visible with binoculars, also forming a number of interesting and unusual shapes. (Astronomy Now, June 2010)

The Earth Moves: The Story of the Foucault Pendulum

Talk by David Le Conte,

Friday, 16th July 2010, 1.00 pm
at the Town Church,St Peter Port
(preceded at 12.30 pm by a light lunch.)

Foucault pendulum at the Town Church.

Monday 12th to Saturday 17th July.

Observatory Tidy Up Day (with some Solar Observing

Saturday 4th September 2010

Opening Evenings for 2010

27	July	9.30 pm
03	August	9.30 pm
10	August	9.30 pm
17	August	9.00 pm
24	August	9.00 pm
31	August	9.00 pm
12	October	8.00 pm

Please note, we are now suggesting donations of £2 per adult and £1 per child for these evenings.

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Material for, and enquiries about Sagittarius should be sent to the Editor

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Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

July – September 2010

Forthcoming Events

Perseids BBQ

Observatory: 12th August:
7.30 pm

Public Open Evenings

27th July: 9.30 pm
3rd August: 9.30 pm
10th August: 9.30 pm
17th August: 9.00 pm
24th August: 9.00 pm
31st August: 9.00 pm

Public Lectures:

The Earth Moves: The Story of the Foucault Pendulum

Talk by David Le Conte,
Friday, 16th July 2010, 1.00 pm

Town Church, St Peter Port

In addition, the Section meets at the Observatory every Tuesday evening, and Friday if clear for observing.

Inside

Inserts

Star chart

Sunset, sunrise, moonset and moonrise times

Foucault Pendulum in the Town Church

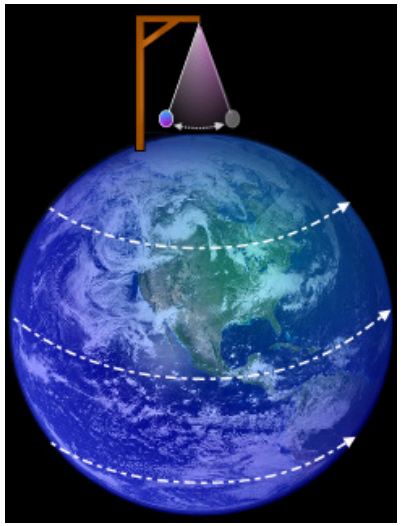
For six days in July, from Monday, 12th to Saturday, 17th, there will be a Foucault Pendulum in the Town Church.

The pendulum provides evidence for the rotation of the Earth, as demonstrated by Léon Foucault in 1851.

The 9-metre pendulum swings freely in space, while the Earth turns beneath it. It thus appears that the angle of swing turns slowly, thereby demonstrating the daily rotation of the Earth on its axis. To illustrate this effect, pegs are positioned so that the pendulum knocks one over every few minutes.

Jean Bernard Léon Foucault (1819-1868) was a French physicist. He first set up a pendulum at the Paris Observatory in 1851, and then at the Panthéon. His pendulum was 67 metres high and had a bob weighing 28 kg. Our pendulum is just 9 metres long, with a bob weighing just 2 kg, but it demonstrates the same principles.

His experiment is being reproduced by the Astronomy Section, by kind permission of the Dean and Rector of the Town Church. Thanks go to Smith Signs for providing the baseboard for the pendulum.



The pendulum is set swinging each morning exactly north-south.

Although the Earth rotates on its axis once every 24 hours, the apparent rate of rotation of the pendulum depends upon the latitude. At the north and south poles it would take exactly 24 hours to make a complete rotation, but at the latitude of Guernsey (49.5°) the pendulum takes 31h 35m. Here, in the northern hemisphere the pendulum rotates clockwise, but in the southern hemisphere it would rotate anti-clockwise. At the equator it would not rotate at all.

wide belt, a relic which it is thought must have remained after the formation of the solar system. (Astronomy, April 2010)

The new VISTA Infrared Survey Telescope. Following on from the launch of previous orbiting infrared telescopes, British scientists have completed the world's largest telescope of this kind. The VISTA telescope's 4.1 metre mirror has a wide field capability and has been installed at the European Southern Observatory in Chile, where it will be used to study the formation, structure, and evolution of galaxies. (Astronomy Now, May 2010)

Meteorites. A set of articles focusing on the different kinds of meteorites - including stony, carbonaceous, and iron types, where they come from, and some of the most famous of these meteorite falls, which can reveal secrets hidden since their formation. (Astronomy Now, May 2010)

The Plough's Triple Double Act. The pair of stars Mizar and Alcor, in the handle of the Plough, is shown in a telescope to be a group of three stars with Mizar being a close double star. The system is now known to contain six stars, with each of the main visible stars having their own companion stars in orbit. (Astronomy Now, May 2010)

The Galaxy - Black Hole Connection. Research has revealed that all large galaxies have a black hole at the centre. There appears to be a definite relationship and co-evolution involved. Although there is much that is not yet understood, there is some evidence that black holes preceded the development of their associated galaxies. (Astronomy, May 2010.)

