



# TRANSIT

The Newsletter of



05 November 2006



NASA's long-lived robotic rover Opportunity is beginning to explore layered rocks in cliffs ringing the massive Victoria crater on Mars. The image above is a view of the Opportunity rover, taken from space by NASA's Mars Reconnaissance Orbiter.

## Editorial

**Next meeting** : 10 November 2006 : Thomas Wright Trophy Quiz (see last page for details)

### **Letters to the Editor :**

*Any new observations, any comments on local or international astronomy, anything you want to share with your fellow members?*

Dear Editor,

None today – shame!

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**Borders Bookshop** at Teesside Park off the A66 (lovely coffee shop) are stocking the latest edition of Norton's Star Atlas, due early October. Thanks to Ed the Webmaster.

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## My Celestron 8" telescope

By Michael Roe

My Celestron 8" telescope is now nearly 25 years old. It's a wonderful telescope and I'd like to share its history. I received it on 19 Nov. 1981, about the same time as I joined the Cleveland Astronomical Society. Around 1980 my old 4-inch reflecting telescope was past its best and I wanted something bigger and better, a compact telescope that could be packed away when not in use, and something to observe Halley's comet in 1985. I had never seen a comet before.

My new C 8 cost £829, with sturdy metal tripod, equatorial wedge and storage case. Its eyepieces give magnifications of X50, X80, and X220. It is a Schmidt-Cassegrain telescope with a folded light path and a corrector plate. The mirror is 8 inches in aperture, and has a 6X30 finder scope. It is orange in colour, as old Celestrons are.

My first observation was of Mizar and Alcor, the well-known double star in Ursa Major, on 20 Nov, 1981 at 20.50 hours, drawn from the X50 eyepiece. Then on 1 Dec I drew the Perseus Double Cluster, and also that winter, epsilon Lyrae, Saturn, the moon (Petavius crater) and Mars. I went through all the planets, only failing on Pluto. Then on 23 Aug, 1982, I spotted a comet at last, Comet Austin, 1982g; it even had a tail.

You can see so much with a Celestron 8 telescope; the moon is incredible, so much detail. The main planets show detail too, except Mercury. Stars are very numerous also.

On 10 Nov, 1985, I finally did see Halley's Comet, a mag. 8 blur. In January, 1986, it had a tail. I did 7 drawings until April of the comet.

In the years afterwards I observed Jupiter and regions of the moon many times and also nebulae, galaxies and star clusters. I've seen a few asteroids too. Man-made satellites quite often whiz through the field of view.

One highlight was in 1994 when I saw Jupiter grow black spots from the Shoemaker-Levy 9 comet collision. About this time some of my drawings of the lunar crater Plato were included in the New Moon magazine.

In 1996 and 1997 I saw close up the spectacular comets Hyakutake and Hale-Bopp. Recently I saw the 2003 transit of Mercury and the 2004 transit of Venus. Over the years I tried photography of the moon. It worked, using the telescope to guide my camera.

So, my telescope is doing well after 25 years. I even possibly saw the tiny planet Pluto recently. I might get a 12-inch Dobsonian telescope soon, but I will keep my Celestron 8.

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## **An infinite Universe**

from R. Jay GaBany

If the universe extends forever and if it's full of stars, why is the night sky dark? This is a question that has been asked by philosophers and scientists since Antiquity. Johannes Kepler sought an answer, as did Edmond Haley, many years after him. Just as an observer sees trees in all directions when standing in a forest, every line of sight in an infinite universe should end with the twinkling of a star. The net result should be a sky ablaze with heavenly light. Not only should the night sky be as bright, if not brighter, than during the day but the heat from all those suns should be sufficient to boil the Earth's oceans away! Therefore, the starry scene depicted in the striking picture that accompanies this article, should appear to be missing stars when compared to gazing into the Cosmos above.

For example, an observer in a forest sees a screen of trees because the forest continues farther than it's background limit- the average distance at which the line of sight is interrupted by a tree. Similarly, from any point in an endless Universe filled with stars, stars that are close should overlap stars that are farther away until every square inch of the view is filled with the light from a distant Sun.

Current estimates place the number of stars in the Universe at 70 sextillion (70,000 million million million), based on a 2003 survey completed by Australian astronomers.

That's ten times the number of sand grains on all the Earth's beaches and deserts combined and certainly more than enough to fill the entire sky with starlight!

But, the night sky is not awash in the light of the Universe, so early theorists speculated that either stars were limited in number or their light somehow failed to reach the Earth. When interstellar dust was discovered, some thought the reason had been found. But, calculations quickly indicated that if the dust particles absorbed all of the missing starlight then the dust particles would, themselves, start to glow.

The answer was finally explained by implications from Albert Einstein's Theory of Relativity.

Somewhere between ten and twenty billion years ago, the Universe was formed by an event called the Big Bang. Why it occurred and what preceded it remain the deepest mysteries but that it occurred now seems fairly irrefutable to most in the scientific community. All the matter and energy- essentially everything that ever was, is or can be- was confined to a concentrated, unimaginably dense state. Interestingly, it was not as if everything in the Universe was squeezed into some location surrounded by a space filled with nothing. In fact, it *was* the Universe- all the matter, energy *and* all the space that they fill. It's external size was unimportant since it had no exterior surface; nothing existed outside of it- this is still true today.

Then, for reasons that are still being debated, this kernel of the Universe started to expand at an extremely rapid rate as if it had experienced an explosion. This expansion has never ceased, in fact, it's rate has increased over time! More to the point of our discussion is the fact that the Universe began at a finite moment in time.

One other implication of relativity theory helps to explain our dark night skies, too. Light travels at a finite speed. However, it moves so fast that it's speed is expressed in the distance it travels during one year. This is known as a light year and during that time, light will traverse 9.46 trillion ( $9.46 \times 10^{12}$ ) kilometers or 5.88 trillion ( $5.88 \times 10^{12}$ ) miles.

Space and time are intertwined. We cannot look out into space without also looking backwards in time. Space is vast and the separation between stars is enormous. For example, the average distance between stars is a few light years. But, this is close compared to other lengths measured by astronomy. The distance from our Sun to the center of our Galaxy is about 26,000 light years or 260 trillion kilometers! The distance from our Galaxy, the Milky Way, to the next closest galaxy, located in the constellation of Andromeda, is over 2 million light years. That means the light we see tonight from the Great Andromeda Galaxy (M31) left for Earth when there were no modern human beings, or Homo Sapiens, on this planet- although our evolutionary lineage was well established. The distance from Earth to the most distant object, a galaxy spotted by the Hubble space telescope, is about thirteen billion light years. We see this galaxy as it looked before our galaxy was formed!

