

Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise
July – September 2009

Forthcoming Events

Perseids BBQ

Observatory: Wednesday
12th August: 7.30 pm

Public Open Evenings

As a result of building work it is unclear whether Open Evenings will go ahead this summer – please check website for details

Foucault Pendulum

Late this summer we plan to install a Foucault Pendulum in the Town Church (see page 12 for details)

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

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Inserts

Star chart

Sunset, sunrise, moonset and moonrise times

Photographs (“A Floral Cosmos”)

Forty Years Since the Moon Race

It is forty years since Neil Armstrong and Edwin Aldrin stood on the moon, while Michael Collins waited above in the Command Module Columbia. This was a remarkable achievement of human skill, endurance and bravery. But we must not forget the men and women who in the years previous to 1969 made that landing possible.

Mikhail Klavidiyevich and Sergey Pavlovich Korolev both worked as head of different divisions for the design of Inter Continental Ballistic Missiles during the 1940's and the early 1950s for the Soviet Union. But their real passion had always been to launch artificial satellites. On 20th May 1954, after many previous requests, they produced a report which the Soviet Council of Ministers finally approved and design work started for the launching of Sputnik. It was a very low key affair, using a slightly modified version of the R-7 ICBM, with no launch date in mind. (Sputnik is Russian for satellite and also means fellow traveller.)

On 1st July 1954, delegations from Europe, USSR and led by the United States, met to discuss the idea of creating International Geophysical Year, between 1st July 1957 and 31st December 1958. On 29th July 1955 President Dwight D. Eisenhower, announced to the same delegates, that the United States would send a satellite into orbit to study the upper atmosphere during the International Geophysical Year. Both Klavidiyevich and Korolev were at the meeting, and

on hearing this announcement they later persuaded the Soviet Council of Ministers that it would be a political coup if the USSR could beat the Americans. This was secretly agreed and Pavlovich Korolev became the Chief Designer. On 4th October 1957, Tasse News Agency announced the successful launch of Sputnik 1 into an elliptical orbit with a maximum height of 600 miles travelling at 16,000 mph. It could be seen from Earth and even heard by tuning to the correct radio frequency.

There was a public outcry in the United States. It came as a blow that the Soviet Union was the first into space and caused alarm that this would lead to spy satellites and threat to national security. Although Dwight Eisenhower did not agree, the United States government had to do something and quickly. Just one month later, Sputnik 2 was launched and this time carried a live cargo, a dog. It was these two events that started the 'Space Race' which culminated in the moon landings.

The US Department of Defence appointed James Killain to oversee a new agency, ARPA (Advanced Research Projects Agency). This was a military agency with two objectives: firstly to get a satellite into space quickly and secondly to prevent any more defence surprises. ARPA was very successful and together with the US Navy designed and built the Vanguard Rocket. President Eisenhower was not happy with the

military running the space programme, and asked Congress to allow ARPA to continue with the country's military defence, but for space flight and research to be in the hands of civilians. This was agreed and a well respected body known as NACA (National Advisory Committee for Aeronautics), which had advised the Government on all aspects of flying since 1915, and had recently been looking at the feasibility of space flight, was offered the mandate. They declined, saying that they preferred to research and solve problems for other people to use. So on 1st October 1957, NACA was installed within a new agency, the National Aeronautics and Space Administration and NASA was born.

ARPA's work and the Navy's Vanguard rocket was transferred to NASA. Vanguard successfully launched Explorer 1, the first US Satellite on 31st Jan 1958 but it was still not reliable. Werner Von Braun joined NASA and he and his team designed and built the successful Redstone rocket. Von Braun worked on the V2 for the Germans during World War II and later on Inter Continental Ballistic Missiles for the US Army. He later became Chief Architect of NASA's Space programme right up to the moon landings themselves.

During 1958 and 1959 both nations had many failures and some successes, the US launched and returned to Earth two and the USSR sent a huge payload of nearly a ton into orbit in Sputnik 3. By now both the United States and the

Soviet Union were starting to look seriously at the Moon. The US Pioneer programme failed three times to achieve a moon orbit. The Soviets second attempt with Luna 2 reached the Moon but it overshoot and orbited the Sun instead. On 4th October 1959, the USSR's Luna 3 successfully orbited the Moon and for the first time people of Earth could look at pictures of the far side of the Moon.

