The Perils of Planet Spotting

Readers of the Guernsey Evening Press will no doubt have seen a very amusing 'Planet Peewee' cartoon, which appeared on May 1st. The cartoon shows visitors to a doctor's surgery, all of them awaiting treatment for swollen eyes - and holding telescopes. The reason is clear, with the caption 'this always happens when the planets are in conjunction'. Although the proper name for this problem is conjunctivitis, perhaps we could suggest a new word for the English Dictionary - Conjunctionitis, but only applicable in the case of astronomers! Does anyone know where the saying 'a sight for sore eyes' comes from? Perhaps somebody has one of those books which, I seem to recall, gives the origin of various expressions. *Geoff Falla*

Observatory Open Evenings

Date (Tuesdays)	Time
16th July	9.30 pm
23rd July	9.30 pm
30th July	9.30 pm
6th August	9.00 pm
13th August	9.00 pm
20th August	9.00 pm
27th August	8.30 pm
10th September	8.00 pm
15th October	8.00 pm
12th November	8.00 pm

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Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiase

July - Sept 2002

Forthcoming events

Barbecue and Perseid Meteor Count
Monday 12th August
8 pm onwards

Observatory Open Days
see back page for details

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

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Is Everything Known about the Universe?

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Centre inserts

Star chart
Sunset, sunrise, moonset and moonrise times

News and Events
by Debby Quertier

The highlight of recent months has been the grouping of the planets in the Western part of the sky. Jupiter, Saturn, Mars and Venus were joined by the elusive Mercury towards the end of April. They made a fine sight as their relative positions changed from night to night. The contrast between the brightness of Venus and Jupiter compared to the redness of Mars and the relative brightness of Mercury showed up well against the twilight sky. We had quite a few visitors to the Observatory who all enjoyed seeing the planetary grouping. It won't happen again for about 40 years.

We have not done a great deal of star-gazing as the weather has not been very obliging. The nights that we have been open to the public have been well attended and have helped to boost our funds. From16th July we are open to the public every Tuesday until 27th August inclusive. As this is during the school summer holidays children will be welcome.

We have used the computer program Starry Night Pro for demonstrations to visitors on the computer in the main building. It shows the sky in real time and can be changed to show the sky at any time in the past or future. You can view the planets from outside the solar system and information windows are available for whatever object you choose to look at. It has proved very entertaining for visitors (and members) and particularly helpful when the sky has been cloudy. As we shall be open now on Tuesdays until September and are expecting a good number of visitors this should prove very useful. Help is always needed on these open nights and any members who are able to attend and assist will be most welcome. You do not need to be an expert on all astronomy topics and you are bound to find it enjoyable.

Future Events

With Venus now sinking into the West, there are no naked eye planets now visible. Pluto is in the constellation of Ophiuchus and within the capability of our Meade LX200 telescope. We saw the planet two years ago and, although it is only seen as a faint star-like point, it feels like a real achievement to actually spot it. Uranus and Neptune are in Capricorn and by the end of August are pretty much due south by 11.30pm. Uranus is at the limit of naked eye visibility and Neptune can be seen with binoculars. In the telescopes they both appear as tiny discs. We should take advantage of suitable nights for viewing these planets.

In 2000, not long after the Meade was up and working, we attempted a Messier Marathon which had to be abandoned at 4am due to the weather. We got as far as M27, the Dumbbell Nebula in Vulpecula. We have talked before about finishing the marathon off, i.e. starting from where we finished and working through to the end of the list. We could do this on an evening towards the end of August and work our way through until done, which would take us to around 2.30 am. Alternatively we could leave it to later in September when the darker nights would give us an earlier start and finish time. As long as we start before the Summer Triangle begins to get too low in the west we should be able to complete it. In fact we have quite a wide window to do it in. Anyone who is interested in finishing off the Messier list please let me know – we can then talk about a date (with options in case the planned nights are cloudy).

Summer Barbecue

Our summer barbecue and meteor count is planned for **Monday the 12th August 2002, from 8pm onwards**. As usual please bring you own food and drink and a dish to share. The sky promises to be favourable for the count of the Perseids. By 10pm the 4.6 day old moon is low in the west and by the time we actually start to look for the meteors it should have set. Let's hope the numbers are good this year. At the time of the barbecue Sagittarius will be well placed in the south with the red giant Antares moving into the southwest (probably behind that large tree that blocks some of our view). Uranus, Neptune and Pluto will all be in the south of the sky that night, though of course not visible to the naked eye. Weather permitting, the 12th August could be quite a good night.

