Advertisements

This space is available free to members for advertisements (preferably, but not necessarily astronomical).

Video evening

There was a disappointing turn-out to the video evening and star nights on the 14th October, but in view of the poor weather it was understandable. Those who did come enjoyed the superb video called *Cosmic Voyage*, and another on the search for planets around other stars. The weather prevented any observing, however. ☆

Web site developments

Daniel Cave has made some changes to the Astronomy Section's web site. Take a look and see. First, the entry page has a new URL:-

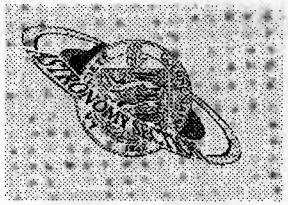
http://ds.dial.pipex.com/nightsky/astro/

However, there is a link from the old entry page, so you can continue to use that if you wish.

The main change is the addition of several new images on *The Gallery* page. One of these is reproduced on page 14 of this issue. ☆

Reduced newsletter size

Members may note that this issue of the newsletter is reduced by one sheet, ie four pages. This is both because of a lack of material, and because of a lack of time on behalf of the Editor. Contributions are always welcome. ☆



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Opinions expressed in Sagittarius are those of the authors, and are not necessarily endorsed by the Astronomy Section or La Société Guernesiaise.

The next newsletter will be published early in January. The deadline for publication copy is the 15th December.

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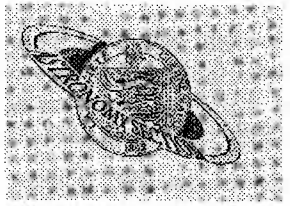
Sagittarius

The Newsletter of the Astronomy Section of La Société Guernesiaise



November/December 1997

Forthcoming events

The Asteroid Belt
Frank Dowding
Tuesday, 18th November
8.00 pm at
the Observatory

Quiz and Supper Evening
Roger Chandler, Quizmaster
Tuesday, 16th December
7.30 pm at
the Observatory

Also:

Every Tuesday
from 7.30 pm
at the Observatory

and every Friday
after dark, when clear

In this issue

Star of Bethlehem
The Big Picture
More colour images

Inside

Centre inserts

Star chart
Moon phases
Sunset, twilight, and sunrise times
Solar eclipse web sites

The Asteroid Belt

At 8.00 pm on Tuesday, the 18th November, at the Observatory, Frank Dowding will talk about the Asteroid Belt.

The Asteroid Belt is of great interest to scientists. Frank will try to show why this is, and why there is increasing interest in some of the trajectories of the asteroids.

The size of the Belt is itself something which commands interest.

Frank will also explain Jupiter's role in controlling the asteroids, along with one or two theories on the Asteroid Belt's origin. ☆

Quiz and Supper Evening

On Tuesday, the 16th December, at the Observatory, we will hold our annual Quiz and Supper Evening, starting at 7.30 pm.

This year, Roger Chandler will be the quizmaster. We will form two teams, as in previous years, but with members individually answering (or attempting to answer!) questions posed by Roger. The format is that a question is put to a team member, and if he or she cannot answer it then it is put to the opposing team for any member to answer.

While stratching our heads (figuratively, of course) we also nibble at finger foods. Members are invited to bring along something suitable to eat and drink, which can be shared with the others.

These meetings are a lot of fun, and there is no need to take the quiz too seriously, so everyone can have a go. Members' families are also welcome. ☆

The lunar eclipse

What crowd is this? what have we here!
we must not pass it by;
A Telescope upon its frame,
and pointed to the sky.

Wordsworth could have been referring to the crowd of some 600 people who joined the Astronomy Section at Jerbourg on the 16th September to view the lunar eclipse.

The Moon was already totally eclipsed when it rose during the evening, but cloud low in the east prevented any sighting of it until about half an hour later. In the meantime, people enjoyed views of Jupiter and its moons through the Section's 11-inch Celestron telescope, Debbie's 4-inch Newtonian, and Brian Le Page's 12-inch Meade.