So, the reason our night skies are black, the reason space is not filled with blinding light is because much of the light from stars that fill the sky has not had time to reach the

Earth- many are so far away that they are simply undetectable at this time. Thus, even though the number of stars is essentially infinite the number of stars we can see is finite and this creates dark gaps in the sky that we see as the vastness of space.

There are also a few other factors that cause space to appear un-illuminated. For example, many stars die out or explode over time and this removes their contribution to the amount of light within the Universe. Additionally, starlight is reduced by red shifting- a phenomenon that is directly related to the Universe's expansion. Red shifting is similar to the Doppler effect because both involve the stretching of light waves.

The Doppler effect describes the motion of a light source relative to an observer. Light from an object moving toward an observer becomes compressed toward higher frequencies, or the blue end of the light spectrum. Light from an object that is moving away becomes stretched toward the lower frequencies or red end.

Red shifting has nothing to do with the motion of a light source but, rather, with the distance a light source is located from the observer. Since space is expanding in all directions, light from a very distant source travels an ever-increasing distance and the widening distance, itself, stretches its light wavelengths toward the red. The more distant a galaxy, the longer the path its light must travel to reach Earth. Because the distance between the galaxy and Earth is also constantly increasing, its light is stretched toward the red end of the spectrum. Light from very far away galaxies can thus be red-shifted out of the visible spectrum into the infrared or, beyond that, into the realm of radio waves. Therefore, red shifting also reduces the extent of visible starlight that reaches Earth and makes the night sky appear darker.

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### **“ The Americans Have Put a Rocket on the Moon.”**

from Ray Worthey

This story happened in July 1950, so it has nothing whatever to do with NASA. In fact NASA itself was not even conceived until many years later.

My story is of a hoax; a practical joke; one of complexity. Do I perplex you further? Well, let me explain. First, it will need a bit of background, because the place and the time are of supreme importance to the story.

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The date is well printed in my memory, because I had just become eighteen years of age. The Korean War had broken out and the period of National Service had been raised from eighteen months to twenty four. I was waiting to be called up, so this had a great bearing upon my future.

At the time, I was studying Forestry and had a place waiting for me in Aberdeen University. I was gaining practical experience by working for the Forestry Commission in their great post war moorland planting scheme and I was living in an isolated part of the Yorkshire Moors.

For all those who were born after this time and have no idea of what the conditions and way of life were like five years after the end of the Second World War, I have to explain one or two things. If you don't understand these conditions, then my story will appear too far fetched. Yet these events happened. They really did.

To my contemporaries who are reading this, let me remind you of what we had then and, more importantly, what we did not have.

Austerity lasted for several years after the War, for instance, I seem to remember that bread came on the ration, even though, during the actual conflict, it had not been. Television was still three years away. It was not until the Coronation in 1953 that most people finally had the opportunity of looking into a tiny black and white screen. Nobody, except doctors and such like, had their own private cars. For getting about, most people had to rely upon public transport or use bicycles. I recall that most of the staff of the grammar school where I was taught, came to school on bicycles, even the headmaster. Of course, one could always walk.

Radios were of the variety which depended for their efficiency upon valves, and these were connected by wires and they were often going wrong. If a person wanted to use a telephone, he or she had to go to the nearest telephone box, a bright red affair which advertised its presence to all and sundry. Nobody had even heard of a mobile phone. At the time of which I am writing, personal radio communication, even in the army, needed a set the size of a rucksack and it worked on a frequency which needed an aerial ten foot long, as I was to discover the following year.

If you know the area around Scarborough, travel in your mind a little towards Whitby then move inland, past a small village by the name of Hackness with its attendant valleys, Low Dales, High Dales and Whisperdales. My place of work, was just north of here on the moor top. It was called Broxa. Pass through Hackness and proceed towards the open spaces of the moorland. Cross over the Derwent River Bridge, up the little bank and you will come across a tiny collection of buildings called Langdale End with an equally tiny pub called the Moorcock. Its only about five or so buildings. Move further west a couple of miles and you will come across the site of Birch Hall Camp.

Birch Hall Camp, today is the site of a scout camp, but in nineteen fifty it was a flourishing work camp for the Forestry Commission. The setting was beautiful indeed, but what sticks in the memory was the quality of the men who lived there. Many were training to be Forest Officers and most were ex-servicemen. After leaving the forces, with all their experience of battle and mayhem, they could not settle in "Civvy Street" and gravitated here where there were open horizons and they felt free from the normal constraints of society.

The camp was so isolated that a family atmosphere developed and there was a great spirit of togetherness around the place. Today, many people have come to depend for entertainment upon things such as the television or computer games, but then and particularly there, self entertainment became a way of life. The quality of the minds of many of these forestry men was high and showed much talent and skill. Many followed hobbies and developed them to great refinement. One friend, called Dave, had a complete collection of the works of Beethoven, another friend had the complete set of the records of Bing Crosby. As you can imagine, they had to live in different huts.

In the musical talent line, two could play the piano to the standard of the London Royal Academy. Each of these fellows worked in gloves to protect their fingers. There was a billiard and snooker player who would have graced the television shows of today. Then, there were the naturalists. Ornithologists we had in plenty; I was one of those, but others specialised in particular aspects and one called Moss, short for Maurice, became a recognised authority on moles. ( "Because, no one else did it ", he said.)

The friend who became the subject of this tale was an expert on space and space travel. He went to meetings down in London and other places and was a member of the " Interplanetary Society", this at a time when space travel was all theoretical. His name was Angus. Angus had a temper which he normally kept well in check, but in full flight his temper was wonderful to behold. One evening, he gave a lecture which we all attended. The topic was "The Development of Rocketry Since the End of the War." Angus described how the Americans had captured German scientists who had developed the V2 rockets which landed on London after the allied invasion of France. These scientists included Werner Von Braun who was the world's leading exponent of rocket technology. They were busy in Texas or somewhere adapting what they knew for inter-continental ballistic missiles. However, these machines could be used for space travel. He implied that he knew something about the work, even though the results were clouded in secrecy. Angus finished off by saying "There's no knowing what they have achieved." The full house cheered him off the platform. I didn't appreciate it at the time, but during his impassioned talk, Angus indicated the depth of his commitment and he laid his soul bare . He was a plant which had raised its head above all the others.

