Messier Marathon

We are planning to take advantage of our new telescope and attempt a Messier Marathon, viewing all 109 Messier objects over the course of a single night (yes - all night!). The end of March/early April is a suitable time for it, when all the required constellations are visible during the same night. Our latitude and the view south from the Observatory make all the objects available to us and they are easily within the grasp of the new telescope.

To complete the Marathon will require viewing the objects in a set order and plenty of stamina (or insanity) to stay the distance. It will be quite an achievement if we can complete it.

We propose to attempt the Marathon on Saturday 1st April into the early hours of Sunday. Anyone interested should come along to the Observatory on Tuesday 21st March at 8pm to run through the plan of attack. It would be useful to have an idea of how many people are likely to be involved so if you are interested please let me know.

Debby Quertier

Healthy Finances

Thanks to eclipse year fundraising and some generous donations I was able to report to the Annual Business Meeting that the Section's finances were in a healthy state at the end of 1999, even after spending £17,400 on the new telescope. If any member would like to see a copy of the accounts please let me know.

Peter Langford - Hon Treasurer

Astronomy Section Officers

Joint Secretary	Jessica Harris	47193
Joint Secretary	Debby Quertier	725760
Hon Treasurer	Peter Langford	720649
Editor	Peter Langford	720649
Facilities	Geoff Falla	724101
Public Relations	David Le Conte	64847
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Research	Frank Dowding	55215
Librarian	Debby Quertier	725760

Observatory:
Rue du Lorier, St Peters,
Guernsey Tel: 64252

Web page:
www.netcomuk.co.uk/~pmlang

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

3 Cameron Place, Upper St Jacques,
St Peter Port, Guernsey GY1 1SU
Tel: 01481 720649
Fax: 01481 715702
E-mail: pmlang@netcomuk.co.uk

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La Société Guernesiaise, Candie Gardens,
St Peter Port, Guernsey. Tel: 725093

Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise

January - March 2000

Forthcoming events

Telescope Launch
Friday, 10th March
At the Observatory
(Details to be announced)

Open Evening for Members of La Société
Saturday, 11th March
8 pm at the Observatory

Public Open Evening
Tuesday, 14th March
8 pm at the Observatory

Messier Preview
Tuesday, 21st March
8 pm at the Observatory

Messier Marathon
Saturday, 1st April
8 pm at the Observatory

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

In this issue

Jupiter and its Moons
Astronomical Highlights of 2000
Mark's Mega Quiz Answers

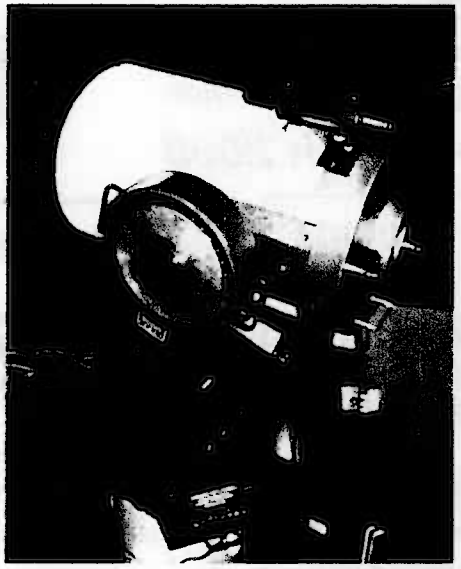
Inside

Centre inserts

Programme of Events for 2000
Star chart
Moon phases
Sunset and sunrise times

It's here!

The new telescope equipment arrived at the Observatory from True Technology Limited on December 2nd. The main packages contained the 16" Meade LX200 Schmidt Cassegrain and the 5" Takahashi FS-128 refractor telescopes. The Meade telescope is primarily for observing deep-sky objects while the Takahashi is mainly for planetary observing. We are now in the process of installing the new equipment in the Observatory and becoming familiar with its operation in time for the official launch in March.



We had already decided to mount the telescope equatorially, that is with the axis about which the forks rotate pointing to the north celestial pole. (With the computer-controlled drive it would have been possible to mount the telescope with this axis vertical but we would then have had problems of image rotation). This meant fixing the telescope onto a wedge with an angle appropriate for our latitude. We had decided to have the wedge made locally and Nick and Charlie Vining manufactured this critical component.

The Meade telescope was then mounted with the wedge on the concrete pillar in the Observatory in place of the C14 telescope (which can be used with its own tripod when required). The Takahashi refractor telescope was piggy-backed on top of the Meade but this arrangement proved too unbalanced for the computerised motor drive to handle. For the time being the Takahashi has been taken off the Meade until we obtain some counterbalances. In the meantime we have borrowed the finder-scope from the C11 telescope so that we can continue setting up the Meade.