Debby Quertier

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

Life from Space. A set of articles underlining the importance of carbon in the emergence of life, how it may have been brought to Earth by comets, and the 'panspermia' theory that microbial life may also have come from outer space. *Astronomy Now, April 2002*

China's emerging Space Programme. From the invention of gunpowder and rockets, the Chinese have recently developed modern facilities for a space programme. Having already launched satellites for various purposes, a manned spaceflight programme is expected in the near future. *Astronomy Now, April 2002*

Observing in Light Polluted Skies. One amateur astronomer's success in viewing the Messier Objects under difficult conditions. Also a guide to better outside lighting, and a photographic image of the Earth at night, showing the main light sources - even Guernsey and Jersey are pinpointed! *Sky and Telescope, April 2002*. The Czech Republic has become the first nation to pass a law restricting light pollution. *Astronomy Now, June 2002*

Expansion of the Universe- Inflation Theory. The Big Bang theory has been amended in recent years by the Inflation theory, to explain a very rapid expansion rate at the beginning,

but the mechanism and energy behind the expansion of the Universe is still the subject of much research. *Astronomy, April 2002*

Microquasars. Quasars, powerful sources of energy formed in the evolution of galaxies, were one of the major discoveries of the last century. More recently it has been discovered that microquasars exist in our own galaxy associated with binary stars. *Sky and Telescope, May 2002*

Pluto Mission. NASA scientists are planning a mission to Pluto, also to include observations of Kuiper Belt objects, and are hopeful that funding will be made available. *Astronomy, May 2002*

Is the Universe Multidimensional? Efforts to understand cosmic puzzles may involve other dimensions. If proved to be correct by ongoing research, the present notion that the Big Bang was the origin of time and space may need to be abandoned. *Astronomy, May 2002*

Black Holes - and Wormholes. A summary of current knowledge on the subject of Black Holes, and Wormholes - thought to be a way of permitting hyperfast travel through space and perhaps time. *Astronomy Now, May 2002*

Envisat - Giant European Satellite. Europe's most ambitious satellite - Envisat, an 8 ton giant, was launched into a polar orbit at the end of February. The satellite will monitor land, ocean, and atmospheric conditions, and measure climate changes. *Astronomy Now, May 2002*

Circumpolar Regions. Many of the most interesting deep sky objects can be viewed all year round, in the circumpolar regions of the sky. Details and list of some of the best objects to view. *Astronomy Now, May 2002*

Comet Ikeya-Zhang. A report and photos of this latest visitor to the inner solar system. With confirmation that the comet was last observed in 1661, it has the longest orbital period of any comet observed more than once. *Astronomy and Space, May 2002*

Eclipses of the Sun. Prospects for this year"s total solar eclipse on December 4th, visible in Southern Africa and in South Australia. Also, the Saros eclipse cycle, and an eclipse reference in Shakespeare's play King Lear. *Sky and Telescope, June 2002*

Hubble Rejuvenated. Following a recent Shuttle mission, the Hubble Space Telescope has been upgraded with new equipment, and is now considered to be better than ever. *Sky and Telescope, June 2002*

Black Holes - In Search of Proof. There is still apparently no direct evidence that black holes really do exist, but with methods of detection improving it is hoped to prove their reality before too long. *Astronomy, June 2002*

Fossil Fuels - from Earth or Space? We have always understood that fossil fuels such as coal and oil originate from decayed organic matter. The production of carbon in stars, and the presence of hydrocarbons in comets suggests a different origin should be considered. *Astronomy, June 2002*

Hubble's New Vision. First images from the new Advanced Camera just installed in the Hubble Space Telescope. *Astronomy Now, June 2002*

Future Astronomy. What new developments can be expected in astronomy? A set of articles on the subject of ongoing research to understand the physical processes of the Universe, new theories, the future of amateur astronomy, and the prospects for spaceflight -particularly the space programme in China. *Astronomy Now, June 2002*

Is Everything Known about the Universe?

by Geoff Falla

In a recent national newspaper interview, to coincide with the publication of his new book 'Our Cosmic Habitat', the Astronomer Royal Sir Martin Rees was asked about current knowledge of the Universe, and was quoted as saying that scientists now know everything except what happened within the first second of creation. For those of us who seem to be constantly reading of new discoveries in the Universe, and theories being modified, this comes as quite a surprise. Not long ago, as a result of a Hubble Space Telescope deep space image of what was thought to be a relatively empty area, with few if any stars or galaxies, the supposedly almost empty area was found to be filled with numerous far-distant galaxies not previously seen. The Universe, it was realized, must contain a far larger number of galaxies than was previously thought. We have also had the recent confirmation that the expansion of the Universe is not constant, or slowing down, but that it is actually accelerating its expansion, being driven outwards by an unknown kind of energy labelled 'dark energy' , the nature of which has yet to be unravelled. Another discovery which is the subject of ongoing research is that there seems to be evidence emerging for the existence of parallel, unseen Universes - other dimensions, and that the long-accepted idea that everything began with the Big Bang, including space and time itself, may need to be reconsidered. All this leaves a feeling that we can hardly be certain of anything, that there is a lot more to be discovered, that there is a lot more to be discovered, and that to assume that astronomers and scientists have all the answers but for a few loose ends to be tied up is rather unwise. We can recall an occasion when a previous Astronomer Royal was asked for his views on the future possibility of spaceflight, which had not yet been achieved at that time. His reply was that the whole idea was complete nonsense. Within a short time of this statement came the announcement of the first satellite