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It was at least a month later when the events unrolled. Angus was in the same gang as I was and one day we climbed into the three ton truck as usual , to be carried to Broxa Forest. The day was like any other, except that some electrical malfunction had rendered all the radios in the camp inoperable. It had happened twice before quite recently, so no one attributed any significance to it.

The wagon stopped at Langdale End to pick up a couple of the local men. Our Ganger, Bill was one of them. He climbed on and stood by the tailboard chatting to Harry his neighbour. They spoke rather quietly, but not so quietly that Angus could not hear the

occasional phrase . His attention pricked up into high gear when he heard the words " Rocket " and " The Moon".

" What was that?" Angus asked " What was that about the Moon ?"

" What was what?" Asked Bill.

" What you just said", said Angus.

" Oh . I was just chatting to Harry about today's news."

Angus was very patient. " What news was that?" He asked

" Oh, you don't believe everything you hear on the wireless do you?" Bill said.

Angus was bursting, but tried to be polite.

"You mentioned the Moon"

"Oh that." Said Bill. " It was on the news this morning."

" BUT WHAT DID IT SAY?" Shouted Angus.

" It said the Americans have landed a rocket on the Moon, but I think it was some sort of cold war propaganda. "

Angus looked around the wagon and studied all of our expressions. He was very well aware of the possibility of deception.

Everyone in the wagon showed their interest but not one fellow even tittered. I was the one deputed to stir it up a little. It was well known that I would have been very interested in "The News", so I had to respond.

" Come on Bill, " I encouraged , What did it say exactly?"

" Oh , it was just that their rocket fellers had succeeded in landing a rocket on the Moon. It's just their claim. There's a lot of doubt about it."

"Was there nothing else?" I persisted.

" There was something about not being able to monitor it properly, but I had to come out of the house to catch the wagon." Bill said.

" Bloody 'ell !", breathed Angus. Then he quickly scanned everyone's faces to check it was not some trick. Let me state here and now that the acting that morning on the way to Broxa Moor would have done justice to the Royal Shakespeare Company.

It was all underplayed. Angus muttered to himself all the way to the nurseries . Bill's gang , of which I was a member, did not work in the nurseries on Broxa Top, that was the province of a gang from Scarborough. They came up from the opposite direction. We were detailed to do some fencing nearby.

Angus was no fool, and all the time knew that there was a possibility of a hoax. He had seen other similar happenings before and he was not going to be caught out. He kept some reservations to himself. He could however, do some checking.

When the wagon reached the nurseries and we began to get all our fencing stuff together, the truck from Scarborough came into sight and one local chap Charlie Everitt arrived by bicycle. Angus asked if Bill would excuse him for a few minutes and he sauntered over to greet the new arrivals, carefully hiding any anxiety. Not one of these lived in the camp.

Yes. Some of them had heard the news on the wireless, but there was nothing in their newspapers. There wouldn't be anyway because the news had broken only hours before. One of them mentioned that there was going to be a special edition of the local paper to come out at mid-day. No, they couldn't tell him any more than he already knew . All that



morning Angus was seen to simmer gently as he mulled over whether he was being made a fool of or not.

As lunch time approached, the weather began to look ominous, very ominous. In the far west, a dark cloud bank was beginning to show itself. We all sat down and got out our flasks and sandwiches and watched as the black cloud build upwards.

At this point, we heard in the distance two reports of gunshot. We all knew who that was. It was our Forestry Rabbit Catcher. These were the days before mixymatosis, that terrible disease which killed nearly all the rabbits in the kingdom. His habit of always firing two barrels one straight after the other, earned him the nickname of "Cannonball". His real name was Ray Cross.

At the sound of the two shots, Angus got up and casually strolled away as though looking for a place to "contemplate" after having eating his lunch. We weren't fooled by this and we watched as Angus picked up speed. "Cannonball" did not live in the camp and would be a good man to question. We carefully followed, keeping hidden in a ditch.

We were too far away to hear what was said, but we knew the outcome. Angus had been given his confirmation. By the time Angus returned we were all sitting in our previous positions finishing off our lunch. The weather was turning really nasty. The cloud bank in the west was showing a kind of blue black colour and was reaching higher and higher. This was not going to be any ordinary storm. We began to prepare a shelter with a tarpaulin, using the top wire of the finished fence section as a tent ridge. The bank of blue-black cloud seemed to reach over us until it dominated our existence. It was quite frightening.

Charlie Everitt from the nursery came running over as the first drops began to bullet down. "Have any of you lot seen my bike?" He asked, as he came into our shelter. Angus had disappeared. Charlie could not understand why we all burst into fits of laughter.

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Living as we did out on the moor, we were used to stormy weather, but this storm was truly horrendous, with hailstones the size of golf balls driving down like bullets. The driver of the wagon delivering our fence stuff was so scared, he would not set off by himself until the storm had passed over. It was a good job that Angus had not met this newcomer as none of us knew him.

Then the lightening came, loud and insistent. We were looking out from our makeshift shelter along the line of the fence which by then was a few miles long. We all saw the lightening strike the fence way out on the moor top and then we watched as it danced along the fence towards us. Until then, I had never realised that lightening could actually give you time to getaway. We did not wait for it to arrive and dived headlong out into the hailstones. There was a great scorch mark along the ridge where the tarpaulin was supported by the fence and a burning smell all around.

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Later , that evening , there were floods all over the place after the storm had passed on and some roads were impassable. Long after we had eaten our usual huge dinner and we were settling down for the evening, Angus was seen in the distance, coming along the road on his stolen bicycle. Everyone in the camp came to the gate and lined up as a guard of honour. A more bedraggled specimen I have yet to see. What a time he must have had. Nobody laughed. It was all so formal.

“ Evening Angus. ” Dave welcomed in a solemn voice. “ It’s been a stormy day , wouldn’t you say?”

Strangely enough, Angus did not see the funny side of the event. He threw the bike down and stormed into the cookhouse for his dinner, to find the place empty. He let out a huge bellow of Scottish imprecations .

“ That’s a pity Angus. Missed your dinner?”

The assembly was just going to break up when I heard someone shout.

“ Bloody Hell man! He’s got Fred’s shotgun .”

“No Angus. No!”

“ It was a joke”

“Watch me laugh. ” Angus shouted and let fly.

He stood still like a sentry and fired whenever anybody made a move towards their sleeping quarters. Naturally we all took the hint and fled the camp. Nobody got much sleep that night. I do not know where the others went, and there were at least sixty of them, but I know that I slept in the garden shed of Bill our ganger, being licked to death by Daisy, his pet labrador.