To get the most out of the telescope it needs to be exactly aligned, which will require some fine adjustments to the positioning of the wedge. It could be a long and tricky task. The Takahashi and the counterbalances can then be fitted and the Takahashi properly aligned with the Meade. There is still plenty to be done before everything is fully operational but it is hoped all will be ready by the official launch.

PML

Officers Reappointed

At the Section's Annual Business Meeting on 18th January all the existing officers were reappointed, in the absence of any volunteers wishing to to take over their jobs. One post remains vacant, that of Light Pollution Officer. If anyone is interested in taking it on please contact Debby or Jessica.

PML

Open Evening 26th October 1999

It was fairly last minute decision to open the Observatory to the public on Tuesday the 26th October 1999. The date chosen was during the half-term break and it was hoped that this would encourage parents to bring their children. The event was well publicised in the Press and on the local radio, with interviews given by us.

Fortunately the weather was great and we estimate that at least 300 people turned up, though it was difficult to tell exactly. Despite having to join long queues people were generally pleased with their views of Jupiter and Saturn in the C11 and C14. The full moon rose later and a third telescope was employed.

The local Press came along to do their feature "I had a go at" with us. This is the weekly feature where the journalists try a different activity each week and do a write up on it. A week or so later there was an article which showed the Observatory and astronomy in a very good light.

Our open evenings seem to be getting pretty popular and, as long as we have clear skies, the numbers attending are increasing. Certainly since the 26th we have all had enquiries as to when we are doing it again. Any members who wish to get involved in future events please let us know. Help is always needed and it's generally a lot of fun.

Debby Quertier

Leonid Meteor Showers

The Press contacted us in November and did an article on the expected Leonid meteor shower. We were all on standby, ready to ring fellow astronomers in the middle of the night in case "it" happened. Well it did, but Guernsey and most of the UK was clouded out. The shower did not peak as it did in 1966, but vast numbers of meteors were seen, though not by us. Jessica spoke live on Radio Guernsey the next morning from a cold and windy Salarie Corner car park and spoke of what we had missed. There is always the possibility of a storm this year, let's hope that we are not clouded out.

Debby Quertier

Christmas Quiz

Debby Quertier posed the questions at the Christmas Quiz and Supper Night. Top scorer was David Le Conte, closely followed by Geoff Falla and Roger Chandler. David generously bestowed the honour of setting next year's quiz questions on Jessica Harris. A good time was had by all.

PML

Jupiter and its Moons

by Geoff Falla

The giant planet Jupiter, largest of the Solar System's planets, is more than ten times the diameter of the Earth and over a thousand times greater in volume. It is one of the outer planets beyond the asteroid belt, and is largely gaseous in content but may have a solid core. In spite of its vast size Jupiter rotates at a remarkable speed, completing one revolution in less than ten hours.We know that it has a powerful magnetic and gravitational field, and that it affects both its nearby moons and the path of any comets which happen to come too close.

We have recently been enjoying excellent views of Jupiter at opposition, the nearest point in its orbit. As it has also been near perihelion, the closest point to the Sun, Jupiter has reached almost its maximum possible apparent size to us in the sky. The most prominent features on the surface of the planet are the North and South Equatorial Belts and the Great Red Spot. The belts usually show up as dark lines above and below the equator. The visibility of the belts seem to vary considerably, and sometimes one of the belts will be barely discernible until later appearing to be regenerated. The Great Red Spot, first seen in 1665, is also a semi-permanent feature on Jupiter. The colour of the spot is not always red as the name implies, but can vary through shades of orange to almost white and is reported to be sometimes difficult to find. The spot is an oval in shape and has been likened to a giant storm as it appears to rotate steadily anti-clockwise at the edge of the South Equatorial Belt. Because of its apparent permanence, there is reason to suppose that the spot may be caused by an eruption of material from the planet's more solid core. A similar large dark spot was recently discovered on Neptune, and at the same latitude. The fact that the largest volcanic structures on Mars and Earth are both again at the same latitude away from the equator may be only a remarkable coincidence, unless perhaps this is a product of a planet's rotational mechanism.

In spite of its vast size Jupiter rotates at a remarkable speed, completing one revolution in less than ten hours.

Jupiter has sixteen moons so far discovered, the four largest first being recorded by Galileo in the year 1610. The four 'Galilean' moons are visible with good binoculars or a small telescope, and it is often fascinating to watch the moons as they travel speedily around the planet. The movement of the moons closest to to Jupiter can be followed during the course of an hour or two, and sometimes one of the moons can be seen crossing in front of Jupiter, or disappearing or emerging from behind the planet.

