Messier Again

It's time again to think about another try at a Messier Marathon. Debby Quertier is looking at possible times and dates within the last 10 days of March and the first week of April when the Moon is favourable and preferably a Saturday night. Saturday 29th March looks a suitable date as there will be no Moon. If you are interested in seeing all 103 celestial objects in the Messier Catalogue in a single viewing session please contact Debby on 725760.

WEA Course

After running a successful course last year for the Workers Education Association the Astronomy Section is again providing a 6-week "Star Gazing" course at the Observatory. It runs on Thursday evenings starting at the end of January. With limited space at the Observatory only twenty participants can be accommodated and the course is heavily oversubscribed. David Le Conte is the course moderator.

Frank Dowding BSc

Congratulations to Frank Dowding who, after many years of diligent study with the Open University, taking astronomy-related courses where possible, has been awarded a Bachelor of Science degree.

Annual Business Meeting

The Annual Business Meeting, the Section's AGM, will be held on 4th February and all members are encouraged to attend.

Astronomy Section Officers

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Copy deadline for next publication is 15th March 2003

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Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiase

January - March 2003

Forthcoming events

Annual Business Meeting
Tuesday 4th February
8pm at the Observatory

WEA Course
Weekly from Thursday 30th January to 6th March at the Observatory

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

Inside

Centre inserts

Star chart
Sunset, sunrise, moonset and moonrise times

Section News

*by **Debby Quertier***

On most Tuesdays we have been hampered by bad weather.

We had two visits from The Ladies' College. Cloudy skies meant that we could not make use of the telescopes but instead we gave the girls a talk and slide show. Towards the end of the second visit the skies did clear a little and the visitors were at least able to see Saturn, which impressed them.

The Fire Safety Officer visited the Observatory and I am pleased that he stated we had a low fire risk. He recommended that we renew our fire extinguishers, which is in hand.

As reported in the local press a group of marine biology students visited the Island in September. They used the facilities at our Observatory in the daytime and made a generous donation to our funds. They came along one Tuesday evening to stargaze. Fortunately the skies were kind that night and they had good viewing.

The November Leonids were clouded out. We are now probably past the years to see a good storm. We have been very unlucky; I can only remember 1998 being cloud free, and that was the night before the predicted peak.

Jupiter and Saturn are now in the evening skies and we should be able to get some good views. Later on in the year they will be joined by Mars, which will reach its best in August 2003.

Astronomical Events in 2003

***David Le Conte** picks out the highlights of the year ahead*

The astronomical highlight of the year must be the close approach of Mars, when it will present a superb opportunity for telescopic observation. But we also have two total lunar eclipses, and a transit of Mercury to look forward to.

PLANETS

Mercury will be visible in the evening in April (maximum elongation on the 16th), August (maximum elongation on the 14th), and December (maximum elongation on the 9th).

A significant event occurs on the 7th May, when Mercury transits the Sun's disc, from 06:12 to 11:31 BST. This event can only be observed with great care, as looking directly at the Sun can cause severe eye damage, and optical aids such as telescopes or binoculars must not be used unless a specialist filter is fixed over the aperture. The Astronomy Section has proper filters, and a coelostat specially designed for projecting the Sun's image.

Venus will appear as the 'morning star' in the eastern sky at the beginning of the year, with Mars right beside it. Its greatest elongation will be on the 11th January, and it will remain visible in the morning, before sunrise, until the end of April. It does not become the 'evening star' until the end of the year, and then only very low in the west.

Mars can be seen in the evenings from August to December.

At the end of August Mars will be at closer to Earth than it has been for 50,000 years, at just 34,646,400 miles (55,791,300 km). It will, therefore, appear large (25 arc-seconds diameter), and considerable surface detail should be visible, even though its altitude as seen from Guernsey at this time will be a maximum of 24 degrees (less during the evening observation hours).

A National Astronomy Week is being held from the 23rd to the 30th August, to coincide with the close approach of Mars. The Astronomy Section will be organising an event during the Week.

Jupiter will visible in the evenings from January to May, in the constellation Cancer. It is at opposition on 08 February.

With the present favourable configuration of Jupiter's axis of rotation, and the plane of its moons' orbits in relation to the Earth, we can continue to expect many events involving Jupiter's moons, such as transits across the planet's disc.

Saturn will be well-placed for evening observation from January to April in Taurus, and again in December, by which time it will have moved into Gemini.

Saturn's rings, still at an angle and open presentation, will remain a beautiful sight.