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When, in the following November, I was called up into the Army, as so many of us were, well, compared with the sort of thing that went on those beautiful Yorkshire Moors, I found the Army experience quite tame; that is, until I lost my rifle.

That, as they say - " Is another story".

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### **Astronomy Podcasts**

For those armchair astronomers like me who prefer others to do the hard work while we lay back in our comfortable seats with a glass in our hand why not try an astronomy broadcast. This relatively new feature on the Internet allows you to listen to people far cleverer than oneself talking about their involvement with professional astronomy.

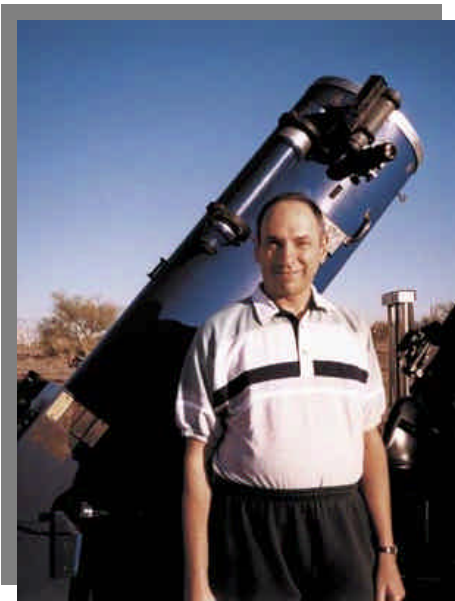
Just Google for “astronomy, podcast” and dozens of fascinating talks appear on your screen. I recommend David Levy’s sessions on the [www.starizona.com](http://www.starizona.com) site. *Editor*

## **Finding comets? Easy! With a little help from technology**

from David Levy

The morning of October 2, 2006, was partly cloudy and warm as I set up Miranda, my 16-inch f/5 Newtonian reflector, to begin my comet hunt. As other telescopes whirred nearby, taking their automated search exposures for comets, I began searching along a strip of sky that soon brought me to Saturn. Then I did a double take. About  $0.6^\circ$  away there was a small, fuzzy, 10th-magnitude glow. My first reaction was that it must be a ghost image of some kind. But it looked too real for that. To check, I looked through my Meade 8-inch "finderscope," which was mounted atop the 16-inch just for emergencies like this. The object appeared fainter in the 8-inch, but in exactly the same place.

Riding at the base of the 16-inch was a laptop computer that was running David Lane's *Earth Centered Universe* program. This program allowed me to track the telescope's position and display its field of view on the monitor in real time. I immediately was able to see that there were no bright NGC objects in the vicinity of the suspected comet.



David Levy poses in front of the 16-inch f/5 Newtonian reflector that he used to discover comet C/2006 T1.

But I've been fooled by reflections before, especially with CCD images. As dawn began, I decided on a final check. One of my survey telescopes — a Meade 14-inch telescope with HyperStar coupled to a Canon digital SLR camera — had just completed its morning run. I quickly aimed it at the suspect's position and took a series of exposures. I went inside the house, downloaded the images, and then displayed them on the computer screen. The images clearly showed a real, moving object. With my heart pounding with excitement, I e-mailed a quick report to Dan Green of the Central Bureau for Astronomical Telegrams, notifying him of the possible new comet. But I still wasn't 100% sure.

So I called my friend Tom Glinos in Ontario, Canada, whose remotely operated 25½-inch RC Optical Systems telescope at Jarnac Observatory has been doing yeoman's work in finding asteroids over the last two years. "I instinctively knew something interesting had happened," Glinos recalls. "We have checked each other's 'discoveries' in the past, and this case was no different. David and I carefully examined his images, trying to eliminate any possible optical illusions or misidentifications. In the end we were left with a comet with no visible tail."

*Wendee Levy*

Later in the day, a simple message that gave the object's position and brightness went up quietly on the Minor Planet Center's NEO (Near-Earth Object) Confirmation Page. This way, observers around the world could try to confirm the new comet before it rose again for me. Richard Miles, president of the British Astronomical Association, was among the first observers. "I was totally fooled by Saturn, being less than a degree away," he notes. "I first thought [the object] might have been confused with one of Saturn's satellites. Then I mistook the glow seeping into the side of the [CCD] frame as being Saturn itself. In fact, it was the new comet."

The following morning, October 3rd, the comet had moved enough away from Saturn to shine beautifully by itself. Later that day Dan Green issued IAU *Circular 8757*, which announced Comet Levy, C/2006 T1, to the rest of the world. After a hectic and wondrous 24 hours, helped by fellow observers in Hungary, Italy, the UK, and the US, I finally enjoyed my first uninterrupted look at this new cosmic interloper.

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## **When is a Planet Not a Planet?**

by Neil Haggath

How many planets are there in the Solar System? For 70 years, every child could answer that with confidence - nine! But in the last few years, that simple question has been the subject of a great deal of controversy, and some of the most heated debates in the history of astronomy. Now, finally, it's official; the Solar System has only *eight* planets! On 24 August 2006, the International Astronomical Union voted to demote Pluto from its former status as a planet, and classify it with the new term *dwarf planet*.

Before I explain how this came about, let's briefly look at a little history, and how Pluto came to be discovered. The planets out to Saturn have been known since ancient times - though of course, it wasn't until the 17<sup>th</sup> Century, and the invention of the telescope, that anyone realised that the "wandering stars" were worlds like our own. The first planet to be discovered in recorded history was Uranus, by Sir William Herschel in 1781.

By the 1840's, it was clear that Uranus wasn't behaving quite as it should. Two astronomers, John Couch Adams in England and U. J. J. le Verrier in France, independently concluded that its orbital motion was being perturbed by another planet, even further from the Sun, and as yet unseen. They even predicted where in the sky the new planet would be. A number of people searched for it, and in 1846, Johann Galle and Heinrich d'Arrest, using le Verrier's calculations, discovered Neptune. This was hailed as a great triumph for Newtonian physics.

But all was still not quite right. It was later found that there were further perturbations to the motion of both Uranus and Neptune, which couldn't be explained. Percival Lowell predicted the existence of yet another planet, even further away, and initiated an intensive search for it which lasted many years. Sadly, Lowell didn't live to see the result of his efforts; it wasn't until 1930, 14 years after his death, that the young Clyde Tombaugh found the body which became known as Pluto, almost exactly where Lowell's calculations predicted it would be. It seemed natural and logical to regard it as the Ninth Planet.