Galaxies near the Dawn of Time. The latest deep field image obtained by the Hubble Space Telescope shows far distant galaxies more than 13 billion light years away - smaller galaxies which existed not long after the beginning of the universe. (Astronomy, May 2010)

The New Search for Life in the Universe. The new KEPLER spacecraft will concentrate on identifying planets in transit across a star - with more Earth-sized planets likely to be found. Some of these are expected to be within a star's 'habitable zone' where the existence of life may be identified. (Astronomy, May 2010)

National Astronomy Meeting 2010. A report on recent developments in astronomy, including the discovery that some of the recently discovered extrasolar planets have backward orbits around their parent stars - an upset to the present theory of planet formation in our galaxy. Also, the finding that larger supernovae are created in colliding galaxies, and further evidence of a link between supernovae and gamma ray bursts.(Astronomy Now, June 2010)

Asterisms - Patterns in the Stars. Constellations contain large or smaller patterns of stars visible to the naked eye, but many of these 'asterisms' - such as the 'Coathanger' in Cygnus are

Geoff Falla's regular roundup of articles from popular Astronomy and Space Journals

Supernovae and other dangers from space. A supernova in our Milky Way galaxy is one of several possible threats. Others would include the impact of an asteroid, a major solar flare which would disrupt communications and power supplies, and the possible arrival of any extraterrestrial viruses. In the case of a supernova, however, it seems that no candidate star of this type is within a dangerous range. (Sky at Night, April 2010)

SETI - The Past, Present and Future. The search for extraterrestrial intelligence was established by radio astronomer Frank Drake in 1960. Before that, the radio pioneer Nicola Tesla was sure that he had received a signal from space in 1899. With evidence of hundreds of planets already found in orbit around other stars, and the first more Earth-sized planets now being identified, it is thought that with better techniques the search may succeed before too long. (Sky at Night, April 2010)

Transient Lunar Phenomena. The Moon was more geologically active in the past with lava flows, and it seems that some activity can still be seen occasionally. An analysis of more than 2,000 observations of this kind has shown that they tend to occur around the margins of lunar Mare areas and in several craters including Aristarchus, the brightest of all the lunar craters. (Sky at Night, April 2010)

The Galilean Moons of Jupiter. A detailed look at Jupiter's four main moons, first observed by Galileo 400 years ago as just points of light orbiting the planet. The innermost moon Io is now seen to have many active volcanoes, Europa has a fractured icy surface - almost certainly concealing a deep ocean, and there are the more rocky and icy outer moons of Ganymede and Callisto. (Astronomy Now, April 2010)

Saturn's moons Enceladus and Mimas. The discovery by Sir William Herschel of Enceladus and Mimas in 1789 and the recent discovery that Enceladus, although it has an icy surface, is presently very active with geysers of ice eruptions produced by tidal heating. (Astronomy Now, April 2010)

The Search for Other Civilisations in the Cosmos. Although nothing definite has been found so far, the search is being widened and the chances of finding habitable planets has also been increased - with the recent confirmation that water is now found to exist more widely in our own solar system. (Astronomy, April 2010)

Secrets of the Kuiper Belt. It was only as recently as 1992 that the Kuiper Belt was confirmed, with the first discovery of another small planetary object beyond the orbit of Neptune. Pluto is also now confirmed as being part of a large population of small planets which exist in this very

Interesting facts about pendulums

- The period of swing of a pendulum depends solely on its length; the longer the wire, the longer the period of swing, but not proportionately. (The period varies with the square root of the length.) Our 9-metre pendulum has a period of 6 seconds. If it was twice as long it would be 8½ seconds.

- The weight of the bob does not affect the period of swing; neither does the size of the swing.

- The above facts were determined by Galileo in the early 17th century.

