a large one. Later, when the rings turned edgewise to Earth and the two companions disappeared, Galileo invoked an ancient myth when he wrote, "Has Saturn swallowed his children?" Galileo lamented that his mind was too weak to comprehend this strange phenomenon.

Actually, it was his telescope that was too weak; a better one would have revealed Saturn's companions as rings. It was not until a young Dutch mathematician, Christian Huygens (1629-1695) utilized a much better telescope, and on March 25, 1655 saw the rings for what they really were.

In mythology, Saturn closely resembled the Greek god Cronus, but he's more usually recognized as the Roman god of agriculture. The name is related to both the noun satus (seed corn) and the verb serere (to sow). But why would the planet Saturn be linked to agriculture? Perhaps a clue can be found from the ancient Assyrians who referred to Saturn as lubadsagush, which translated, meant "oldest of the old sheep."

Possibly this name was applied because Saturn seems to move so very slowly among the stars, compared to nearer planets that shift their seasonal positions in the sky more quickly. It may have also

reminded sky watchers of the slow pace of plowing oxen or cattle.

Closer views of Saturn are eagerly awaited for this year. NASA's Cassini Spacecraft "<http://saturn.jpl.nasa.gov/index.cfm>" will arrive at the ringed planet in June 2004 and is expected to produce the best images and data ever collected of the sixth planet from our Sun.

## **Andy McCrea Honoured.**

Congratulations to EAAS Member and IAA President, Dr Andy McCrea on being awarded the MBE in the Queen's New Year Honour's. It is awarded "For services to the electricity industry" as Andy is Manager of Environmental Services for NIE. Andy is well known to us at the EAAS for his very exuberant lectures, and is due to take our next Beginner's Night in March. Very well done to Andy from all his friends at EAAS.

## **PERFORMANCE** **IMPROVEMENT FOR** **ACHROMATIC REFRACTORS**

*By Walter Martin (EAAS).*

Anyone who owns a conventional achromatic refractor will be aware of the blue halo surrounding any white or bright object at high powers. Most people will know that this is due to the inability of the two objective elements to bring the complete colour spectrum to focus at the same point (chromatic aberration).

There are of course many products on the market to eliminate this, usually colour filters which block out the blue end of the spectrum normally costing about £30. However, as the problem is generated by the outer edges of the lens, which behave more like a prism (particularly at the extremities) splitting up the light into colours, then obviously one solution is not to use the light from the edges.

The procedure of stopping down the aperture is a well known practice, albeit, sometimes frowned upon, as reducing the aperture not only reduces light grasp but has a resultant theoretical loss of resolution. Nevertheless, after a suggestion that I should try this— I decided to give it a go!

I currently own the Helios Startravel 120mm (4-3/4") refractor and made several discs of eighth inch thick black plastic with an external diameter of 120mm of course fitting over the objective lens. The centres of the discs were cut out to various diameters, giving effective apertures of 4", 3", and 2". Not much difference was noticed with the aperture stopped

down to 4"——however with the 3" aperture the blue——yellow halo effect was virtually completely eliminated with hardly any trace detectable, and believe it or not, the image quality was better, sharper and less "confused" even though the aperture has been reduced!!!

Therefore stopping the aperture down to about 65% will be very worth while. For people with 150mm refractors an aperture of 100mm should be tried. For those with 100mm refractors an aperture of 65mm should be tried. It is such a noticeable improvement that I urge you to try this yourself, even with a thick piece of cardboard at first, you can make a proper permanent one at a later date!!!

Another tip for users of colour planetary filters which screw into the eyepiece — try screwing them into the star diagonal instead — this will allow you to change eyepieces without having to unscrew the filter!

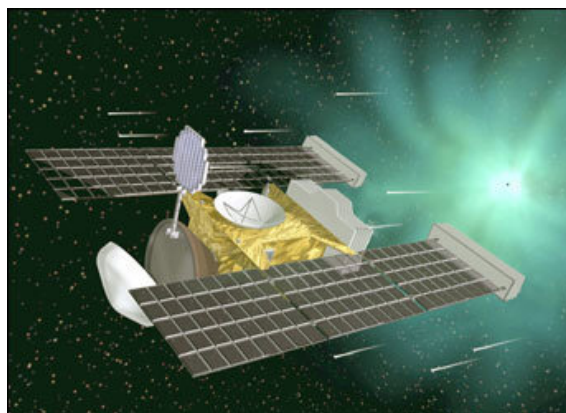
## **Stardust Arrives at Comet Wild2**

After a five-year journey that racked up about 2 billion miles, a robotic science scout is about to corner its quarry on the far side of the sun for an unprecedented mission to retrieve samples of materials believed to be left over from the creation of our solar system.