Clyde Tombaugh



Pluto, now a trans-Neptunian dwarf Planet

But *had* Lowell been right, after all? Unfortunately, no. His predicted planet had to have several times the mass of Earth, but it soon became apparent that Pluto was a small body - smaller than Mercury, and vastly too small to produce the observed perturbations to Uranus and Neptune. It had been merely a lucky coincidence, that it happened to be in the right place at the right time during Tombaugh's search. This led many astronomers to believe that another large planet must be waiting to be discovered - but searches for the hypothetical Tenth Planet were unsuccessful. In fact, as the years went on, and Pluto was observed with more sophisticated techniques, estimates of its size became ever smaller; we now know that its diameter is a mere 2274 km - smaller than the Moon, Titan and the Galilean satellites of Jupiter - and its mass only about 1/500 that of Earth.

Pluto's orbit also differs greatly from those of the other planets. It's much more eccentric - as is well known, it actually comes inside the orbit of Neptune for 20 years of each 248-year orbit - and much more highly inclined; while the planes of all the other planetary orbits lie within 7° of each other, Pluto's is inclined at 17° to that of Earth. But strange

though it is, it continued to be regarded as the Ninth Planet, because it was a solitary body out there in the outer reaches of the Solar System. Or so we thought...

In 1978, Pluto was found to have a satellite, which was named Charon. Charon is roughly half the size of Pluto itself, making it the biggest satellite, in comparison with its parent body, in the Solar System. This seemed to give extra credence to Pluto's status as a planet. Very recently, two other tiny satellites have been discovered.

But we would later find that the outer Solar System is nowhere near as simple as we thought. In the 1950's, Gerard Kuiper postulated, as a consequence of theories of the formation of the Solar System, that a large number of small bodies may exist, orbiting the Sun at distances greater than that of Neptune. Four decades later, he was proved right; the first object of what we now call the Kuiper Belt was discovered in 1992.

Throughout the '90's, hundreds of Kuiper Belt objects, or KBOs, were discovered - some orbiting between Neptune and Pluto, and some beyond Pluto. It became clear that Pluto was not, after all, a planet orbiting in isolation, but was in fact just one among many, probably thousands, of bodies "out there". It simply happened to be the biggest. Some astronomers began to question the status of Pluto, asking whether we should continue to regard it as a planet, or simply as the biggest Kuiper Belt object. However, as all the other KBOs were tiny in comparison, the majority preferred to leave Pluto alone, as it still appeared to be in a class of its own.

All this changed abruptly in 2002, with the discovery of another KBO of substantial size. The object, now known as Quaoar, is 1250 km across, roughly half the size of Pluto. It orbits half a billion kilometres further from the Sun than Pluto, at a mean distance of 42 AU, compared with Pluto's 39. ( One astronomical unit, or AU, is the Earth's mean distance from the Sun). The following year saw the discovery of another KBO, named Sedna, which is even bigger than Quaoar, though at 1770 km, still smaller than Pluto. It's also twice as far from the Sun, at a mean orbital radius of 86 AU!

These discoveries prompted serious and heated debates over Pluto's status. Distinguishing it from the rest of the KBOs purely in terms of size was now nonsensical, and many astronomers proposed that it was equally nonsensical to continue regarding it as a planet. Others insisted - as did many members of the public - that we should leave it alone for reasons of history and tradition - but that view was based on sentiment, not science. In fact, the demotion of a planet is not without precedent. When Ceres, the first asteroid, was discovered in 1801, it was initially regarded as a new planet. Prior to its discovery, the so-called "Bode's Law" - a supposed mathematical relationship between planetary distances, which we now know to be completely unfounded - had "predicted" the existence of an unseen planet between Mars and Jupiter, and a society of astronomers calling themselves the "Celestial Police" had organised a hunt for it - though Guiseppe Piazzi, who discovered Ceres, wasn't a member.

The next three asteroids were also initially regarded as planets. Then, as more of them were discovered, it became clear that there were a great number of small bodies orbiting

in a belt, and Ceres, Pallas, Juno and Vesta were relegated to the status of asteroids or “minor planets”.

The biggest problem, in deciding whether to classify Pluto as a planet, was that there was no formal definition of what a planet *is!* Where exactly do you draw the line between a planet and a “minor planet” or “small body”? It was clear that a formal definition needed to be established - but this in itself became the subject of intense debate. Some of the “leave Pluto alone” traditionalists proposed that a planet should simply be defined as a body larger than some arbitrary limiting diameter - which of course would be conveniently defined so as to include Pluto, but exclude any other KBOs. Strictly speaking, this would then also have included the Moon, Io, Europa, Ganymede, Callisto and Titan, all of which are bigger than Pluto - but of course, there *is* an obvious distinction between planets and satellites. A planet is a body which directly orbits the Sun; a satellite is a body which orbits another body, which in turn orbits the Sun.

Others suggested a somewhat more scientific definition; a planet is a body in orbit around the Sun, which is large enough for its gravity to have formed it into a spherical shape. But that would have included not only Pluto, but also Quaoar, Sedna and Ceres! Still others insisted that Pluto’s possession of a satellite should qualify it as a planet - but then, we already know that several main belt asteroids, which are far too small to meet any of the other criteria, also have satellites - albeit tiny ones, probably just pieces chipped off the parent bodies - as do Sedna and at least a couple of other KBOs.

In 2005, as the debate was still raging, the biggest spanner of all was thrown into the works, in the shape of a recently discovered KBO known as 2003UB<sub>313</sub>. This is the most distant Solar System body yet found; it has a highly eccentric orbit, with a period of 560 years. Its perihelion distance is 38 AU, but its aphelion is at a whopping 97 AU - two and a half times Pluto’s distance! Its orbit is highly inclined, at 45° to that of Earth. It also has a tiny satellite.

In 2005, Professor Mike Brown and his team, at CalTech, used observations by the Hubble Space Telescope to measure the diameter of 2003UB<sub>313</sub>. It turned out to be about 2400 km - slightly bigger than Pluto! So now we knew that Pluto really *was* just another KBO; it had even lost its distinction of being the biggest!

So those who wanted to classify planets simply by size were faced with an obvious dilemma. If Pluto is a planet, then by definition, so is 2003UB<sub>313</sub>. Conversely, if 2003UB<sub>313</sub> isn’t, then Pluto can’t be!