Calm, though impatient, is the crowd;
each stands ready with the fee,
And envies him that's looking; –
what an insight must it be!

Indeed, there were long queues at each telescope. People waited quietly, although a few were obviously impatient for their turn. We did not charge a fee, and made only about £35 from sales of publications and from donations. In fact, the crowd was so great that most people probably never got close to our stand.

When it did finally appear, the Moon was still totally eclipsed.

The silver moon with all her vales,
and hills of mightiest fame,
Doth she betray us when they're seen?
or are they but a name?

Well, the eclipsed Moon was, of course, more red than silver. People did get a good view, although it has to be said that sky conditions were not the best.

One after One they take their turn,
nor have I one espied
That doth not slackly go away,
as if disatisfied.

Well, here Wordsworth is totally mistaken! People seemed quite happy with the experience.

Special thanks go to Peter Langford, Roger Chandler, Ken Staples, Debbie Quertier, Brian Le Page, and David Le Conte. (Geoff Falla was out of the Island that week.) The media were in evidence. Ken and David were interviewed by BBC Radio Guernsey, and a photograph of the eclipse by David appeared on the front page of the next day's Guernsey Evening Press.

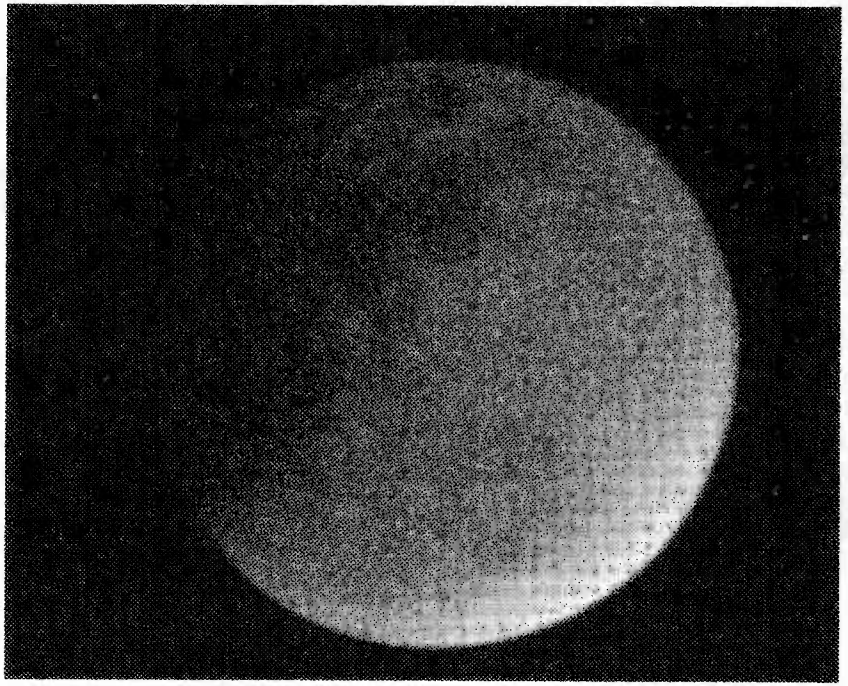
The crush of the crowd trying to peer through the 11-inch telescope made it difficult to get decent pictures with a camera piggy-backed on top of the telescope.

Participating with us in the event was Dr Chris Baddiley of the Worcester Astronomical Society. He came with a battery of equipment, including a motorised Scotch mount. One of his photographs is reproduced below, with his kind permission.

This was the last lunar eclipse visible from Guernsey until the year 2000. Between now and then there are four penumbral eclipses, and a partial eclipse (not visible from here).

Surprisingly, the one in January 2000 is the first total lunar eclipse visible anywhere for nearly 2½ years. In that time there are two total solar eclipses and two annular solar eclipses.