The moon nearest to Jupiter is Io, around 2,300 miles in diameter and comparable with the size of our own Moon. It is the densest of the four major satellites and has been found to be remarkably volcanic, discovered as a result of photographs taken during the Voyager mission in 1979. The photographs showed active volcanoes, with plumes of material being thrown high above the surface. Io is predominately a striking red colour, produced by the continuous eruptions of material containing sulphur from deep within the interior. The satellite has an orbital period of only about forty two hours, and it is this rapid motion together with Jupiter's gravitational attraction which are evidently responsible for Io's volcanoes. The heating produced by tidal forces make Io the most volcanically active body in the Solar System.

Europa could be one of the best prospects for the discovery of life elsewhere

The next closest of the Galilean moons to Jupiter is Europa, slightly smaller than Io, and with double the orbital period at three and a half days. Europa has a relatively smooth surface, but photographs from Voyager and the more recent Galileo mission has aroused the interest of scientists in an intriguing possibility. The surface of Europa seems to be ice with extensive patterns of cracking, like ice floes, and the suggestion is that below the ice is a deep ocean. The tidal forces of Jupiter are causing movement of the ice. Not only that, the heating produced from within the moon, as in the case of Io, could mean that any water below the ice could be warmed from the interior. There is the possibility that this could be one of the best prospects for the discovery of life elsewhere. Recent discoveries have shown that life on Earth is far more tenacious and can thrive in conditions much more extreme than previously accepted, so this increases the chance that microbial or more developed life will be found on another planet or moon. Scientists are in the early stages of developing a plan to explore beneath the ice of Europa, using a robot device to melt its way through to the water below.

Ganymede is the largest moon in the Solar System, having a diameter of around 3,200 miles. The orbit again doubles compared with Europa to seven days, and it is less dense than Jupiter's two innermost Galilean moons. The surface is more varied than on Europa, with an icy crust but also dark areas of rock with many craters. Being further away from Jupiter, the surface appears to be inert, unlike the evident activity on Io and Europa.

The furthest out of Jupiter's major moons is Callisto, taking more than sixteen days to complete one orbit. It is only slightly smaller than Ganymede and also has ice on the surface, with many craters and a particularly large impact basin.

Some of Jupiter's minor moons have interesting features, and altogether the Jovian system has been compared with the Solar System in miniature. Jupiter has the same gas constituents of hydrogen and helium as the Sun, and if it had been slightly larger it too would have become a star.

Geoff Falla

Astronomical highlights of 2000

***David Le Conte** previews the year ahead*

The following is a summary of the main astronomical events which we will be able to see from Guernsey during the year 2000.

There is a total eclipse of the Moon on the morning of 21st January, starting at 03.04. Totality starts at 04.06 and lasts until 05.24, with mid-eclipse at 04.45. The eclipse ends at 06.26.

The best dates to see elusive Mercury are: 10th to 20th February (evening), early June (evening), and 10th to 20th November (morning).

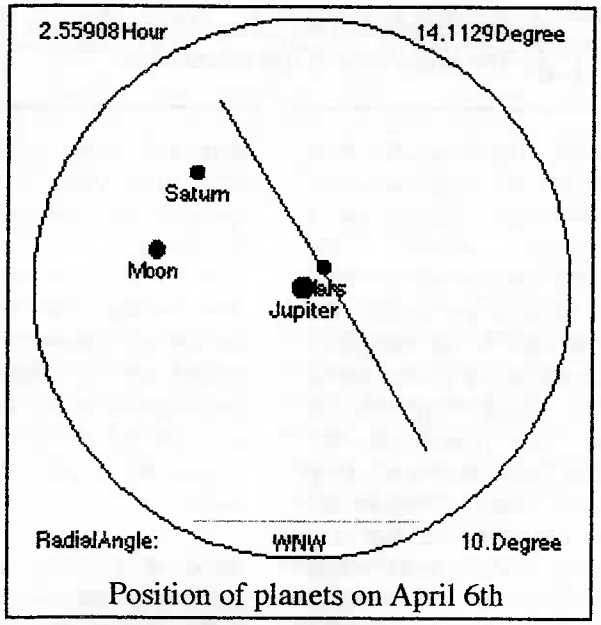
Venus disappears from the morning sky by March, reappearing in the evening in August, and shining as a brilliant evening "star" during the autumn.

Mars is rather unimpressive this year.

Jupiter and Saturn are visible in the evening until April, in the morning from June to August, and then in the evening again for the rest of the year.

An interesting triple conjunction appears in the first half of April, when the planets Jupiter, Saturn and Mars form a close group in the western evening sky, changing positions night by night. They are joined by the crescent Moon on the 6th April, and that should be a lovely sight.

Venus and Mercury are also close together (2 degrees) on the 15th and 16th March, very low in the east before sunrise, and on the 21st June Venus and Mars approach within a third of a degree.