Uranus is at opposition on the 24th August, **Neptune** on the 4th August, and **Pluto** on the 9th June.

CONJUNCTIONS

27 Jan	Mars and Moon	Separation 2°	Before sunrise	In south-east.
26 May	Mercury and Venus	Separation 2°	Before sunrise	In east
21 June	Mercury and Venus	Separation 0.5°	Before sunrise	In east.
30 June	Mercury and Saturn	Separation 2°	Before sunrise	In east.
8 July	Venus and Saturn	Separation <1°	Before sunrise	In east.
17 July	Mars and Moon	Separation 0.15°	Morning	In south-east.
26 July	Mercury and Jupiter	Separation 1.25°	After sunset	In west.
21 Aug	Venus and Jupiter	Separation 0.7°	After sunset	In west.
26 Oct	Venus and Moon	Separation 1.25°	After sunset	In west.

OCCULTATIONS
There are no lunar occultations of the planets or bright stars this year (apart from a daytime occultation of Mercury by the Moon on the 25th October, when it is dangerously close to the Sun).

METEORS
The full Moon will hinder observation of the Perseid meteors on the night of the 12th/13th August. The Leonids, about the 17th November, will be not be so hindered, but no meteor storm is expected this year. The Geminids (12th December) will also be affected by the Moon.

COMETS AND ASTEROIDS
Several faint comets and asteroids should be visible in telescopes, as in most years. It is, of course, possible that an unexpected bright comet may appear.

ECLIPSES
Two total eclipses of the Moon, and a partial eclipse of the Sun will be visible from Guernsey this year.

The first lunar eclipse will take place in the early morning of the 16th May, starting at 03:02 BST. The Moon will set at 05:32 BST, before the eclipse finishes (at 06:17 BST).

The second lunar eclipse will be on the night of the 8th/9th November, starting at 23:32 GMT and finishing at 03:04 GMT.

The partial solar eclipse will take place in the early morning of the 31st May. Observers will have to be quick to see this one, as it will be almost over by the time the Sun rises, at 05:12 BST. At that time it will be less than one-third eclipsed, and the eclipse will finish at 05:31 BST, when the Sun has reached an altitude of only 2°. While the eclipse is only partial in Guernsey, it is annular as seen from Iceland and (briefly) the north-west coast of Scotland. Again, it must only be observed if precautions are taken against eyesight damage. The Astronomy Section can provide advice.

SATELLITES
The International Space Station is regularly visible from Guernsey. Details of the times and directions of visibility can be obtained from a link on the Astronomy Section's Web site, at www.astronomy.org.gg.

David Le Conte

References:
The Handbook of the British Astronomical Association 2003.
Astro Calendar 2002/2003 by the Federation of the Astronomical Societies.
Skywatch '03 by Sky and Telescope.
Starry Night Pro software.

What is a Planet?

With a question mark over Pluto and the recent discovery of QUAOAR, claimed by some to be a tenth planet, ***Geoff Falla*** *investigates what defines a planet*

To be, or not to be a planet? This may seem to be a rather pointless question, since we all know that our Sun has a family of nine planets in orbit around it, with accumulating evidence that there are also planets orbiting around many other stars. The question of what should, or should not be regarded as being a planet has, however, been raised twice within the last year or so. Firstly in the case of Pluto which, as suggested by some astronomers, is not really a true planet, and most recently following the discovery of an even smaller object in the far reaches of the Solar System. This was found in the Kuiper Belt more than four billion miles from the Sun, and has been given provisionally the rather unpronounceable name QUAOAR, derived from an Indian tribe which used to inhabit the Los Angeles area.

Pluto, as we know, was discovered by the astronomer Clyde Tombaugh in 1930, after the study of perturbations in the orbit of Uranus indicated the existence of an unknown planet beyond the orbit of Neptune. Pluto was found to be much smaller than expected, from the calculations which had been made. It has an estimated diameter of not more than 2,000 miles, similar to that of our own Moon. The orbit, unlike other planets, is more eccentric so that it reaches a maximum distance of almost five billion miles from the Sun, but then comes back to a position which is just within the orbit of Neptune, about three billion miles away. This proximity of Pluto's orbit at its closest point to that of Neptune led inevitably to the question being asked - whether Pluto could, in fact, be an escaped moon of Neptune? In 1978 it was discovered that Pluto had a large moon of its own, which was given the name Charon. As it is not known for moons to have their own satellites, this seemed to reaffirm Pluto's place as perhaps an independently formed planet. Its strange orbit, however, still meant that at its greatest distance it is within the Kuiper Belt, a wide band of icy objects beyond the orbit of Neptune. This has led to the recent suggestion by some astronomers that Pluto should be considered perhaps to be a Kuiper Belt object rather than a true planet. There is evidence now of surface changes on Pluto, and that its atmosphere seems to have cooled considerably in recent years, but we will not know what it is really like until a space probe is sent there.