Clearly, a precise definition was needed, to distinguish true planets from minor planets and smaller bodies. This was discussed at this year’s General Assembly of the IAU in Prague; after much lively debate, the new term *dwarf planet* was coined, and a convention was established, whereby bodies in orbit around the Sun are now divided into three categories - planets, dwarf planets and small bodies.

A true *planet* is a body which dominates its region of space. That is, its gravitational influence has swept the surrounding region clear of primordial debris, and has either

captured or expelled any other sizeable bodies which once had similar orbits. This clearly applies to the eight planets from Mercury to Neptune, but not to Pluto or any other KBO, or any of the asteroids.

The remaining bodies - those which don't dominate their surrounding regions, but share their environs with many others - are subdivided as follows. A *dwarf planet* is a body large enough for its gravity to have made it spherical; this criterion encompasses Pluto, Quaoar, Sedna, 2003UB<sub>313</sub> and Ceres, the biggest main belt asteroid. No doubt it will also apply to more KBOs, which are yet to be discovered. Those bodies too small to be spherical are simply termed *small bodies* - though of course these can still be classified into two main groups, the asteroids and KBOs.

Some astronomers, including dear old Sir Patrick, claim that this new system is too complex, and think that we should stick to just two classes, planets and minor planets. But it seems the best way to resolve the dilemma of how to classify Pluto and its similar-sized brethren; these definitions were officially adopted by the IAU on 24 August.

Just a couple of weeks after the IAU ruling, that troublesome object, 2003UB<sub>313</sub>, was given an official name - Eris. In Greek mythology, Eris was the goddess of discord, who caused people to quarrel and fight with each other. Its satellite was named Dysnomia, after Eris' daughter.

Given the quarrelling and discord that Eris has caused among astronomers, seldom has a name been more appropriate!

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## **So What Exactly IS a Planet?**

from Rob Peeling

Here is the full text of the final two resolutions adopted at the IAU XXVIth General Assembly in Prague, on August 24, 2006.

### **RESOLUTIONS**

Resolution 5A is the principal definition for the IAU usage of "planet" and related terms.

Resolution 6A creates for IAU usage a new class of objects, for which Pluto is the prototype. The IAU will set up a process to name these objects.

### **IAU Resolution: Definition of a "Planet" in the Solar System**

Contemporary observations are changing our understanding of planetary systems, and it is important that our nomenclature for objects reflect our current understanding. This applies, in particular, to the designation "planets". The word "planet" originally



described “wanderers” that were known only as moving lights in the sky. Recent discoveries lead us to create a new definition, which we can make using currently available scientific information.

### **RESOLUTION 5A**

The IAU therefore resolves that planets and other bodies in our Solar System, except satellites, be defined into three distinct categories in the following way:

(1) A “planet”<sup>1</sup> is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (c) has cleared the neighbourhood around its orbit.

(2) A “dwarf planet” is a celestial body that (a) is in orbit around the Sun, (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape<sup>2</sup>, (c) has not cleared the neighbourhood around its orbit, and (d) is not a satellite.

(3) All other objects<sup>3</sup>, except satellites, orbiting the Sun shall be referred to collectively as “Small Solar System Bodies”.

<sup>1</sup> *The eight planets are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.*

<sup>2</sup> *An IAU process will be established to assign borderline objects into either “dwarf planet” and other categories.*

<sup>3</sup> *These currently include most of the Solar System asteroids, most Trans-Neptunian Objects (TNOs), comets, and other small bodies.*

### **IAU Resolution: Pluto**

### **RESOLUTION 6A**

The IAU further resolves: *Pluto is a “dwarf planet” by the above definition and is recognized as the prototype of a new category of trans-Neptunian objects<sup>1</sup>.*

<sup>1</sup> *An IAU process will be established to select a name for this category.*

That’s clear enough isn’t it? Well, no. Not really. Dr Alan Stern, who leads the US space agency’s New Horizons mission to Pluto and did not vote in Prague, told BBC News: -

*"It's an awful definition; it's sloppy science and it would never pass peer review - for two reasons. Firstly, it is impossible and contrived to put a dividing line between dwarf planets and planets. It's as if we declared people not people for some arbitrary reason, like 'they tend to live in groups'. “Secondly, the actual definition is even worse, because it's inconsistent.”*

Owen Gingerich chaired the IAU’s planet definition committee and helped draft an initial proposal raising the number of planets from nine to 12.

The Harvard professor emeritus blamed the outcome in large part on a "revolt" by dynamicists - astronomers who study the motion and gravitational effects of celestial objects.

*"In our initial proposal we took the definition of a planet that the planetary geologists would like. The dynamicists felt terribly insulted that we had not consulted with them to get their views. Somehow, there were enough of them to raise a big hue and cry,"* Professor Gingerich said.

*"Their revolt raised enough of a fuss to destroy the scientific integrity and subtlety of the [earlier] resolution."*

He added: *"There were 2,700 astronomers in Prague during that 10-day period. But only 10% of them voted this afternoon. Those who disagreed and were determined to block the other resolution showed up in larger numbers than those who felt 'oh well, this is just one of those things the IAU is working on'."*

Source: <http://news.bbc.co.uk>

My personal view is that these resolutions are a disaster for the IAU. The charge, and it is a grave one, is that the members of the IAU have violated the cardinal rule of science and allowed their emotions to prevail over scientific method.

The original draft resolution established two conditions to define a planet, it is in an independent orbit around the sun and that is in hydrostatic equilibrium (helpfully adding, "nearly round" and with a mass above  $5 \times 10^{20}$ kg and diameter greater than 800km being required to satisfy this condition). This was a definition that could be applied completely objectively and was therefore scientifically sound.

Unfortunately this definition made Pluto, Charon, Ceres, and 2003 UB<sub>313</sub> all planets and this was simply anathema to some IAU delegates. The result was the hasty addition of the additional requirement to have cleared the neighbourhood around its orbit. As Alan Stern points out this fails the test as being capable of objectively applied and appears to have been a clumsy stratagem to ensure that Pluto got kicked out from planetary status. Poor Clyde Tombaugh (Pluto's discoverer) would be devastated at this arbitrary treatment of his lifetime achievement.

One other remark (on the subject of Pluto's demotion as a planet) comes from Eileen Ryan who once shared an office with Clyde Tombaugh and who favours the status quo. *"Every time the subject came up Clyde was just crushed"*, she said.

Source: *Beyond Pluto, John Davies, Cambridge University Press, 2001*

The IAU resolution is also deeply unsatisfying science in two other ways. Firstly, it restricts itself to the Solar System only and fails to take any note of the discovery of exoplanets. Secondly, the resolution fails to consider any lower limit to Small Solar System Bodies. When is something not a body at all but simply dust or other detritus?