(The quotations are from the poem *Star-Gazers* by William Wordsworth, published in 1807). ☆ DLC



The lunar eclipse photographed on the 16th September by Dr Chris Baddiley

The Big Picture

Several members heard Professor Alec Boksenberg speak about the Hubble Space Telescope (HST) at the meeting of the Channel Islands Group of Professional Engineers (CIGPE) on the 1st October at the Duke of Richmond Hotel. Altogether there were over 100 people present, which was apparently a record number for CIGPE.

Professor Boksenberg showed many slides, a lot of them taken with the HST. He started by jumping in at the deep end (well, the deep sky end, anyway) talking about light-time, showing pictures of galaxies, and discussing Edwin Hubble's discovery of the recession of the galaxies. He picturesquely described the foreground stars as "like net curtains" – we peer through them to the galaxies beyond. He showed ellipsoidal galaxies, which contain old stars, and where there is no stellar "fuel" left.

The recession of the galaxies is not caused by them moving away from each other through space, but is rather caused by the expansion of space itself. This is a difficult concept to visualise, but Dr Boksenberg demonstrated it with a slide of a network of girders. The expansion of space could be visualised as a lengthening of all the girders, the joins representing the galaxies. So everything is moving away from everywhere, and there is no central point.

This implied that there must have been a beginning, and this could be calculated as having happened about 15 billion years ago. So we can see 15 billion light-years away – that distance is our "horizon", but the universe is bigger than that.

Dr Boksenberg then described the use of spectroscopy as an analytical method, as compared with imaging. He explained the production of continuous spectra, emission line spectra, and absorption line spectra. The latter can be considered as the "fingerprints" of gases, giving their chemical constitution.

Absorption line spectra are caused by electrons jumping up atomic levels, rather like stepping up stairs. The jump takes a specific amount of energy. Therefore, the energy is taken out of the material (hence "absorption"). Each kind of atom has a specific energy level to its "stairway", and therefore the element represented by the atom can be identified.

Similarly, electrons dropping down the "stairs" release energy, and produce emission spectra.

The solar spectrum shows absorption bands caused by absorption by the Sun's atmosphere. The spectrum shows two characteristic dark bands of Calcium. These bands are important in determining the amount of blue shift (caused by objects moving towards us) and red shift (objects moving away). In galaxies, one sees a collective spectrum of all the stars, and the amount of the shift of the calcium lines depends on the distance.

Dr Boksenberg then showed the 4.2-metre telescope in the Canary Islands. It is in a good location, above the clouds, and, being on an island there is a laminar air flow, which helps "seeing". However, it is still not good enough for extremely high-resolution work, because there is still some atmosphere above it. ➠

The Hubble Space Telescope, however, is above the atmosphere, and so gives much better views than can be obtained from ground-based telescopes. It is a 100-inch telescope, and carries similar instruments to those on telescopes on Earth. However, it has much more precise pointing than ground-based telescopes, and is designed to give at least a ten times better image.

The Telescope cost between $3 and $4 billion, but, as is well known, it did not work properly after launch. The primary mirror is the best ever made, but is the wrong shape – by 1/50th of the diameter of the human hair (2 microns) between the edge and the centre. It is, in effect "perfectly wrong".

However, the HST was, of course, designed to be serviced, and corrective optics were therefore installed during the first servicing mission. Now the Telescope has a resolution of about 0.06 arc-seconds, compared with 0.6 arc-seconds for ground-based telescopes. Superb images are now being obtained.

The HST uses a combination of image photon counters (which build up an image) and Charge Coupled Devices (CCDs). Dr Boksenberg showed pictures taken by the HST of Saturn, the Jupiter Shoemaker-Levy 9 comet event, and the Galilean Moons of Jupiter (Io is heated by the gravitational effect of the planet, and has tremendous geological activity).

The Horsehead Nebula is a collapsing gas system, containing dust composed of carbon, silicon and other elements. The Eagle Nebula was shown in a ground-based view and an HST view, for comparison. The collapsing regions are where stars will form, as shown in the very dense "pillars" of gas.