The dictionary definition of a planet is found to be "any heavenly body revolving about a star, as the Earth does about the Sun, and shining by light reflected from the star." We should bear in mind that the definition of a planet does not apparently depend on the size of the object. The objects making up the Asteroid Belt between

Mars and Jupiter are mostly small, the largest being Ceres with a diameter of less than 700 miles, with Pallas and Vesta having diameters of around 400 miles. Most of the asteroids are much smaller. But they are still planets, officially known as the Minor Planets. They may also be the remains of a larger planet which once occupied the present substantial gap between the inner planet Mars, and the first of the outer planets, Jupiter.

It seems that we must look for a definition of a planet which does not depend on its size but on the type of object it is, and whether it is seen by its reflected light. The Kuiper Belt objects are thought to be mainly icy, with some being quite substantial in size, but they are not considered to be in the same league as any of the planets - not even the minor planets of the asteroid belt. The Kuiper Belt is identified as being the source of short-period comets, with the origin of the long-period comets accepted as being the Oort Cloud, even more distant at the very edge of the known Solar System. All of these objects are in orbit around the Sun, but we would never consider comets to be in the same realm as the planets. A comet is, we understand, not visible to us as a result of light being reflected from its surface, but from an active process generated by solar radiation. As the comet enters the inner regions of the Solar System, gas and dust is produced which blows away from the comet's nucleus to produce the familiar and highly visible tail.

The newly discovered object QUAOAR was claimed in some news reports to be a tenth planet, but although it has a near circular orbit it is also located in the Kuiper Belt. It is the largest object to have been found there, with an estimated diameter of almost a thousand miles. Other objects almost as large have also been found recently in the same region. The orbit was quickly identified because a check back confirmed that it had already appeared in images dating from 1982.

The definition of a planet may perhaps depend in part on its composition, and whether there is evidence of a geological or other process in its formation. Objects thought to consist largely of ice, such as the Kuiper Belt objects and comets, would not fit this category. We would all be interested in knowing if there really is an as yet undiscovered planet out there somewhere in the depths of space.

It seems that we must look for a definition of a planet which does not depend on its size but on the type of object it is

Perhaps before too long the International Astronomical Union will make some kind of ruling on the matter, to end the present uncertainty about the precise definition of what really is, or is not a planet.

Geoff Falla

Astronomy and Space - References for Further Reading *by Geoff Falla*

The Aurora Borealis. A set of articles focusing on the spectacular phenomenon, also known as the 'Northern Lights', with some of the best views obtainable from northern Norway. Also observations of the aurora from space, with some remarkable photographs. *Astronomy Now, October, 2002*

Saturn's Moon Titan. The largest moon in the Solar System. Details of what is currently known about Titan, which has a substantial atmosphere, and is soon to be further investigated by the joint NASA-European space probe Cassini-Huygens project. *Astronomy Now, October 2002*

The Fate of the Earth. The Sun is steadily becoming more luminous and hotter. Eventually the Earth will no longer be able to support life, but it is envisaged that this seemingly inevitable future can be changed. *Sky and Telescope, October 2002*

Gems from the Stars. It was once thought that interstellar dust was relatively simple in composition. Recent observations, and the study of meteorites, have found more complex materials, including precious minerals released into space by dying stars. *Sky and Telescope, October 2002*

The Universe takes Shape. What is the shape of the Universe? It may be spherical, flat, or a more complex shape, while the curvature of light may confuse the true situation by producing mirror images. More intensive observation and mapping may help to provide the answer. *Astronomy, October 2002*

Mercury. Two new spacecraft missions are planned to visit the innermost of the planets after a gap of 25 years. Details of what is currently known about Mercury, and what it is hoped to discover from the U.S. and European missions. *Astronomy, October 2002*

Archaeology's Message. The ancient monuments of Mexico and the Mayan culture, which had interests in the observation of Venus, and precise alignments as seen in the pyramid at Chichen Itza. *Astronomy, October 2002*

How Stars Explode. The anatomy of a supernova, and what causes these stellar cataclysms at the end of a star's life cycle. Different kinds of supernova have also been identified. *Sky and Telescope, November 2002*

Planetary Oceans. Water seems to be plentiful in the Universe, and in our own Solar System, often in the form of ice. Life as we know it depends on water, but an outwardly cold planet or moon does not mean that water cannot exist. *Sky and Telescope November 2002*

Saturn at its Best. Saturn takes just under 30 years to make one orbit around the Sun, and is now approaching its closest point to Earth.