Position of planets on April 6th

Of course, the big planetary grouping during 2000 occurs in May, when Mercury, Venus, Jupiter, Saturn and Mars are all close together. Even the Moon is there on the 4th May. Unfortunately, the Sun is also part of the grouping, and its brightness will mean that all the planets, except Mars, will be invisible. However, at the end of May Jupiter and Saturn emerge from the Sun's glow, and we will catch a glimpse of a close (one degree) conjunction of these two planets before sunrise.

The Moon occults a number of stars during the year, but none of them brighter than about magnitude 4.

Unfortunately, the bright Moon will interfere with the three main meteor showers: Perseids (11th-12th August), Leonids (17th November) and Geminids (13th-14th December).

All in all, it will not be an outstanding year for Guernsey astronomy (after all it would be hard to beat 1999!), but neither will it be a bad year. There will be plenty to keep sky-gazers occupied. If I had to pick a single highlight as the year 2000 event, then it would have to be April's planetary conjunction. Do look out for it!

David Le Conte

Astronomy and Space - References for further reading

compiled by Geoff Falla

New Hubble Images. The latest images from the Hubble Space Telescope, and looking to the future when telescopes may be capable of imaging planets orbiting other star systems. *Astronomy, October 1999.*

Accelerating the Cosmos. The recent discovery that the expansion of the Universe appears to be accelerating. Findings from supernova measurements which if confirmed by further research is unexpected, important and heretical to current theory. *Astronomy, October 1999.*

Nicolas Copernicus. The 15th century astronomer who changed astronomy forever with the heliocentric idea of the solar system, as opposed to the Earth being at the centre, producing a revolution in science and religion. *Astronomy, October 1999.*

Surviving in space. Research into the physical effects of weightlessness in Space, important in planning for future manned missions. *Astronomy, October 1999.*

Carl Sagan. The life of the famous astronomer and planetary scientist, subject of a recently published book. *Astronomy, November 1999.*

Are We Alone? The SETI programme, the search for extraterrestrial intelligence. Currently two types of search, an all-sky survey and a targeted area search represented by Project Phoenix. *Astronomy, November 1999.*

Odd-shaped Galaxies. The work of astronomer HC Arp. The observation of unusual galaxies for over 40 years, helping to explain the formation and evolution of galaxies, and indicating some revolutionary ideas. *Astronomy, November 1999.*

In Search of Martian Seas. Evidence for the past existence of a large sea area on the northern hemisphere of Mars. *Sky and Telescope, November 1999.*

The Great Total Eclipse. Review of the total solar eclipse of August 11th 1999, the last of the century and one of the most widely viewed celestial events of modern times. *Sky and Telescope, November 1999.*

Changing the Face of Mars. Terraforming, the prospects of returning Mars to a more favourable environment for life. *Astronomy Now, December 1999.*

Art in Astronomy. Astronomical events have featured in many historical works of art. Now modern artists use current data to represent planetary landscapes. *Astronomy Now, December 1999.*

High Resolution Radio Astronomy. The use of radio telescopes separated by very long base lines to provide the sharpest resolved images in current astronomy. *Sky and Telescope, December 1999.*

New Products for Astronomy. A survey of some of the latest instruments, accessories and software packages available for astronomy. *Sky and Telescope, December 1999.*

Variable Star. The Hipparchos satellite project. A discovery that many stars previously thought to be constant are in fact variables, or eclipsing binaries. *Sky and Telescope, December 1999.*

Giant Eyes on the Sky. Some of today's ground-based telescopes are huge, but there seems no limit to what is planned for the future, even a 100 metre telescope. *Astronomy, December 1999.*

Lunar Eclipse 2000. The first total lunar eclipse for nearly three years is on the night of 20-21st January. Tips on how to photograph the eclipse. *Astronomy, December 1999.*

Space Exploration - Plans for the 21st Century. NASA plans for the future of space exploration, including projects for the further use of robot explorers in solar system missions. *Astronomy, December 1999.*

Size of Life

Say the dinosaurs had been smart enough to have a space program. They would still have needed an enormous spacecraft to lift a crew of say three brontosaurus into orbit. On the other hand it would not be nearly so difficult to design a spacecraft to launch a few insect-size creatures into space. Does this tell us anything about the size of any extraterrestrials that may visit?

PML

Book Review

David Le Conte reviews two topical books

"The Calendar", by David Ewing Duncan. Published by Fourth Estate Ltd, London, 1998. Price £12.99, paperback £6.99.

"Mapping Time: The Calendar and its History", by E G Richards. Published by Oxford University Press, 1998. Price £20.00, paperback £8.99.

With the advent of the year 2000, the interest of much of the world is on the end of the second Millennium and the beginning of the third. It may well be debated as to whether this has any real significance, and, of course, the very date of the end of the Millennium is itself a subject of debate.