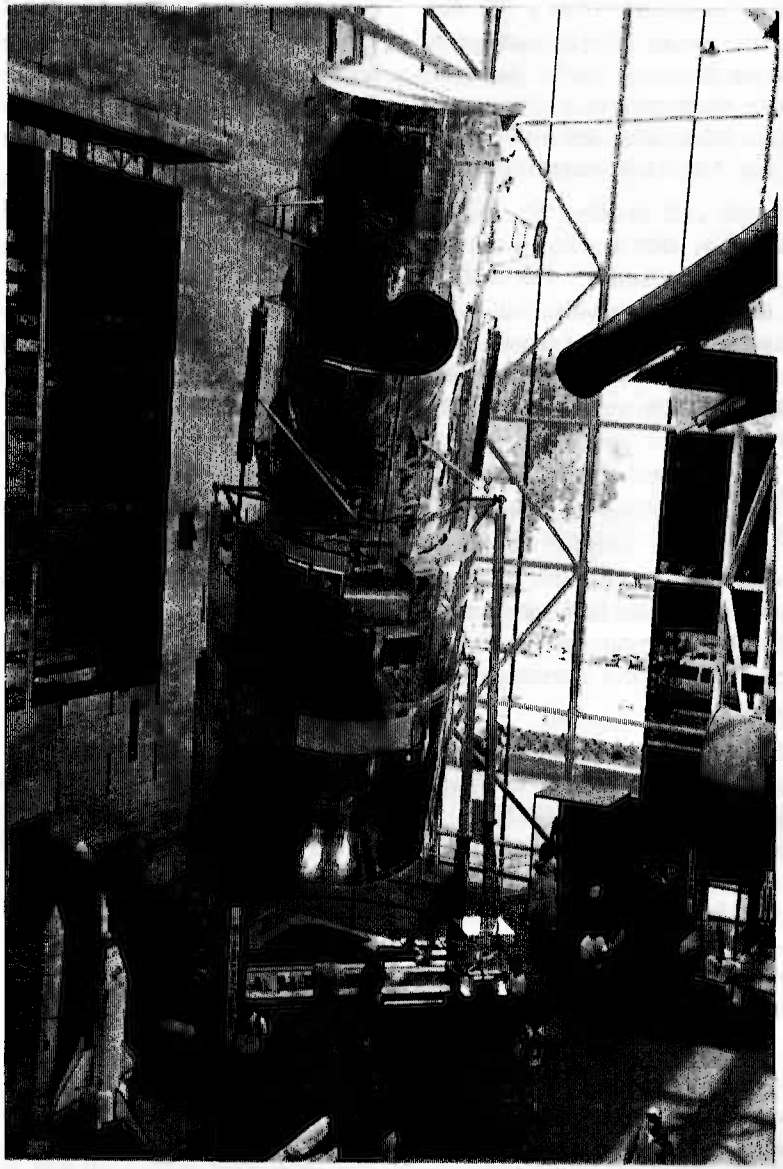
Dr Boksenberg described the Orion Nebula as like a cave in a vast mountain, lit up by an internal bonfire. It is a molecular cloud, consisting of gas at high density. The HST view shows a very complex star-forming region. The new infra-red camera (NICMOS) on the HST can see deeper into this region.

The HST image shows condensations within the Orion cloud. These are dark solar-system size objects (although some appear to be lit up by stars). Inside the dark region is the light of the new star, surrounded by the debris left over from the star-forming process. This debris can possibly form planets.

The formation of stars was described. The gas cloud falls in on itself, heating up in the process. Jets are sent out, to lose mechanical energy, and therefore angular momentum, and this leaves the system in a relaxed condition. The new star can therefore fall in on itself, and ignite, becoming a fully-fledged star.

The heat emitted from the surface of the star acts as a release for the energy produced in the core – the star is not burning on the outside. In the centre of the star the temperature is about 10 million degrees. It takes millions of years for the heat to get from the centre to the star's outer edge.