During the early part of 1960, NASA was enjoying some success, they were working towards a manned space flight but taking one step at a time. The Mercury programme was to be a series of launches which would simulate carrying a human payload until they knew it would be safe. Unfortunately due to failures and delays in construction, NASA had to ask Congress for extra funding amounting to millions of dollars.

In the USSR, the Chief Designer, Pavlovitch Korolev and his team were also working towards a human space flight. During May 1959, the Soviet Government approved a manned orbital flight. This was the Vostok project which was the equivalent of the US Mercury programme. NASA actually knew that the Soviet flight was imminent but did not want to speed up their programme for fear of making mistakes.

NASA had celebrated further success on 31st January 1961 after a Chimp called 'Ham', named after the Holloman Aerospace Medical centre, had returned from an up and down space flight hop. On 12th April 1961

Tasse News Agency announced that Major Yuri Gagarin had completed an orbit of the Earth and landed within six miles of his intended position in Central Asia.

This came as a further blow to the Americans, the Soviet Union had not only beaten them again, but Gagarin had completed an orbit, whereas NASA was intending a hop into space and down again. However, on May 5th 1961, just a month after Major Gagarin's pioneering voyage, Alan Shepard was the first American to be sent into space. His craft was a Redstone rocket with its capsule named Freedom Seven. His altitude was 114 miles, covering a surface distance of 300 miles. On 21st July this was repeated by Virgil Grissom using a Redstone rocket and capsule named Liberty bell. On the same day, President John Kennedy made his famous speech "that before the decade is out we shall land a man on the moon and return him to Earth."

On 20th February 1962, Colonel John Glenn, completed four earth orbits, at a height of 162 miles launching from the Kennedy Space centre in Florida. This was a proud moment for all Americans as now they were on their way. Scott Carpenter, this time in an Atlas rocket completed three orbits on 24th May 1962.

In the USSR, Pavlovich Korolev had gone a stage further, he had planned a Vostok mission where Andriyan Nikolayev had been launched on 11th August 1962 and Pavel Popovich was launched twenty four hours later. Such

was the accuracy that the two ships met up within four miles of each other in space and flew together.

Wally Schirra piloted a Sigma rocket, completing six orbits on 3rd October 1962.

Both US and USSR were getting more confident in orbital space travel and were setting their sights on the Moon. Unfortunately all early unmanned attempts failed. NASA sent five Ranger rockets to photograph the moon before crashing into it, but all failed and Soviet attempts were no better.

On 14th June 1963 Vostok 5 was launched piloted by Valery Bykovsky. Forty five hours later, the first woman to go into space, Valentina Tereshkova, also launched from Baikonur Cosmodrome. Both missions were successful.

30th January 1964 saw the first rocket successfully hit the Moon. It was a NASA Ranger spacecraft which took close up pictures before it hit. During the same year the US tested the design of their command module and the USSR flew a vehicle carrying three cosmonauts: Vladimir Komorav, Konstantin Feoktiston and Boris Yegoron.

In 1965, several unmanned rockets were launched by both NASA and the Soviets. Accuracy and reliability were all improving. On 17th March, Alexei Leonov was the first man to do a space walk outside of his Voskhod space craft. Ed White was the first

American to spacewalk on 3rd June 1965. Ed shared the Gemini spaceship with James McDivitt. On 23rd March 1965, Virgil Grissom and John Young shared Gemini 3 to test the crew's ability to change altitude in a space craft. 21st August saw Gordon Cooper and Charles Conrad complete eight days in space the time needed for a moon mission. One of the back up crew was Neil Armstrong. NASA wanted to know if two spacecraft could dock successfully. On 12th December 1965, Gemini 7 with Frank Borman and Jim Lovell on board and Gemini 6 with Walter Schirra and Thomas Stafford came within one foot of each other but did not touch. It was then Neil Armstrong and David Scott's turn in Gemini 8 to dock with a previously launched unmanned Agena target vehicle. Armstrong docked perfectly but a thruster jet on Gemini 8 jammed open and both spacecraft began to roll violently. Armstrong and Scott had to undock and use the re entry motors to counteract the roll and then return to Earth quickly.