"Mapping Time" by Richards is a much more thorough work, and I found it a more satisfying read.

Nevertheless, it must be acknowledged that a year with three zeros in it is a rare event, although it is merely an arbitrary artifact of the calendar. We could, of course, have chosen to use some calendar other than the Gregorian one, and indeed many other calendars are still in use. It is not surprising, therefore, that the origin of the Gregorian calendar, a comparison of it with other calendars, and the whole history of calendar development is of particular interest at this time.

Both of these books give prominence to a discussion of the history of the Gregorian calendar, but have entirely different approaches. They also have very different treatments of other calendars.

"The Calendar" by Duncan is subtitled "The 5000-year struggle to align the clock and the heavens - and what happened to the missing ten days". It has become a best-seller, being listed as number 4 on a New Scientist list of science books at the time of writing of this review (October 1999).

It is written in a narrative form; clearly intended as a popular account of the Gregorian calendar. The format of the book is small and easy to handle, rather similar to Dava Sobel's best-selling "Longitude". The cover blurb proclaims it, rather pretentiously, as "the first complete history of the calendar"; in fact many books have been written about the calendar and its history. I found it quite readable, but was a bit concerned by some of the more imaginative writing, such as "Under an ancient gnarled oak tree in south-west England the first Archbishop of Canterbury held a meeting sometime in the late 590s . . . to settle a local dispute over Easter." The chapter titles, such as "A Flaming Cross of Gold" and "Time Stands Still", give little indication as to what the chapters contain. Also, there are only vague source references. Also, there are few summaries, tables and illustrations, so it cannot be easily used as a reference work.

The book cannot, therefore, be regarded as a work of scholarship, and indeed the author, who is described as "a writer and traveller", acknowledges this fact.

By contrast, "Mapping Time" by Richards is a much more thorough work, and I found it a more satisfying read. Dr Richards was formerly a Senior Lecturer at King's College, London, and has produced a most scholarly, but at the same time readable work. Although it too concentrates on the history of the Gregorian calendar, it does so in the context of calendrical development generally. It discusses many of the other calendars, and includes algorithms for converting dates from one calendar to another. It is divided into four parts, dealing with: calendar theory (which provides a detailed discussion of the astronomical basis of calendars, time, writing, numbers, and the variety of calendars), calendars of the world, calendar conversions, and Easter.

It is full of tables and references, and contains a comprehensive set of appendices which include astronomical constants, the names of the days of the week in many languages, a glossary, and long lists of further reference works. In short, it is an excellent volume, and, to my mind, although costing a bit more, is much better value and more likely to be of use for a longer period than Duncan's book. I am sure that I will refer to it time and again.

David Le Conte

Mark's Mega Challenge Quiz

proved too great a challenge for all but the brave few. Congratulations go to ***David Le Conte*** *who won Mark's prize of a book token.* **Mark Humphrys** *now reveals the answers.*

1. The Very Large Telescope in Chile consists of 4 telescopes each 8m in diameter. What are the names of the 4 telescopes?
They are named using words from the local Mapuche Indian language:
Antu - Sun; Kueyen - Moon; Melipal - Southern Cross; Yepun - Sirius (AN 5/99)

2. In what film did Bruce Willis save the Earth from a lump of rock the size of Texas?
Armageddon

3. Brian Marsden works where and does what?
He has been director of the IAU Central Bureau for Astronomical Telegrams in Cambridge, Mass., the world's clearing house for all comet, asteroid, nova, and supernova discoveries, since 1968 (ST 1/98)

4. Why was there world wide consternation when Brian Marsden added an exclamation mark in one of his IAU circulars?
The asteroid 1997 XF11 was reported to pass 0.00031 AU from the Earth on October 26, 2028!, the calculated error made it a distinct possibility that it would collide with the Earth. (ST 7/98)

5. The formula Rs = 2.59M gives what?
The Schwarschild Radius, the radius of the event horizon of a Schwarschild blackhole.

6. What is the exact length of a sidereal day?
23 hrs 56 mins 4 secs

7. Who was the subject of a lawsuit by Edmund Halley and won?
Margaret Flamsteed, wife of the astronomer royal was sued by Edmund Halley over possesion of instruments in the Royal Observatory that she claimed were personal belongings of her late husband.