The star converts hydrogen into helium. Originally, helium formed about 20% of the universe, with hydrogen forming most of the other 80%. Almost no other elements existed; they are formed in the centres of stars. As helium is formed in the star, it becomes a sort of cinder, which eventually contracts in on itself, igniting at 100 million degrees, and forming the heavier elements. ➠



Full-scale model of the Hubble Space Telescope
in the Smithsonian Institution Air and Space Museum, Washington DC. (Photo by David Le Conte)

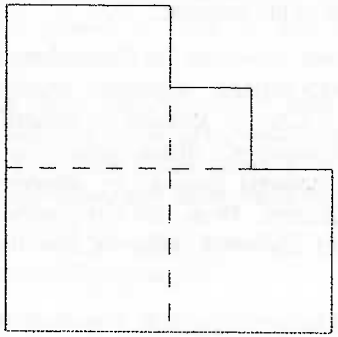
The volume of the star increases enormously because it is so hot, and becomes a red giant. The fuel in the centre is used up, but it is not hot enough to create more heavy elements, and the star then becomes a white dwarf. The atmosphere of the star then wafts away. The outside of the white dwarf is very hot, 100,000°, compared with the Sun's 6,000°.

Dr Boksenberg showed pictures of a white dwarf and a red giant. The diameter of a red giant is about 2,000,000,000 miles, compared with the Sun's 884,000 miles, and white dwarf's 10,000 miles.

He then introduced other kinds of stellar objects, first showing an HST picture of Eta Carina and its nebula. The star is much brighter than the Sun, and shows evidence of being a star in trouble. He turned to supernova 1987A, saying that such supernovæ produce iron, which is endothermal (takes energy in). Therefore, the core of the star collapses in a second, and then bounces back because of a shock wave action. It lights up, to about 100,000 million times its original brightness, and produces elements such as lead, gold, and uranium. It is an "alchemist's nightmare", turning gold into lead!

Dr Boksenberg showed pictures of the Crab Nebula (which is the remnant of a supernova event in the year AD 1054), and the Vela supernova remnant. A typical galaxy has one supernova in 40 years. The gas produced by such an event is enriched with heavy elements, and this goes to produce new stars. The process is cyclical, new supernovæ producing new enriched material for the formation of new stars, some of which will themselves become supernovæ, and so on. The Sun (and its planet Earth) contain elements produced after about 30 such cycles.

Dr Boksenberg then showed an HST image of the Coma cluster of galaxies. There are four cameras on the Telescope. The fourth camera works at a much higher magnification than the other three, and when all four cameras are used to provide a composite picture the fourth image has to be reduced in order to match the scale of the others. This gives the HST pictures their characteristic shape:-



He then showed the famous HST Deep Field image – "the most expensive picture ever taken". Its width is equivalent to a grain of sand held at arm's length. The most distant galaxies shown in the picture are 14 billion light-years away. They do not appear as regular galaxies, but look chaotic. In the early universe little clumps, called proto-galaxies, were formed, and these clumped together to form larger galaxies.

Observations of the rotation of gas in the galactic core enable its mass to be determined. This turns out to be the equivalent of 3 billion times the mass of the Sun – in a volume just the size of the solar system! Such a condensation of mass implies the existence of a black hole, with an enormous energy output from the galaxy.

He pointed out a galaxy 14½ billion light-years away, with a brighter galaxy close to it. This galaxy, he said, must have have a black hole at its centre, because it is so bright.

Light emitted from distant galaxies is absorbed on its way to us, and the determination of the absorption is an important technique in determining the evolution of the universe.

One picture shown by Dr Boksenberg had a cobweb-looking structure around a galaxy. This is actually a magnified, distorted image of a distant galaxy, caused by "gravitational lensing" by intervening galaxy clusters. From this it is possible to produce a corrected image of the distant galaxy.

This technique confirms that the early galaxies were completely irregular. But it also shows that there must be enormously more mass in the intervening galactic clusters than we can infer purely from their light emission. The implication is that as much as 99% of the universe may be "dark matter" which we have not yet seen.

Dr Boksenberg likened the appearance of the universe in dark matter to a big sponge. The visible parts of the universe are like specks in the sponge, and have the appearance of a giant web. He said that we know very little about the universe in its material form, but a lot about its dynamics.