The Soviets suffered a severe and tragic loss in 1966. Their successful, but previously unnamed Chief Designer, Pavlovich Korolev died of a heart attack. Korolev's name was kept secret because Khrushchev did not want to risk him being approached by the Americans. Vasily Mishin was to succeed him but did not match Korolev's ability.

Gemini 10 was launched in 1966 with John Young as Commander and Michael Collins as pilot. Michael

Collins left Gemini 10 and space walked to a previously abandoned rocket and retrieved a faulty part. On 12th September 1966, Charles Conrad and Richard Gordon simulated the return from the Moon by docking with an orbiting Agena target rocket. This was accomplished in 85 minutes. Edwin (Buzz) Aldrin with James Lovell as Commander onboard Gemini 12 spent 2 hours outside the space vehicle to prove that space walking was safe for humans to do.

The scene was set for the Apollo programme and the moon landing but tragedy struck on 27th January 1967 when three men died in a flash fire in command module 012 during a launch pad test of the Saturn/Apollo space vehicle. They were Virgil (Gus) Grissom, Ed White and Roger Chaffee. An extensive enquiry was carried out and as a result, the design of the command module became safer for subsequent crews. In honour of those who died, command module 012 was renamed Apollo 1.

On 23rd April 1967, Vladimir Komarov died when his Soyuz spacecraft crash landed due to multiple failures including the parachute. There followed various unmanned flights to the moon by NASA and the Soviet Union in 1967 but there were no further manned flights.

The USSR resumed their first manned flight after the death of Komarov on 26th October 1968, more than a year later. Georgi Beregovoi piloted Soyuz 3 to attempt a docking with the

unmanned Soyuz 2 but the mission was a failure.

NASA felt confident enough to enter the next level, on 21st December 1968, a Saturn 5 rocket was launched as Apollo 8, with a manned crew for the first time. When in Earth orbit, the Saturn third stage sent the crew in their module all the way to the moon but following NASA's cautious approach it did not land. The mission was to fly to the moon, complete ten orbits, then to return. The mission was a complete success for the crew of Frank Borman, James Lovell and William Anders.

Meanwhile, the USSR had resolved their docking problem. On 14th January 1969, Soyuz 4 and 5 docked while in Earth orbit and the crew transferred from one craft to the other. This was not easy, because the Soviets had not developed a tunnel between the two ships. Instead they had to don spacesuits and exit one ship then enter the other. The Soviets planned to only have one man land on the moon in a descent vehicle, while three others stayed orbiting in the command ship. Soyuz 4 contained Vladimir Shatalov. Soyuz 5 had Boris Volynov, Alexei Yeliseyev and Yeugeny Khrunov.

Apollo 9 was launched on 3rd March 1969 with Jim McDivitt, David Scott and Russell Schweickart. Once the Saturn 5 rocket reached Earth orbit, it released both the command module and the lunar module. The crew were in the command module. This successful mission was to dock and undock the two modules when

orbiting the Earth and transfer from one to the other, to simulate what would happen if orbiting the Moon prior to a moon landing.

22nd May 1969 was the final rehearsal and a Saturn 5 rocket took off with Thomas Stafford, Eugene Cernan and John Young as crew. As with Apollo 9 an orbit was reached around the Earth, but when the command module and the lunar module were released, they went to and orbited the moon. As practiced in Apollo 9, Thomas Stafford and Eugene Cernan transferred to the lunar module and descended to within 1.5 miles of the moon's surface and then ascended to rejoin John Young.

By now the United States were far ahead of the Soviet Union in the race to the moon. The cautious step by step approach had paid off while the Soviets were dogged by many failures in an attempt to catch up.