8. What is so special about the Pistol Star?
It is about 10 million times more luminous than the Sun making it one of the brightest and most massive known (ST 1/98)

9. Where are you likely to find the "coathanger" and what is it?
Vulpecula, it was thought to be an open star cluster, but data from the Hipparchos mission shows that it is merely an asterism. It is also known as Brocchi's Cluster. (ST 1/98)

10. Which journal, newsletter or magazine recently admitted to a mistake which has taken 56 years to come to light?
Sky and Telescope published an article in 1943 which stated that a blue moon occurs when there are two full moons in one month - this was an incorrect interpretation of a Maine Farmers Almanac - but the definition has stuck until the error came to light recently. (ST 3/98)

11. In what month are you likely to see the Geminids?
December 9-14

12. In Nigeria certain tribes think that a particular apparition in the sky was the cause of the Biafran Civil War in the late sixties. What was this apparition?
Comet Ikeya-Seki

13. NEO stands for what?
Near Earth Orbit - an asteriod or comet with an orbit close to Earth's.

14. S type stars have a similar temperature to M type stars but what in their spectra differentiates them?
S type stars have a zirconium band instead of a titanium oxide band.

15. What is the Earth's escape velocity? (In Km per second)
11.2 km per second (AN 2/98)

16. Dark matter is thought to make up a large portion of the universe's mass, so where will you find Dark Currents?
In CCD cameras, it is the rate at which a pixel will accummulate electrons regardless of whether it is exposed to light or not. (CCD Fall 96)

17. Which is the most volcanically active body in the Solar System?
Io (AN 2/98)

18. What is the name given to the sequence of solar or lunar eclipses that is repeated every 18 years or so?
Saros (AN 11/98)

19. Where would you find a Serrurier Truss?
It is the open tubing found on some telescopes.

20. When the first Ariane 5 blew up what was lost?
The CLUSTER satellites designed to map the structure of the Earth's magnetosphere (AN 11/98)

21. Which old age pensioner got a second chance recently?
John Glenn got another trip into space 37 years after his first (AN 11/98)

22. Triton is unusual - why?
It has a retrograde orbit around Neptune. (AN 11/98)

23. And Titan is another unusual moon - why?
It is the only satellite to pocess a thick atmosphere of nitrogen and traces of hydrocarbons (AN 11/98)

24. Where are you likely to find MERLIN other than in King Arthur's day? Who or What is it?
Multi-Element Radio Linked Interferometer Network. It is an array of radio telescopes across the UK which are used in tandem to create high resolution radio maps.

25. Where is O'Neils Bridge and what did its discovery lead to?
It is an illusory bridge between Promontorium Lavinium and Promontorium Olivium on the Moon, first reported by John J O'Neil. Hugh Percy Wilkins, director of the BAA Lunar section became convinced that it was real feature, so much

so that he resigned when it was proved to be a trick of the light. (ST 1/98)

26. What was the name given to the second rock visited by Sojourner recently?
Yogi (AN 5/98)

27. What distinguishes a type II supernova?
Strong hydrogen lines (AN 8/98)

28. Deepspace 4 is designed to do what?
Its mission is to rendezvous with Comet Temple 1, land a probe on the comet's nucleus and return drilling samples to Earth, it is supposed to be launched in 2003 (SA 99)

29. Deepspace 1 is on its way to an asteroid, what is special about its engine?
It is the first time that an Ion engine has been used to propell a spacecraft (SA 99)

30. If an object is moving away from you is the wavelength of its light going to be stretched or compressed?
Stretched - its called Redshift. (AN 6/98)

31. When you plot stellar luminosity against temperature what graph is produced?
Hertzsprung-Russell diagram. (AN 6/98)

32. When an electron spirals around a magnetic field it produces what?
Synchrotron radiation.

33. IC434 has a famous object in it - what is it?
The Horsehead Nebula. (ST 1/98)

34. Where are you likely to find COAA and what does it stand for?
Centre for Observational Astronomy in the Algarve, Portugal.

35. On what part of the Moon did Apollo 18 land?
It didn't - Apollo 17 was the last mission to the Moon. But if you read James A Michener's book "Space" it landed on the far side of the Moon.

36. What name is given to a filter that will transmit light at a wavelength of 6563 angstroms and what kind of observations would you likely be doing if you used this type of filter?
Hydrogen Alpha filter, and you would mostly use this for observing the Sun. (ST 3/98)

37. Which major observatory can be found in the French Pyrenees?
Pic Du Midi Observatory

38. Jack Wall is a member of the Crayford Manor House Astronomical Society. What piece of equipment did he design that has gained world wide recognition?
Crayford Eyepiece Mount

39. The Watford Gap is a motor way service station so what is the Kirkwood Gaps?
Regions of the Asteroid belt that are largely empty of asteroids.

40. He discovered Helium, founded the journal Nature, discovered the chromosphere of the Sun and in his spare time had seven sons and two daughters. Who was he?
Sir Joseph Norman Lockyer, born 17 May 1836, died August 16 1920.