During the question and answer period Dr Boksenberg explained that the size of the universe depends on the time we see it. The universe is very finely balanced. It is not clear why the expansion rate of the universe is just sufficient for galaxies to form. However, it may be that we happen to be in one of several universes, which happens to be suited to us.

For example, one could imagine two boxes at different temperatures, one of which is suitable for microbes. Then microbes will occur in it, but not in the other.

Another possibility is that the universe is like a foam, and we are in one of the bubbles.

The universe probably formed out of a vacuum, with no material, but very high energy density. The inflation theory of the universe suggests that there was an exponentially expanding period in the very early universe, when it expanded to the size of a grapefruit, and then the expansion "coasted".

Yet another possibility is that a universe could be produced in a black hole, and that universes could be forming all the time in different places.

In his talk about the universe, especially as seen by the Hubble Space Telescope, Dr Boksenberg certainly gave us the "Big Picture" – in the sense of the beautiful images produced by the HST, but especially in the sense of fathoming the deepest questions of the universe. It was a remarkable lecture, focusing on how such deep questions can be answered by the use of new techniques and instruments.

Professor Boksenberg is one of Britain's most well-known astronomers, and has long been associated with the Hubble Space Telescope. It was a privilege to hear such an authority speak on such a subject. It was also a pleasure for a few of us to speak privately with him at length, after the talk, over a drink in the hotel bar.

It was clear that the audience thoroughly enjoyed the talk, and many island students heard a repeat of it at the Grammar School the following day. ☆ DLC

STAR OF BETHLEHEM
by Tom Butler

As the days get shorter and the leaves turn red and yellow and fall from their perches, we begin to see Christmas displays in the stores. This seems to happen earlier each year, even before Halloween. With the approach of the Yuletide season astronomers invariably hear the question repeatedly: "*Is that bright star in the southeast the Christmas Star?*" Just as invariably the astronomer will reply; "*No, that is Sirius, the Dog Star, which has been known by that name for millennia.*"

We know of no star in the sky today that would match the special requirements for the Star of Bethlehem that led the Wise Men to the new born Christ Child. Many people believe that the star was a special star designed by God for the special purpose of announcing the birth of his Son. Skeptics believe it was only a story invented by early Christians to enhance a legend.

Those of us who try to find an explanation for the Miracle Star have only one source of information to turn to: the story of the Star as related by Matthew in twelve short verses in his Gospel. There is no other mention of the star, either in the Bible or in history, in spite of the common belief that the shepherds saw the star. Luke is the only one to document the shepherds, and he describes what was seen by them as an angel and a multitude of the heavenly hosts. Nowhere does he mention the Star.

Now there may be a few ways in which the appearance of the Star may be explained astronomically. Matthew leaves us three clues in his account. He relates that the Magi had seen the star in the east, which heralded the birth of a King of the Jews. They then traveled to Jerusalem and told Herod of the star, and wished to know where He was that they might worship Him. Herod sent them to Bethlehem because it had been prophesied that the Messiah would be born in the city of David.

"***When they had heard the king, they departed; and, lo, the star, which they saw in the east, went before them, till it came and stood where the young child was.***"

"***When they saw the star they rejoiced with exceeding great joy.***"

The first clue is that the star was visible for a long time. The Wise Men saw it at least twice, at home and later when it went before them from Jerusalem to Bethlehem. We must remember that they reported seeing "*his star in the east*" when they first saw it. But since the old road from Jerusalem to Bethlehem leads due south, the star must have changed position to that direction in order to be their guide to Bethlehem. The original Greek text, the phrase *en te anatole*, referring to the direction in which they first saw the star, actually means *to appear in the east in the first rays of dawn.*

The second clue is that the star was not particularly bright; if it had been, Herod would have noticed it, as would his advisors and the populace as a whole.

The third clue was that the star had great significance to the Wise Men, and its unique appearance announced the birth of a King of the Jews.