**The draft resolution awkwardly and imperfectly handled exoplanets and specifically mentioned an upper limit to planets before ducking the issue.**

### **Warmest World in 12,000 Years**

Hot enough for you? A new NASA study has found that global temperatures are nearing their hottest level in more than 12,000 years - since the last glaciers covered large portions of the planet. In fact, global temperatures have been going up approximately 0.2° Celsius (.36° Fahrenheit) per decade for the past 30 years. In fact, global temperatures are now within one degree Celsius of the hottest temperatures measured in the last million years.

A new study by NASA climatologists finds that the world's temperature is reaching a level that has not been seen in thousands of years.

The study appears in the current issue of the Proceedings of the National Academy of Sciences, authored by James Hansen of NASA's Goddard Institute for Space Studies, N.Y. and colleagues from Columbia University, Sigma Space Partners, Inc., and the University of California at Santa Barbara (UCSB). The study concludes that, because of a rapid warming trend over the past 30 years, the Earth is now reaching and passing through the warmest levels in the current interglacial period, which has lasted nearly 12,000 years. This warming is forcing a migration of plant and animal species toward the poles.

The study includes worldwide instrumental temperature measurements during the past century. These data reveal that the Earth has been warming at the remarkably rapid rate of approximately 0.2° Celsius (.36° Fahrenheit) per decade for the past 30 years. This observed warming is similar to the warming rate predicted in the 1980s in initial global climate model simulations with changing levels of greenhouse gases.

"This evidence implies that we are getting close to dangerous levels of human-made (anthropogenic) pollution," said Hansen. In recent decades, human-made greenhouse gases (GHGs) have become the dominant climate change factor.

The study notes that the world's warming is greatest at high latitudes of the Northern Hemisphere, and it is larger over land than over ocean areas. The enhanced warming at high latitudes is attributed to effects of ice and snow. As the Earth warms, snow and ice melt, uncovering darker surfaces that absorb more sunlight and increase warming, a process called a positive feedback. Warming is less over ocean than over land because of the great heat capacity of the deep-mixing ocean, which causes warming to occur more slowly there.

Hansen and his colleagues in New York collaborated with David Lea and Martin Medina-Elizade of UCSB to obtain comparisons of recent temperatures with the history of the Earth over the past million years. The California researchers obtained a record of tropical ocean surface temperatures from the magnesium content in the shells of microscopic sea surface animals, as recorded in ocean sediments.

One of the findings from this collaboration is that the Western Equatorial Pacific and Indian Oceans are now as warm as, or warmer than, at any prior time in the Holocene.

The Holocene is the relatively warm period that has existed for almost 12,000 years, since the end of the last major ice age. The Western Pacific and Indian Oceans are important because, as these researchers show, temperature change there is indicative of global temperature change. Therefore, by inference, the world as a whole is now as warm as, or warmer than, at any time in the Holocene.

According to Lea, “The Western Pacific is important for another reason, too: it is a major source of heat for the world’s oceans and for the global atmosphere.”

In contrast to the Western Pacific, the researchers find that the Eastern Pacific Ocean has not shown an equal magnitude of warming. They explain the lesser warming in the East Pacific Ocean, near South America, as being due to the fact this region is kept cool by upwelling, rising of deeper colder water to shallower depths. The deep ocean layers have not yet been affected much by human-made warming.

Hansen and his colleagues suggest that the increased temperature difference between the Western and Eastern Pacific may boost the likelihood of strong El Ninos, such as those of 1983 and 1998. An El Nino is an event that typically occurs every several years when the warm surface waters in the West Pacific slosh eastward toward South America, in the process altering weather patterns around the world.

The most important result found by these researchers is that the warming in recent decades has brought global temperature to a level within about one degree Celsius (1.8° F) of the maximum temperature of the past million years. According to Hansen “That means that further global warming of 1 degree Celsius defines a critical level. If warming is kept less than that, effects of global warming may be relatively manageable. During the warmest interglacial periods the Earth was reasonably similar to today. But if further global warming reaches 2 or 3 degrees Celsius, we will likely see changes that make Earth a different planet than the one we know. The last time it was that warm was in the middle Pliocene, about three million years ago, when sea level was estimated to have been about 25 meters (80 feet) higher than today.”

Global warming is already beginning to have noticeable effects in nature. Plants and animals can survive only within certain climatic zones, so with the warming of recent decades many of them are beginning to migrate poleward. A study that appeared in Nature Magazine in 2003 found that 1700 plant, animal and insect species moved poleward at an average rate of 6 kilometers (about 4 miles) per decade in the last half of the 20th century.

That migration rate is not fast enough to keep up with the current rate of movement of a given temperature zone, which has reached about 40 kilometers (about 25 miles) per decade in the period 1975 to 2005. “Rapid movement of climatic zones is going to be another stress on wildlife” according to Hansen. “It adds to the stress of habitat loss due to human developments. If we do not slow down the rate of global warming, many species are likely to become extinct. In effect we are pushing them off the planet.”

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## **Planetarium & Observatory** **Autumn & Winter Events 2006/7.**

from Dr Ed Restall, Director

Located on Wynyard Woodland Park (formerly Castle Eden Walkway), near Thorpe Thewles, signposted from the A177, (the Durham/Sedgefield road) Stockton-on-Tees. This star theatre, see it to believe it, was opened in 2002, and over 900 shows have been enjoyed by schools, colleges, community groups and the general public. In this modern age, light pollution tends to spoil the view of the night sky, an area of outstanding natural beauty, but here we have a chance to enjoy the stars, as they should be seen.

### **Public Planetarium Shows:**

*Public shows last for about one hour.*

- Friday 1<sup>st</sup> September 2006, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 15<sup>th</sup> September 2006, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 6<sup>th</sup> October 2006, 7:30p.m. : “Sun Signs”
- Friday 20<sup>th</sup> October 2006, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 3<sup>rd</sup> November 2006, 7:30p.m. : “Sun Signs”
- Friday 17<sup>th</sup> November 2006, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 1<sup>st</sup> December 2006, 7:30p.m. : “Sun Signs”
- Friday 15<sup>th</sup> December 2006, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 5<sup>th</sup> January 2007, 7:30p.m. : “Pyramids in the Sky”
- Friday 19<sup>th</sup> January 2007, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 2<sup>nd</sup> February 2007, 7:30p.m. : “Pyramids in the Sky”
- Friday 16<sup>th</sup> February 2007, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 2<sup>nd</sup> March 2007, 7:30p.m. : “Pyramids in the Sky”
- Friday 16<sup>th</sup> March 2007, 7:30p.m. : “What’s Up in the night sky this month?”
- Friday 6<sup>th</sup> April 2007, 7:30p.m. : “Pyramids in the Sky”
- Friday 20<sup>th</sup> April 2007, 7:30p.m. : “What’s Up in the night sky this month?”