Since its launch on Feb. 7, 1999, and throughout its orbits around Earth to pick up speed and its spin around the sun, the Stardust space probe has been driven with this singular goal in mind: to be in position at 2:20 p.m. ET on Friday when a comet comes soaring by.

This will be no easy trick, as Stardust itself will be travelling at a speed of about 13,650 mph relative to its target.

The probe approaches from above the comet, then dips below, allowing itself to, in effect, be run over. The manoeuvre has been carefully planned to get Stardust within about 186 miles of the comet's core — close enough to trap some particles for return to Earth and far enough away, the team hopes, to avoid being damaged or destroyed by the comet's cloud of



debris.

*It's a tremendous effort for a thousandth of an ounce of comet dust, but the information that may be gleaned from its study should help answer questions that transcend the realm of science: How was the universe formed? Where did the planets come from? How did life arise? For scientists to have some actual samples to study of what the solar system, the planets and even ourselves were made from is an opportunity of our era.*

*"This could prove to be a pivotal time for science," said Donald Brownlee, principal scientist for the Stardust mission. "There's a museum out there in the outer solar system that has preserved our building blocks and it is going to be an absolute thrill to have this stuff to look at."*

*Scientists believe comets were created before the planets and may have been the carriers of organic materials and water to the new worlds. While the planets have changed from their original states by weathering, tectonics and other dynamics, the comets, which spend most of their lives billions of miles from the sun and planets, are believed to be pristine and unchanged from their original formation.*

*Stardust's target, Comet Wild-2, (pronounced "vilt-2") is a relative newcomer to the inner solar system, its path perturbed by an encounter with Jupiter's powerful gravity field. Because it has not made many orbits close to the sun, Wild-2 was an attractive target for the Stardust science team, which wants samples as close as possible to their primordial state.*

*The particles will be studied on the atomic level for information about what elements they contain, what energy they have been subjected to and dozens of other characteristics.*

*During the 10-hour encounter, Stardust will transmit live to Earth except during an eight-minute period when the spacecraft is closest to the comet's nucleus and turns away to point its camera at Wild-2. Stardust has five minutes to complete its science operations.*

*With its precious cargo packed inside, the probe continues on its journey around the sun for another two years until its next encounter. This time it will be Earth — a section of the Utah desert, in particular — that Stardust will be targeting as it drops a capsule containing the samples for a parachute landing at 5 a.m. ET on Jan. 15, 2006.*

### **"Stardust".**

*Due to some domestic problems Terry Moseley, (Editor) has not been able to produce the issue due out at the end of December. A double issue should appear towards the middle/end of January. Terry has offered sincere apologies to those EAAS members who subscribe to the magazine.*

*I'm sure all Members will join with me in offering sincere sympathies to Mr Robert Dick on the death of his Mother, Margaret, just before Christmas, at the grand old age of 97. Our sympathies also go to Robert's wider Family Circle.*

*Chairman.*

### **Upcoming Meetings.**

*Uppermost in our minds is our "Andrew Trimble Memorial Lecture" being held this year on Monday February 2nd. Start spreading the news and bring your friends! The speaker this year is Mr Neil Bone, Meteor Section Director of the British Astronomical Association, and Contributing Consultant to "Astronomy Now" magazine. His title is "The Leonid Meteors". Neil will also be giving a seminar at the Armagh Observatory at 11.15am on February 3rd on "The Work of the BAA Meteor Section". As this will be held in the observatory library space will be limited, so those interested in attending should please contact the observatory on Tel 028 3752 2928 or email Aileen on ambn@star.arm.ac.uk to book your place. As this will be Neil's first visit to the Province let us give him a good show!*

### **The Planets in January.**

*During January three bright planets dominate the skies. Venus is visible even before the Sun has set shining at -4.0 reasonably high in the SSW. Not much will be seen telescopically as the disk is around 75% illuminated. On January 14/15 Venus and Uranus are only 1 degree apart, but you will need binoculars to see Uranus! (Try to spot it with the naked eye), it's mag +5.9.*

*Mars is still visible all night but is now disappointing through a telescope, but the casual observer might be able to recognize some of the more obvious markings such as the Syrtis Major. Observers with large telescopes and CCD equipment would still be able to get a good result given good conditions.*

*Jupiter rises late evening, and by about 3am is worth getting up to see as it will then be high in SE. It shines at mag -2.3, and any telescope will show the four bright moons and numerous belts on the planet.*

*Saturn is the planet of the month being just past opposition and also it's closest to Earth in almost 30 years. (See the front page for the details).*

*The Minor Planet 1Ceres is at opposition on January 7th. in Gemini and at mag +6.8 may be visible to the naked eye, (details on the separate sheet). Clear skies for 2004! John.*