Interest in Saturn will increase further as the Cassini spacecraft arrives at the planet in July 2004. *Astronomy Now, November 2002*

Light Pollution. An increasing problem for astronomers everywhere, unnecessary light in the night sky can be reduced, and energy saved by introducing shielded lights reflecting downwards. *Sky and Telescope, December 2002*

The Space Station on Video. Good images of the Space Station have been obtained using a computerized telescope in conjunction with a satellite tracking programme and video equipment. *Sky and Telescope, December 2002*

Catalogue of Books and Products. The 2003 catalogue of astronomy books and products, issued as a supplement to Sky and Telescope magazine. *Sky and Telescope, December 2002*

Io – Jupiter's Fiery Moon. The most volcanic object in the Solar System. Information from space probes reveals Io to be an extraordinary moon. *Astronomy Now, December 2002*

Beyond Apollo. It is now 30 years since the last Apollo mission to the Moon, but interest in further investigation continues with robotic missions planned to start in 2003. There are also commercial incentives driving a return to the Moon. *Astronomy Now, December 2002*

Royal Greenwich Observatory History. The Royal Observatory at Greenwich is more than 300 years old, and has an extensive collection of artefacts and scientific instruments, tracing the observatory's history from the time of the first Astronomer Royal in 1675. *Astronomy Now, December 2002*

Belief in the Big Bang. A public survey in the United States has revealed that most people do not believe that the Universe was created in a cosmic explosion. But with evidence built up over many years, there are at least five good reasons why it should be accepted as fact. *Astronomy Now, December 2002*

Doomsday Asteroids. An asteroid has been discovered which returns to the same position relative to the Earth every 11 years. A collision or very near miss seems likely - in about 900 years time, but by then it is expected there will be means available to deflect it. *Astronomy, December 2002*

The Christmas Star. What are the possible explanations for the Christmas Star - a supernova, conjunction of planets, a comet, or something else? *Astronomy Now, December 2002*

Planets on Parade. Mars will be at its very best for viewing during the summer of 2003, the closest it has been for a long time. Jupiter and Saturn are also well placed during the earlier part of the year. *Sky and Telescope - Skywatch Special Issue, Autumn 2002*

The Leicester Space Centre

***Debby Quertier** describes her recent visit*

I spent Christmas 2002 with my family in Cheshire and, on the drive up there from Portsmouth, I stopped overnight with a friend who lives in Quorn, in the Leicester area. She suggested that I take the opportunity to visit the National Space Centre. My 14 year old daughter had visited it in June 2002 and described it as 'boring' and my friend, in her job as a teacher, had taken a group of children there a week or so before and said it was not as 'hands on' as she'd expected and her group of children had not been that keen. I put my daughter's comments down to her being a teenager and everything being 'boring' and went along minus my children with just my friend. It costs £7.95 for adults and £5.95 for children, or less if you buy a family ticket.

I only had about two hours there so I did not get to see everything, but I was impressed. There were displays about the planets (I recall seeing a large model of Saturn in a bathtub) which were quite interesting and informative. There was the space suit worn by Helen Sharman, squeezed into the position she was in when the Shuttle took off – this did not look very comfortable, especially when you consider the speeds reached during the first part of the Shuttle's journey. Further on there was a space toilet complete with information on how the astronauts were trained to use it – a little too much information, though I suppose my daughters would have found this bit very amusing!!

As you walk along to the rocket tower you pass a Soyuz space capsule, like the one that linked up with the American Skylab in the 70's. You then arrive at the 42m tower, housing the Blue Streak and Thor Able rockets. It is most impressive when looking up. You can reach the top either by lift (which was shut at the time of my visit) or by about 142 steps. I decided I hadn't the time (or the energy) to climb them so made do with the view from the bottom. There are a few hands-on things to amuse on the first floor of the rocket tower but they are nothing special. You can see how high you can send a rocket by filling it with water as fuel – if your calculations are right the rocket will reach maximum height, the wrong amount and it barely takes off. This did amuse for a while.