*Details as follows:*

#### **“What's Up in the Night Sky?”**

Find out what stars and planets are in the sky for the coming month, and keep in touch with any special events such as comets, shooting stars and eclipses.

#### **“Sun Signs”**

Take a tour of the Zodiac and discover the origins of astrological sun signs. Uncover the real science and wonder behind your birth sign and dispel the myths and fantasy of astrology once & for all.

## **“Pyramids in the Sky”**

Discover the wonders of ancient Egypt and their alleged astronomical significance. Marvel at the theories of the creation of the heavens on earth in the Fourth Dynasty of the Old Kingdom. Egyptology meets astronomy in an exciting and interesting show.

### **Planetarium Events:**

*All events are at Wynyard Woodland Park unless otherwise stated. All children under the age of 16 must be accompanied by an adult.*

- Friday 1<sup>st</sup>, 8<sup>th</sup>, 15<sup>th</sup>, 22<sup>nd</sup> & 29<sup>th</sup> September 2006, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 29<sup>th</sup> September 2006, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup> & 27<sup>th</sup> October 2006, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 27<sup>th</sup> October 2006, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 3<sup>rd</sup>, 10<sup>th</sup>, 17<sup>th</sup> & 24<sup>th</sup> November 2006, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 24<sup>th</sup> November 2006, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 1<sup>st</sup>, 8<sup>th</sup>, 15<sup>th</sup>, 22<sup>nd</sup> & 29<sup>th</sup> December 2006, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 29<sup>th</sup> December 2006, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup> & 26<sup>th</sup> January 2007, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 26<sup>th</sup> January 2007, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup> & 23<sup>rd</sup> February 2007, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 23<sup>rd</sup> February 2007, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> & 30<sup>th</sup> March 2007, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 30<sup>th</sup> March 2007, 7:30p.m. : *Telescope Club* inside the Planetarium
- Friday 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup> & 27<sup>th</sup> April 2007, 9:00p.m. : *Public Observing* outside the Planetarium
- Friday 27<sup>th</sup> April 2007, 7:30p.m. : *Telescope Club* inside the Planetarium

### **Public Observing**

See the wonders of the universe through the observatory telescopes. The Wynyard Observatory is located near the planetarium and houses a large reflecting telescope and a state of the art computer controlled system. Through these can be seen clusters of stars and clouds of gas in our own Milky Way galaxy, plus many more galaxies in their own right out in the depths of the universe. Public observing nights take place on Friday evenings from September to April, from 9:00 pm onwards. On Friday evenings when a planetarium show or the Telescope Club takes place, visitors can observe afterwards if the sky is clear. Come along, free of charge, but only if the skies are clear!

## **Telescope Club**

Calling all star-struck youngsters (and the young at heart)! Do you have a telescope? Did you get one last Christmas or as a birthday present? Would you like to meet other people with their own telescopes, and find out how best to see the stars and planets?

The Telescope Club is free, and aimed largely at youngster's aged 10-14 (accompanied by an adult), however adults are most welcome. Bring your telescope with you to see the night sky (weather permitting!). There's a chance to use the Wynyard Observatory's large reflecting and computer controlled telescopes and help to start the Telescope Club's own magazine with your observations in it! Meetings are from 7.30p.m. - 9.00p.m. (September to April) at the Planetarium.

Public Planetarium Show charges apply: Adults £3.50, concessions £2, family ticket (2 adults & 2 children) £7. We reserve the right to change the title and subject matter of the above planetarium shows, but strive to keep to this schedule. Public shows are usually deemed unsuitable for children under the age of 6, please call us for advice on shows, events and suitable age ranges. For further information contact: Dr. Ed Restall on 01740 630544, or e-mail [director@wynyard-planetarium.net](mailto:director@wynyard-planetarium.net). The planetarium is accessible to wheelchair users.

The Wynyard Planetarium & Observatory is a joint venture between Stockton Borough Council and the Cleveland and Darlington Astronomical Society, supporting science education on Teesside and across the northeast. Visit our website at [www.wynyard-planetarium.net](http://www.wynyard-planetarium.net)

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## The Thomas Wright Trophy

From Neil Haggath (Hon Sec)

This year, we are again hosting the annual Thomas Wright Trophy quiz competition, contested by CaDAS, York and Durham. The questionmaster will be Yours Truly, so the contestants can look forward to some fiendish questions – evil laugh!

The competition will take place at our November meeting this year, instead of October, which has now become traditional. This is because we are also hosting Yorkshire Astromind; the traditional date for this is the second Saturday in October, which of course is the day after our October meeting. We thought that two quizzes in two days might have been a bit much for some people!

We need three volunteers for the CaDAS team; anyone interested, please let me know by the time of the September meeting. We would prefer not to have to resort to what happened on one occasion, when people were “pressganged” into competing at literally ten minutes’ notice! Don’t worry if you think you’re not good enough; it’s only a bit of fun – though of course, we do hope to keep the trophy in its Rightful Place.

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## Transit Tailpieces

### Custom Telescopes UK.

Glen Oliver, a long-time member of the Society, can supply telescopes and accessories of all kinds. He operates from Hartlepool and has a website,  
<http://homepage.ntlworld.com/glen.oliver/custom.htm>  
e-mail [glen.oliver@ntlworld.com](mailto:glen.oliver@ntlworld.com)

Support local businessmen! Glen tells me that he now has an Astronomy and Space books page on his website

Transit Adverts If you wish to let members know what you want to sell or what you are looking for, please send an advert for the magazine.

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CaDAS Website Don’t forget to visit our very own website at  
[www.wynyard-planetarium.net](http://www.wynyard-planetarium.net).

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Articles Please send contributions for the newsletter to Bob Mullen, 18 Chandlers Ridge, Nunthorpe, Middlesbrough, TS7 0JL, 01642 324939 ([b2mullen@hotmail.com](mailto:b2mullen@hotmail.com))  
Copy deadline date is the 25<sup>th</sup> of each month.

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