➠

Modern science has added **a fourth clue.** Study of the events in the Bible, contemporary with the birth of Jesus, has convinced biblical historians that Herod died in 4 BC, and consequently Christ must have been born before then, probably between 8 BC and 4 BC.

We do not know the exact date of Jesus's birth, but we do know that it was not December 25th in the year 1. The current calendar was set by a Roman monk, Dionysius Exiguus, who died in the year 556 AD. Dionysius set the date of Christ's birth as the year 754 since the founding of Rome. The date of December 25th was not celebrated until the fourth century AD, long after the real date was forgotten.

There is a number of possibilities that could be used to explain the Christmas Star.

Meteors must be discounted because they flash through the sky in a matter of seconds, so that even a very bright one would not be a good candidate as the Wise Men saw the star for a long period of time.

Perhaps a **comet** might be the answer. Bright comets have been recorded since well before Christ's time, and none fits the time scale that has been established for the period of Jesus's birth. Halley's Comet appeared in 11 BC, which is not far removed from the 8 to 4 BC period, and it did appear to pass directly over Jerusalem. But this is very unlikely since comets were supposed to bring disaster and the death of kings, not the good news of the birth of God's Son.

Another possibility might be a **supernova.** These are exploding stars that suddenly appear where no star has been seen before, and can be bright enough to be seen in full daylight. Supernovas have been reported and cataloged since earliest times, and none has been reported between 8 and 4 BC. A supernova would certainly have been seen by Herod's advisors, or even by Herod himself, and he would not have asked the Wise Men where and when the star appeared.

The planet **Venus** can be extremely bright, and even be seen at noon if one knows just where to look. But the Wise Men knew the planet well, and this would not have caused them any concern.

The Wise Men were in reality astrologers who knew the positions of the fixed stars as well as the movement of the planets. The word *planet* comes from the Greek *planetes* which means *wanderer.* At the time of Christ everything seen in the sky was referred to as a star. The known planets, Mercury, Venus, Mars, Jupiter and Saturn, plus the Moon, were referred to as wandering stars. Comets were hairy stars; the word *comet* is derived from the Greek *coma* meaning *hair.* The Sun was the day star and the Moon the night star. Meteors were shooting or falling stars.

The Chaldeans were assiduous observers of the heavens, although they were not astronomers as we think of today, because they observed the stars and planets for religious purposes and for foretelling coming events. In order to fulfill the requirements of the Christmas Star, it must have been something that was not of particular interest to the casual observer but would have had a special meaning to a Chaldean astrologer.

Indeed, there was such a phenomenon that seems to meet the necessary criteria.

By using modern computers we can set the stars back to appear as they did at any time in the past in order to see what may ➡

have happened. We find that in the year 7 BC there was a triple conjunction of the planets Jupiter and Saturn. This means that these objects seemed to pass each other three times. This, of course, is an optical illusion due to our viewpoint from Earth. It happens when a faster moving planet, such as Jupiter, passes a slower moving planet, like Saturn, at the same time that Earth is passing both of them.

This is much like watching trees while driving a motorway; the nearer trees seem to move backward against the background of more distant trees. First Jupiter overtakes Saturn, then, due to the phenomenon similar to the trees along a motorway, that we call retrograde motion, Jupiter backs up, passes Saturn a second time, then resumes forward motion, passing the slower planet a third time.

In 7 BC on May 29th the first such conjunction occurred, placing the two planets only a degree apart and visible for a full two hours prior to sunrise. Recall the Greek term used in the New Testament, *en te anatole*, meaning "*We have seen this star appear in the east in the first rays of dawn*". This would have been cause enough to get the attention of the Wise Men, but summer was coming on and it was not a good time to start on a long journey. But when it happened again on October 3rd and in the Astrological House of the Hebrews, Pisces, this was enough to make them saddle their camels and head toward Jerusalem.

