

## U3Astronomy meeting 27-06-2008

### Miscellanastronomy

#### Remarkable short pieces of information and strange news items collected over the past months

- Why do stars twinkle and planets (almost) not?

Stars twinkle, spoiling our view when looking through a telescope. Stars are never bigger than a dot in the sky, and the very narrow beam of light is distorted by the Earth's atmosphere. So the world's best telescopes are situated on high mountains in dry regions.

How much a star twinkles does not only depend on how turbulent the air is, but also on how high the star is above the horizon (=length of trajectory through the curved atmosphere).

Planets do not twinkle, or anyway much less than stars. That's because planets are discs, roughly 200-1200 times larger than stars (as seen from Earth).

- What destroyed Sodom and Gomorrah?

We know that the Bible tells us that these cities – situated near the Dead Sea - were punished by God because of their homosexual scandals – but astronomers recently found another explanation.

In the mid-19<sup>th</sup> century a circular stone tablet – with a pattern of lines and symbols - was found in the remains of the library of Nineveh. A researcher at Bristol University has now cracked the tablet's code and says that it describes how an asteroid, probably with a diameter of more than half a mile, flew low over the Middle-East before crashing in the Austrian Alps, on its way destroying everything it passed in an area of about 1 mln sq.km. So obviously, Sodom and Gomorrah were not the only cities destroyed at the time.

- Was the extinction of the dinosaurs not caused by a meteorite, but by insects?

American scientists say that it was an 'explosion of insects', that spread disease and killed plants that were eaten by the dinosaurs. The meteorite impact (+ climate change caused by it) may have played an additional role – like volcanism – but with only that it cannot be explained why the extinction took millions of years. So the impact-story does not have to be totally wrong, but the whole situation was probably much more complex.

- An astronomical scrap heap

Since *Sputnik* some 4600 rocket launches have taken place, delivering some 6000 satellites. About 800 satellites are operational, the rest – weighing over 2 million kg - is 'space junk', including rocket stages dumped by rockets launching satellites and other materials. There are some 35 million pieces. Most of the objects are very small, but still large enough to disable a satellite. Of the larger objects, over 10 cm in size, some 12,000 are known and catalogued. An *International Association for the Advancement of Space Safety* is trying to keep things more or less under control.

- Want to buy a meteorite?

Possible, but you'll need some cash. Last October the Bonham Auction House organised the first meteorite auction, offering 53 lots with prices up to over 1 million dollars. Obviously you will need to have some money in the bank. But if you are lucky (or not ?!) you may one day find one in your back garden: more than 30 meteorites are believed to land in the UK each year.

- Or do you want to buy a ticket into Space?

Our fellow-townsmen Dr Ray Wright has developed plans to construct three spacecraft designed to give tourists an experience of weightlessness + a view of Earth from space. The vehicles will carry two pilots and 8 passengers up to an altitude of over 300 km (c. 200 miles). Dr Wright set up the *Spacefleet Club* on the Internet, of which you can become a member for the modest amount of £ 45 per year, with the promise of a reduction on the standard fare of about £ 100,000. Look at [www.spacefleet.org.uk](http://www.spacefleet.org.uk)

## Recent news

- On 8 April the *Soyuz* carried two Russian cosmonauts and one from S.Korea (the first) to the ISS. The *Soyuz* docked with the ISS on Thursday 10/4. It returned to Earth on Saturday 19/4, landing in Kazakhstan, some 475 km or almost 300 miles further West than planned! The cause was that one of the three parts of the spacecraft – a propulsion module – separated too late from the module in which the cosmonauts were travelling. It was the second time in a row that such a thing happened, and NASA is rather worried about this, as crew will depend totally on the *Soyuz* for flying to and from the ISS when after 2010 the shuttle will be retired – until the Shuttle's successor (*Orion*) will be ready in 2015.
- Europe's 'space truck' or ATV (Automated Transfer Vehicle) *Jules Verne* docked safely with the ISS on Thursday 3-4. It delivered some 4,500 kg of supplies (water, oxygen, food, fresh clothing and scientific materials). On 7/8 the ATV will undock from the ISS, its speed will be reduced and as a result it will fall back to Earth and burn up in the atmosphere together with c. 4000 kg of the station's trash (somewhere over the South Pacific). A new ATV is under construction already.  
The ATV can also control the ISS's orientation by firing its thrusters. That was tested on Saturday 5/4. This is very essential, as the ISS gradually tends to fall back towards the Earth by about 100 metres per day.
- On 31/05 the shuttle *Discovery* was launched from the *Kennedy Space Centre* carrying the Japanese *Kibo* Laboratory to the ISS. It is the biggest module attached to the ISS – about 11 metres long, the size of a large tour bus. In addition to that *Discovery* also brought a spare pump for the Space Station's Russian toilet. *Discovery* returned to Florida on 14th June.
- *Spirit* and *Opportunity*, the two Mars Rovers launched in January 2004, supposed to function for 90 days, are now, more than 4 years later, still going strong. There are, however, some minor problems of old age. One of *Opportunity's* robotic arms does not function anymore, while one of *Spirit's* six wheels has got blocked. This has, however, turned out to be a big advantage, as the jammed wheel gouged out a narrow trench, in which white silica was discovered. And silica deposits only form in water, so this discovery means almost certainly that in the past water must have been present in large quantities.
- On 25/05 the *Phoenix Mars Lander* descended to Mars' surface. It was a big 'nail-biting' event for the NASA staff involved, as more than 50% of all previous missions to Mars failed to land safely! The journey of 275 mln km had lasted for 10 months, and radio signals took 15 minutes to reach Earth. That meant that nothing could be changed or adjusted during the landing procedure, as instructions to the spacecraft would always arrive too late.  
The whole landing procedure took about 7 minutes. *Phoenix* entered the Mars atmosphere at a speed of over 22,000 km/h and was slowed down by rockets and a parachute.  
*Phoenix* has a robotic arm with 4 electrical motors, ending in a scoop with which material from the surface in the N.polar region can be dug up and delivered to a small laboratory on board of the lander. It has already found some hard bright material just under the surface – just as it was expected – and it has been proven that this is water ice. *Phoenix* will now look for organic material in the ice which could give an indication of former life on Mars.