41. What is the only spacecraft to have flown over the Sun's polar regions?
Ulysses, built by ESA, launched in 1990. (ST 4/98)

42. Andrew Lloyd Webber has something in common with Terry Platt, what is it?
Mr Webber had a hit play called Starlight Express, Terry Platt has a top selling CCD company called Starlight Xpress.

43. How hot is a B-type star?
10,000 to 25,000 K

44. If you talked about the stag, or the Wain, or a leg of beef or a parrot what constellation would you be discussing?
Ursa Major. Stag is the Siberian term, Wain is English, leg of beef - Egyptian and parrot is Aztec. (ST 5/98)

45. Results from the Galileo spacecraft indicate that Europa may have what?
A global subsurface ocean. (ST 5/98)

46. Sobieski's shield was named in honour of the Polish King, John III Sobrieski, to what are we talking about?
The constellation of Scutum, lying between Aquila and Sagittarius

47. NGC3587 is a hoot to find, especially in small scopes. What and where is it?
The Owl planetary nebula in Ursa Major.

48. Where are you likely to find KBO's?
Kuiper Belt Objects - beyond the orbit of Neptune, about 60 or so have been found. (ST 8/98)

49. M20 is a combination reflection/emission nebula, what is it commonly called?
The Triffid, in Sagittarius. (ST 9/98)

50. What is the difference between an emission nebula and a reflection nebula?
The reflection nebula reflects light from nearby stars off dust grains, it has a blue colour. Emission nebula are heated by stars inside the nebula, the gas, mostly hydrogen glows with a reddish colour.

51. What birds cost NASA millions of dollars in 1995, and how?
Woodpeckers pecked over 135 holes in the insulation of the Shuttle Discovery's external fuel tank.

52. Once upon a time a birdwatcher called Hubble spotted some eggs in an eagle's nest. What are we talking about?
M16, the Eagle Nebula is a stellar nursery, and observations by the Hubble Space Telescope show regions of dense gobules of gas which may contain new born stars. These globules are termed EGGs, Evaporating Gaseous Globules.

53. What did Eratosthenes do in 200BC?
Measured the circumference of the Earth, he derived a value of 40,000 km close to the modern value of 40,074 kms. (AN 3/99)

54. What is the phrase "Old Moon in the New Moon's Arms" referring to?
Earthshine, often it is bright enough to show the whole moon when it is a narrow crescent.

55. Fragments A to W made a big impact, what did they come from?
Comet Shoemaker-Levy 9 which broke up and collided with Jupiter.

56. When we talk of the Paschen, Lyman, Balmer and Pfund series what are we referring to?
Spectrum lines due to the presence of hydrogen. Lyman series occur in the UV, Paschen and Pfund occur at IR wavelengths and Balmer series occurs in visible light.

57. When would you be using the Danjon scale?
A scale used to describe the appearance of a lunar eclipse when using the naked eye.

58. Where will you find the Porter Turret Telescope and what is so special about the site?
Stellafane, the place where the Stellafane Star Party has been held for over 40 years. (ST 6/99)

59. If you were looking at MEL111 what would you be looking at?
The Coma Star Cluster in Coma Berenices.

60. Which person was the first to have their ashes taken in space?
Gene Roddenberry, creator of the Star Trek series.

61. In mythology what constellation is used by the Herdsman to drive the bears around the pole?
Canes Venatici - the hunting dogs. (AN 3/99)

62. A student, J B Burnell, detected strange signals in some radio data, it was initially thought to be LGMs. What are LGMs and what did the signal turn out to be?
LGMs are Little Green Men. The signal actually came from Pulsars.

63. If you were using a distant VHF FM radio station and the technique of forward scattering, what observations are you likely to be making?
Meteor watching, the meteor trail causes the radio waves from a distant radio station to be reflected towards the Earth giving a sudden increase in signal strength. Counting how many times this happens gives an indiction of the number of meteors.