On 16th July 1969, Apollo 11 was launched and this time it was to land and walk on the moon. After reaching Earth orbit, the third stage of the Saturn 5 sent the command and lunar modules on their way, with Neil Armstrong, Edwin (Buzz) Aldrin and Michael Collins onboard. This was a cumulatively successful landing, which owed its success to the great many who had contributed to achieving President Kennedy's goal of landing on the Moon before the end of the decade.

There was one final touch. The Soviets had tried to steal their last

chance of glory over the Americans, by sending an unmanned probe to the moon to bring back lunar soil samples. The mission was a failure. However, in case the Soviet rocket might prove a danger to Apollo 11, the Soviets gave NASA the flight trajectory and this

was one of the first times that co operation between the two administrations had been achieved and not the last.

Frank Dowding

2009 Astronomy Stamps

Several years ago I suggested to the Guernsey Post Office that they consider issuing a set of stamps commemorating Guernsey man and astronomer Warren De La Rue (1815-1889). At the time they felt that, while it was a good idea, they should wait for a significant anniversary. Early in 2008, therefore, I contacted them again, and pointed out that 2010 was the 150th anniversary of his important photographic observations of the total solar eclipse of 1860, by which he showed conclusively that prominences were part of the Sun. Alternatively, the stamps could mark the 120th anniversary of his death in 2009.

The Head of the Post Office's Philatelic Bureau accepted the idea, but said quite reasonably that it was not usual to mark a death, and that 120 years was, in any case, not a significant anniversary. She was due to leave the Post Office, but did indicate that she would recommend to her successor that De La Rue be used for the 2009 Europa stamp issue, whose theme was to mark the International Year of Astronomy.

Having heard nothing further for a few months I contacted the Philatelic

Bureau again, and was informed that the 2009 astronomy stamp issue was at an advanced design stage. It did not, however, include De La Rue, but just general astronomy images. Neither was it planned to use him as a theme in 2010 as they did not want two astronomy issues in consecutive years. They conceded, however, that the text accompanying the stamps could include something about him. They invited me to work with the copywriter on a suitable text, and to check its accuracy.

It transpired that the six astronomical images for the stamps had been sourced from a commercial agent. They were picked for their attractiveness, rather than any cohesiveness, and bore no relation to Guernsey. I pointed out that we could have provided images which had been taken by members of our own society, at Guernsey's own astronomical observatory. They would thus have supported the local community and probably saved money, as well as having a stamp issue which had a strong Guernsey connection. However, it was too late for any major changes.



Two of the images had significant problems. The 36p stamp is a painting purporting to show a quasar, but to me it looks nothing like a quasar. The 77p stamp was an image taken by the SOHO spacecraft of a solar eruption, but the eruption itself had been cropped out of the picture! The stamp designs had to be approved by Buckingham Palace, as they bear the Queen's head, and as they had already gone through this process changing them was going to be difficult. I was, however, fortunately able to get the solar eruption image improved to some extent.

The text, prepared by a professional copywriter in Jersey with clearly no knowledge of astronomy, needed a lot of rewriting to correct factual errors and improve the stamp descriptions, as well as the syntax, grammar and punctuation.

I did manage to include mention of Warren De La Rue achievements, as well as the Astronomy Section's Observatory, but the final result is still, in my view, far less than it could have been, and the opportunity to

create a distinctive Guernsey stamp issue has been missed. It is sad that the Post Office does not enlist the help of someone with specialist knowledge at an early stage in stamp design, does not source that knowledge within the Bailiwick, does not use local sources for images, and makes little use of local subjects.

The stamps were released on 28 May 2009, the subjects being: quasar, asteroid, sunrays falling on the Earth, Jupiter, total solar eclipse, and solar eruption. I will leave the reader to identify which is which. They can be viewed at www.guernseystamps.com/. The stamps are issued in packs of ten, presentation packs and first-day covers, together with a description in *Philatelic News*. The accompanying texts are pretty much as I wanted, albeit with some slight editing. The first-day cover has a cancellation stamp depicting a rather cheap-looking Newtonian telescope, about which I was not consulted.