launch by the Russians, who soon followed this up with the achievement of the first manned spaceflight and orbit of the Earth. Today we have astronauts living and working in space, and constructing an international space station which will no doubt be the springboard to interplanetary exploration in the not too distant future.

When it comes to the question of other solar systems, and the possible existence of life elsewhere, there has also been a marked change in knowledge and opinions. Not many years ago it was thought that our solar system was probably unique, the result of rare conditions which produced its formation. But just in the last few years evidence has started to be found indicating the existence of planets orbiting other stars. So far, around a hundred planets have been found, mostly very large planets which have been identified from their gravitational effects on the parent star. It is accepted that many smaller, more Earth-like planets must also exist, too small to be identified at such distances until much more powerful telescopes are available. However, the first more direct observation has been achieved, with the identification of a planet in transit across a star in the constellation Pegasus, and analysis of the planet's atmosphere from its reflected light. It is now thought that planetary systems must be common in our galaxy, and in other galaxies beyond. The present estimate is that perhaps as many as one in ten stars could be accompanied by planets. The chances of there being life, and the prospects for the development of intelligent life on planets with the environmental conditions considered necessary, has been immeasurably increased. It should not come as a complete surprise if the existence of microorganisms and other organic material is confirmed before too long either on Mars, or on one of our solar system's moons. There is evidence that such material exists in space, and in comets, and if so must have spread widely over the course of time.

All this leaves a feeling that we can hardly be certain of anything

Astronomers, including the Astronomer Royal, are happy to accept that intelligent life must also exist elsewhere in space, but any such life is assumed to be much too far away to be of any relevance, and the possibility of visitations to our solar system is thought at present to be out of the question. Some of us would say that there may be evidence to suggest otherwise. The possibility has been ruled out by astronomers because we are told that the speed of light cannot be exceeded, putting the Earth out of bounds to any of those would-be Star Trek voyagers. It is, however, already known that there is a time dilation effect as journey speed is increased, that time in effect slows down, making impossibly long journeys more practical theoretically, if not yet in practice. It cannot at present be known what technologies may be available to any other civilizations elsewhere, maybe much more advanced than ourselves. Now that scientists are also starting to admit the possibility of other dimensions, this may widen the scientific horizons still further. Whatever lessons we may be learning from the ongoing progress of scientific discovery, we should always bear in mind that there are constantly new surprises which may change some current way of thinking, and that perhaps nothing should be thought to be impossible. The author Martin Amis is quoted as making the appropriate remark that 'the history of astronomy is the history of increasing humiliation', in the sense that the scale and complexity of the Universe has always been underestimated. Perhaps while acknowledging the achievements and discoveries of today's science and astronomy, we should be aware at the same time that there must be a lot more that is as yet unknown.

Geoff Falla

Time Dilation and Space Travel

In his article above Geoff Falla refers to the relativistic effect of time dilation and how this may make long journeys possible for future astronauts. It is worth seeing how this might work out. Say we find an interesting star system at the relatively close distance of 10 light years, and a crew of astronauts willing to travel there. Assume we also have a propulsion system to accelerate a spacecraft to an appreciable fraction of the speed of light. The table below shows how long the journey would take from the point of view of us on Earth and for the astronauts.

The table shows that even if the astronauts are going at a nippy 18,600 miles per second, 10% of the speed of light, the time dilation effect is not very significant. The journey takes 100 Earth years and 99.5 years for the atronauts. Increase the speed to 50% of the speed of light and the journey starts to look more feasible, but the time dilation effect is still not very great. The journey takes 20 Earth years and 17.3 astronaut years. Time dilation really starts having a big impact when the astronauts can travel within a couple of percent of the speed of light. The journey then takes slightly longer than 10 years viewed from the Earth, but for the astronauts it can be less than two years. The lesson is clear. To take advantage of the time dilation effect for travel to distant stars we need a system of propulsion which can accelerate a spacecraft to very near to the speed of light - and slow it down again at the other end.

Peter Langford

Spacecraft Speed % of speed of light	10%	50%	75%	90%	98%	99.5%
Earth time-years	100.00	20.00	13.33	11.11	10.20	10.05
Astronaut time-years	99.50	17.32	8.82	4.84	2.03	1.00