64. Will Hay was a comic actor in the thirties, what astronomical discovery did he make?
He discovered a Great White Spot on Saturn on August 3rd 1933
65. If the Earth's axial tilt is 23.5 degrees what is the biggest tilt in the Solar System?
Uranus with a tilt of nearly 98 degrees.
66. An optical system with an even number of reflections gives a reversed or mirror image. True or false?
False.
67. M84 and M86 lie close to each other in Virgo, which one is blue shifted?
M86, it is moving towards us at a speed of 450 km per second.
68. If you were using the formula: m = 2.7 + 5 log D, where D is the telescope aperature in mm, what would you be trying to determine?
The limiting magnitude of your telescope.
69. In astrology a "cusp" is any division between houses or signs of the zodiac, what is its astronomical meaning?
One of the two points or horns of the crescent Moon, or of a planet in crescent phase.
70. Inside the Sun how much matter is converted to energy each second?
About 4.4 million tonnes. (AN 5/93)
71. If you miss the Solar Eclipse this year when is the next one visible from the Channel Islands?
2nd September 2081
72. Meteor Crater in Arizona is about 1,200 metres across. What size of object is thought to have caused it?
100 metres across!
73. What woman in 1963 amassed more time in space than the whole of the US astronaut corps.
Valentina Tereshkova - the first woman in space. She spent three days in orbit.
74. Troposphere, stratosphere, thermosphere, exosphere, what is missing?
These are the layers of the Earth's atmosphere, and the one that is missing is the Mesosphere which lies between the stratosphere and the thermosphere.
75. $P^2 = a^3$ was determined by whom?
Kepler, it is his third law of planetary motion. The square of a planets orbital period (p) is proportional to the cube of the semi major axis of its orbit (a).
76. What is unusual about R Coronae Borealis variable stars?
These are stars that show a sudden decline in brightness instead of a rapid rise in brightness. They pulse at a maxima then rapidly fade for a period of time before rising back to the maxima.
77. If an Anomalistic year is 365.25964 days in length how long is a Platonic year?
25,800 years, it is the length of time required for the Celestial Pole to describe a circle around the pole of the ecliptic. ie the effect of precession.
78. How close did Giotto get to Comet Halley (to the nearest hundred Kms will do)?
600 kms.
79. What discovery by the Lunar Prospector caused widespread media discussion?
Large quantities of frozen water. (ST 5/98)
80. What instrument is used to identify changes in two photographs of an area of sky taken at different times?
Blink comparator
81. The Octagon Room was designed by Sir Christopher Wren for using long telescopes. Where will you find this room?
Royal Observatory, Greenwich.
82. What is a Schiefspiegler?
A telescope.
83. Which is the innermost of the two martian moons?
Phobos
84. At what time scales do the known laws of physics begin to break down, and what is this time called?
10^{-44} seconds and is called Planck Time, after Max Planck.

85. What is and what would a Porro Prism be used for?
Two right angle prisms which produce an image that is the right way up and the correct way round. Used in binoculars and as an accessory in telescopes.
86. NGC 2261 is better known as what?
Hubbles Variable Nebula, its surface brightness varies as does its form which is thought to be due to shadows from R Mon. the nebula's illuminating star. (CCD Win 96)
87. A science fiction comedy show has the same name as a star that has a surface temperature of around 2500 to 5000 kelvin and 0.8 to 0.08 solar masses, what is it?
Red Dwarf
88. If a moon approaches within the Roche limit of its planet what is likely to happen?
The moon will break up, the Roche Limit is the point at which the tidal stresses will pull the moon apart. It is about 2.5 times the radius of the planet.
89. Chicxulub is thought to be the site of what?
The impact of the meteorite that wiped out the dinosaurs 65 million years ago. (ST 5/98)
90. What does the Drake equation try to do?
Estimate the number of observable civilisations that may be present in our Galaxy. (ST 12/98)
91. Where will you find the "Mountain of the Boys"?
La Palma, Canary Islands. It is the mountain where the Isaac Newton, Herschel and the Kapteyn telescopes, among others, are sited.
92. In 1892 a comet was discovered for the first time using photography. Who was the photographer?
E E Barnard
93. Acceleration of gravity is about 8.8 metres per second, albedo is 0.76, diameter is 12104 km. What planet are we talking about?
Venus.
94. What was the name given to the automated rovers sent to the Moon in the 1970's by the Russians?
Lunokhods 1 and 2
95. Homestake Mine Astronomical Observatory is 4,850 feet under ground. Why?
It is used to detect neutrinos. Cosmic rays also affect the results, but thousands of feet bedrock help to shield the detector from the cosmic rays while the neutrinos pass straight through.
96. Which school played a major role in the discovery of the Russian launch sites of the early Sputniks, out doing many of the intelligence services?
Kettering Grammar School. Mr Perry and his physics class built a radio receiving station which tracked the satellites and from simple calculations derived the launch site location. These were published in Flight International and resulted in visits from the Intelligence Services.
97. What telephone system is going to cause problems for radio astronomy?
The Iridium satellite system that transmits on frequencies very close to the OH 1612Mhz line causing interference to observations. (ST 5/98)
98. Orion's belt is formed by three stars in a line, where is Orion's Arm?
It is the local spiral arm of the Galaxy.
99. What is "green river" solution and what is it used for?
A solution of Hydrochloric acid and copper sulphate used for stripping off the aluminium reflective layer of telescope mirrors prior to re-aluminising.
100. Su Song is noted for what particular astronomical inventions?
He designed clock driven astronomical instruments, in particular an Armillary Sphere which preceded Western designs by six hundred years. (b 1020, d 1101)

Mark Humphrys