The last astronomy stamp issue was exactly ten years ago, when the total solar eclipse of 11 August 1999 was

the subject. The approach to that stamp design was very different. I was invited to be involved from the very earliest concept stage, and to have complete control over the stamp designs as well as the text. I suppose it will be some years before an

astronomy issue is again produced, and it is to be hoped that Guernsey astronomy will then be given its due prominence.

David Le Conte

A Floral Cosmos

The Guernsey Flower Arrangement Society chose astronomy as their theme for the annual flower display this year, in celebration of the International Year of Astronomy

(IYA). It transformed the Church of St Pierre du Bois from the 1st to the 4th May, and was entitled *A Cosmic Array*.



The solar system in St Peter's Church. [Photo David Le Conte]



Galaxies. [Photo David Le Conte]



The Plough. [Photo David Le Conte]

This magnificent display consisted of over two dozen separate flower arrangements, plus a model of the solar system high above the Nave. The entrance to the Church had the theme of *The Milky Way*. There followed arrangements representing all of the planets, plus the Sun and Moon, the Plough, meteors, supernovae, galaxies, the Big Bang, the Jodrell Bank radio telescope, aurorae, a rocket launch, and UFOs. Accompanying each arrangement was a detailed description of the subject.

We had only a few days notice of this event, when I received a telephone call asking for some assistance. On behalf of the Astronomy Section I prepared

three posters describing Guernsey astronomy and the IYA, and we lent a telescope.

This was an excellent show; a lot of thought and effort had gone into it, and the liberal floral interpretations of the subjects were interesting. It is good to see the public picking up on the fact that this is a special year for astronomy, and it is obvious that the participants entered wholeheartedly into the subject.

David Le Conte

[Editor: Some photographs of the arrangements, taken by David Le Conte are included in the accompanying insert]

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

Titan is Earth-like. Saturn's largest moon Titan is larger than the planet Mercury, and is the only moon in our solar system known to have a dense atmosphere. Although the surface of Titan is frozen, it is surprisingly Earth-like, with mountains, water ice and hydrocarbons essential ingredients for life which may have developed below the surface. (Sky and Telescope, December 2008)

Mount Palomar's Giant Telescope. The story of George Ellery Hale, and his vision in developing giant telescopes. The first was the 40 inch refractor at Yerkes Observatory, Wisconsin in 1895, followed by the 60 and 100 inch reflectors at Mount Wilson, California, and finally the 200 inch telescope installed at Mount Palomar in 1947. This remained the largest of its kind for many years, with far larger but different telescopes now being planned. (Sky and Telescope, December 2008)

Black Holes. Evidence seems to confirm that massive black holes exist at the centre of every galaxy, including our own Milky Way. Although much is unknown about black holes, including their origin, it is known that their powerful gravitational forces mean that they are all growing in size as they draw on their surroundings. A set of articles describing the research, how black holes are identified and what is

currently known. (Astronomy Now, December 2008)

Gravity - Is there something we don't know? Variations in the Moon's orbit, and the greater than expected slowing down of the spacecraft Pioneers 10 and 11 as they escape from the solar system may result in another revision of gravitational theory. (Astronomy, March 2009)

Spitzer Space Telescope reveals the Unseen Universe. The Spitzer Space Telescope, launched in 2003, investigates the universe in infrared, identifying sources which are otherwise hidden. Its achievements have included discovering the more detailed structure of our galaxy, also the discovery of black holes in other galaxies, and being able to detect the radiation produced from planets in other solar systems. (Astronomy, March 2009)

Deep Skies. Deep sky objects such as galaxies, nebulae, and star clusters are popular challenges for amateur astronomy. A set of articles focusing on several aspects of this, including star catalogues, some of the most interesting objects to be observed, and how to find them. (Astronomy Now, April 2009)

Unveiling the Hidden Universe. Two European Space Agency projects, launched at the same time, are planned to study deep space sources. The Planck spacecraft is to investigate the Cosmic Microwave Background, with mapping of the sky at a wide range of frequencies, while the Herschel Space

Observatory, with the largest telescope mirror launched into space, will study infrared radiation from the early formation of stars, galaxies, and planets, and the chemical composition of interstellar matter. (Astronomy Now, April 2009)

The Universe with No Beginning?