I watched the show in the planetarium entitled SETI and must say it was fantastic, the best I have ever seen. At times the effect was like being in a vessel travelling through space and then underwater in a submarine watching early life-forms. A cartoon alien, with the voice of Hugh Laurie, narrated the show. It talked about our Solar System, how the Earth was formed and then how life first appeared. The narrator asked, if there are aliens out there what are they likely to look like? It then went through the pros and cons of how many legs, arms, eyes etc an alien would be likely to have and came up with an alien formed similar to us, but typical of how we 'see' aliens (bug

eyes and all). The show was light-hearted and most entertaining. It didn't take UFO sightings very seriously but, whatever your opinion on this subject, the visual effects alone made this show worth seeing. Later in the day there was a second show which taught you about the night sky. I did not see it as it was being shown after I had to leave but, if what I had seen was anything to go by, I expect it would have been very good.

The Space Centre is involved in the search for Near Earth Asteroids but unfortunately I did not have enough time to see much about its activities.

To see the centre in full you do need much longer than I had. Some of my time was spent looking at the shop and having a cup of coffee and about half an hour was taken with the show. I did enjoy my visit and for those with an interest in astronomy and space it will provide an interesting day. It is situated just off the A6 two miles north of Leicester. It is well signposted and not too difficult to find, you soon spot the rocket tower! More information can be found on their website at www.spacecentre.co.uk.

Debby Quertier

"Children of the Stars"

Mark Humphrys reviews the book by **Daniel R Altschuler**

As amateur astronomers we've all looked up on a dark night and marvelled at the sights that the sky has to offer. For me looking at the Milky Way with the naked eye or binoculars is one sight that never fails to inspire, but at the same time it gives me a sense of just how small we really are. There are many sights: the dust clouds that cause the Great Rift, the glowing nebula and the menagerie of stars to name a few.

But where do we fit into the scheme of things, where do we come from and what are we made of? One answer usually given is that we are made of "Star Dust", which is true, but that is a very simplified answer and leaves a lot out. If you want to know more detail then this is the book to read.

It starts with a brief history of the development of astronomy, detailing all the important events and characters such as Copernicus, Galileo and others, though you will find reference to many of the historical characters intertwined throughout the narrative of the book. Next it goes into some detail about our local star the Sun. What it is made of, the processes that occur within and the products produced.

Chapter 2 looks at "The fertilization of space" – the evolution of stars and how the various elements produced in the furnaces of the stars are spread out into the interstellar medium. The next chapter looks at the formation of protoplanetary disks and the subsequent formation of planets

from the collapse of dense clouds of gas and dust.

Chapter 4 covers the Earth, it details all the properties of the planet and what makes it just right for life. It covers the geological processes and looks in more detail at substances such as water in its role on the planet.

Chapter 5 goes into detail about the formation of life and its evolution throughout the history of the Earth. If you want an overview of the biological development of DNA, genes, cells, microbes, and so on then this chapter is a very good starting point. Everything is written in a clear manner which is highly readable.

What of the dangers to Earth and the life that it contains? This is covered in the next chapter, which looks at the minor bodies in the solar system – asteroids and comets. It gives examples of some impacts and their effects from the extinction event 65 million years ago to Tunguska in 1908 right up to Comet Shoemaker-Levy 9's impact with Jupiter in 1994.

Chapter 7 – "Other Worlds" looks at the exploration of the other planets in the Solar System and gives a readable account of the current state of our knowledge of these other worlds, again intertwined with historical figures that were involved in the development of the ideas about the planets and life. The final pages of the chapter look at the search for planets and life beyond the Solar System.

The penultimate chapter is one that is not often found in astronomical books – it gazes at the crystal ball and gives a view of what may happen in the future to this planet and the life upon it. Not from the usual view point of the Sun expanding and swallowing up all the planets, but from problems that will affect us long before that happens. Problems that the intelligent inhabitants of the planet Earth are causing; overpopulation, excessive greenhouse gases and climate change, unchecked genetic engineering, reduction in biodiversity, ozone depletion. It brings home the point that if we don't change our ways we may not have a future!

The last few pages are taken up by the Epilogue, further reading lists and three appendices.

Overall the book achieves what its title suggests – it shows what we and all life are – the children of the Stars, but it does much more. It shows that there is no father or mother figure looking after us, we are on our own and if we get it wrong there is nothing that is going to put it right for us. We have to get it right now, because if we don't we may not have a future.

Mark Humphrys

'Children of the Stars' by **Daniel R Altschuler**. *Published by Cambridge University Press, 2002. Price £19.99. ISBN 0 52181212 7*