- However, the force of gravity does matter; a pendulum would swing slower if gravity is weaker. On the Moon, for example, where gravity is one-sixth that on the Earth, the period of our pendulum would be almost 15 seconds.

- A heavy bob is used simply to provide sufficient momentum to keep the pendulum going, minimising the effect of air resistance, air currents and friction at the point of suspension. Nevertheless, because of these effects the pendulum will eventually come to a stop.

- The rotation of the Earth shows itself in other ways: the deflection of winds, ocean currents, inter-continental flights, and space launches. It does not, however, affect the direction that bath water takes in going down the plug-hole!

- Longcase ('Grandfather') clocks typically have a pendulum one metre long, which gives a period of two seconds, ie one second in each direction.

- The Earth is not spherical; it is *oblate*, ie it is wider at the equator than at the poles. This is a consequence of its rotation. A pendulum would swing slightly slower at the equator than at the poles, as the gravity at the equator is less.

- The oblateness of the Earth and of the Moon is responsible for the fact that the Moon always keeps its same face turned towards the Earth. The Earth rotates 24 hours with respect to the Sun, but actually rotates once on its axis every 23h 56m 04s, with respect to the stars – the *sidereal day*. This is because the Earth is annually revolving in its orbit around the Sun; so in one year the Earth makes one extra rotation on its axis.

David Le Conte

Launch of Discovery, STS 131, 5th April 2010

Eye witness report, and advice for attending remaining Shuttle launches.

In Florida we saw a shuttle leave for the International Space Station "by the dawn's early light". Here is Discovery, on mission STS131, launch plus 6 seconds, 06.21 EST on 5.4.2010, photo taken from the Cocoa Beach Inn roof, twelve miles south of launch pad 39A, by Ella Dunlop aged 12. The ground didn't start shaking for another 40 seconds.

The launch took us slightly by surprise, as we were tracking the countdown via NASA's TV station on the WLAN internet. This turned out to have a 3 minute lag. In particular, when the TV/internet said that the International Space Station was going over, about 20 minutes before the launch, we all looked up, and some of us even claimed to see it. Actually it had passed three minutes before.

When the launch came, it was far brighter than expected, and because we were so far away, the shuttle seemed to take a long time to get into its stride. It fired from the dark earth into the already sunlit heavens. In the still, upper atmosphere, it left a sunlit cloud hanging over us many miles higher than we had ever seen. Through

the field glasses, the slanting light showed the nose of the rocket hooded with an outer cone or shock-wave. And once it reached orbit height, perhaps only three times higher above sea-level than we were far from the launch pad, the Shuttle turned to the north east and began haring after the Space Station. I had expected a trajectory which just went upward, but this was definitely capped at a certain height, after which the work began.

If you are thinking of catching one of the last shuttle launches, aim to arrive three days in advance and pre-book the last available shuttle tour from the Visitor centre. This tour takes you within a two miles of the launch pad and seeing the size of the solid rocket booster tanks just puts into perspective the risk those astronauts take when strapping in for ascent on a roman candle.

Then hire a Winnebago and stake out a slot on the Indian River in Titusville, or on the north side of the causeway from Merritt Island to Canaveral Port. These viewing points are perhaps half as far from the launch pads as we were, and second best only to a 'causeway ticket' from the Kennedy Space Centre, which are released on the internet. Because noise dissipates exponentially with distance, halving the miles greatly increases the loudness experienced. We were told that if you are close to the launch pad the noise alone will kill you. Makes you wonder what happens to the wildlife in the National Wildlife and Seashore parks around.

In January, the Obama administration cancelled the Constellation Program – Mars via the Moon - which was due to click in after the three remaining shuttle missions in May, September and November. However, the austere future outlined then was replaced on 15th April by a promise of money to search for "clever" new propulsion technology, able to lift heavier spaceships, with the ultimate goal of a manned mission to Mars in the 2030s. A challenge indeed – while China and others merely follow in US footsteps on the moon.

So for the immediate future, instead of Florida, try a trip to the plains of Kazakhstan and see a commercial Soyuz rocket race towards the ISS. Or watch out for the Falcon 9 and other commercial projects due to step into the vacuum left along Florida's Interstate 4 by the end of the Shuttle era.

Dunlop family,
Le Mont Saint

[Editor: Just two Space Shuttle missions remain, STS 133, Discovery, scheduled launch date: 1st November 2010 and STS 134, Endeavour, scheduled launch date: 26th February 2011. Nasa launch schedules can be found: www.nasa.gov/missions/highlights/schedule.html]