The present theory that the big bang was a unique event is being challenged by a new cyclic model - that the universe is an endless cycle of expansion and cooling contraction. The two theories differ in predictions regarding gravitational waves and the distribution of matter, and it is expected that these predictions can be tested over the next decade. (Astronomy, April 2009)

Is Earth One of a Kind? Was the evolution of life on Earth the result of a series of chance events? With increasing knowledge and evidence of planets found in orbit around other stars, claims of the Earth's possible uniqueness can now start to be compared with recent observations. (Astronomy, April 2009)

Galileo and the Development of Telescopes. A set of articles to mark the 400 years since telescopes were first used for astronomy; including how telescopes transformed established ideas about the universe and Earth's place in the solar system; the development of telescopes; a summary of the most important discoveries, and a profile of the life and times of Galileo in the 17th century. (Astronomy, May 2009)

Top Telescopes - A Recommended Choice. A selection of the best telescopes of all types, and the advantages of particular choices - refractors, reflectors, and some of the latest more compact models, whether for observing the Moon and planets, deep sky observing, or for photography. (Astronomy, May 2009)

Tracing the Sun's Family Tree. The Sun was evidently formed from a nebula similar to that presently seen in the Sword of Orion. A search is now being made to track down other stars in the original formation which have drifted apart - but would share the same chemistry, and would still be in similar orbits around the galaxy when compared with our own Sun. (Astronomy Now, May 2009)

Spectroscopy. The use of spectroscopes in astronomy has allowed astronomical objects and their behaviour to be analysed in detail. A set of articles describing the development of spectroscopy - from Sir Isaac Newton's original discovery that a prism splits sunlight into its rainbow spectrum of colours, to analysis of the atmospheres of extrasolar planets now being discovered, and cosmological questions about the universe and its expansion. (Astronomy Now, May 2009)

How we could see another Universe. It is thought that our own universe could be in the form of a bubble, and one of many. The cosmic microwave background radiation has been found to have hot and cold spots - which

appear to be aligned along a particular axis, rather than having random distribution. If evidence of a disc is found around this axis, it will be taken as evidence of a collision with another bubble universe. (Astronomy, June 2009)

Guide to Galaxies. An Astronomy Now magazine special feature, a guide to the different kinds of galaxies to be seen, including spirals similar to our own Milky Way and variations of these, elliptical galaxies, and irregular ones, with the top five of several types for observation. (Astronomy Now, June 2009)

National Astronomy Meeting. A set of articles on subjects presented at the recent annual event, including the continuing lack of solar activity; the latest research on exoplanets - in particular the four planets found in the Gliese 581 system; the formation process of galaxies and the analysis of material found to pre-date the formation of our planets, and doubts on the reality of dark matter, dark energy, and the claimed acceleration in the universe's rate of expansion. (Astronomy Now, June 2009)

Section News

Those of you that have visited the Observatory recently will have seen that the roof of the Main Building is in a sorry state of repair. The roof has been leaking for quite some time and we had cut part of the ceiling away in early spring to see the state of the roof timbers. The upshot is that the roof will need major repairs which will start imminently. We have had to remove all fixtures and fittings from the building including the sink so that this work can commence.

As a result of these works it is unlikely that our full series of Public Open Evenings on Tuesday Evenings during the school holidays will go ahead this year. Certainly whilst builders are on the premises then the Observatory site will be hazardous with builders debris and equipment. Even once we are free of builders the telescope building is being used for storage so only limited facilities will be available. We hope to run some open evenings in August please refer to website for details.

Once building work is complete then the Main Building will need significant refurbishment and any assistance of time, skills or materials would be very welcome so that we can get fully operational in the shortest time possible.

We still plan to hold the annual Perseids BBQ on 12th August though with limited facilities.

Foucault Pendulum

Late this summer we plan to install a Foucault Pendulum in the Town Church, by kind permission of the Dean and Rector. The pendulum demonstrates the rotation of the Earth, as it swings in a constant plane in space, while the Earth rotates beneath it. It will be in place for about a week when the Church is re-opened following building works. Look out for media announcements, or visit the website.

Colin Spicer



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