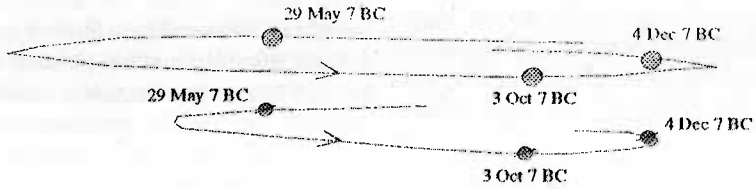
This journey would have taken a couple of months so they would have arrived in late November or early December. On December 4th the third conjunction appeared, and this time it would have been seen in the south, in the direction of Bethlehem.

A triple conjunction by itself is not all that rare, occurring between 20 and 250 years apart. But to occur in a particular constellation, is rare indeed. It is approximately 850 years between a triple conjunction in Pisces. The one prior to 7 BC supposedly told of the birth of Moses.

In 1925 cuneiform records of the School of Astrology at Sippar, close to ancient Babylon, were deciphered, and a complete timetable of the 7 BC triple conjunction was found among them. Among the many thousand Jews living in Babylon at the time, many of them must have studied at the Sippar School, and so it is very likely that the Wise Men came from there.

Whether the Star was a miracle, or a natural phenomenon the results were the same. The Christ Child was born and came into the world to save us from our sins. When you look up to the heavens try to find your own Christmas Star. ☆

Tom Butler



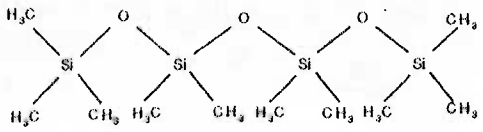
The triple conjunction of Jupiter (top) and Saturn (bottom) in Pisces in the year 7 BC

What do you know?

The answers appear on page 14.

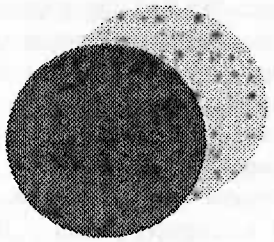
1. What is the difference between *Mass* and *Weight*?
2. What elements have the following atomic weights? 11 20 30 92 98
3. John Dalton gave his name to what medical condition?
4. Staying with John Dalton, can you identify the following elements using 19th century symbols?

5. What was the last Apollo mission number?
6. On which mission did the Lunar Roving Vehicle first appear?
7. On one Apollo mission the astronauts use a handcart to help carry equipment. What was the official name of the handcart. (*Clue: Its initials were MET.*)
8. The Apollo mission left behind an *ALSEP*. What was *ALSEP*?
9. The last Apollo mission was in December 1972, but who were the last two astronauts to walk on the Moon? Which one was the last to leave?
10. One here for *Star Trek* fans. Why would Capt Kirk, Mr Spock and Dr McCoy be interested in this? (A clue: *NO KILL ME.*)



David Williams

Solar eclipse plans



The Particle Physics and Astronomy Research Council (PPARC) has established a UK National Coordinating Group to plan for the solar eclipse which is to take place in August 1999. The Group includes solar scientists. representatives of research institutions, astronomical organisations (professional and amateur), educationalists, representatives of the government authorities in areas most affected by the eclipse, and the media.

I am a member of the Group, officially representing the States of Guernsey, but also looking after the interests of the Astronomy Section. The inaugural meeting was held in London in July. About 30 people attended, and were invited to brief the meeting about their respective activities. I described the importance of the eclipse for Guernsey and Alderney, and the initial ideas for the events being held in both islands. David Boalch, Deputy Director (Policy) of Education, was also present, and also spoke.

The next set of meetings was held on the 21st and 22nd October in Abingdon, Oxfordshire. Three sub-group meetings were held, followed by a plenary session. I did not attend the solar physics meeting, but did attend the education meeting, the meeting on public information, public understanding of science, and safety, and the plenary session. ➟

The eclipse will afford excellent opportunities for public involvement in scientific research. Educational investigation packs are to be prepared, covering a wide range of activities, including astronomy, information technology, environment, and social subjects.

These projects will cover the range of ages: primary, secondary, and post 16/ general public. I have offered to assist with the provision of historical eclipse information.

One possible project involves people's reminiscences of the last total solar eclipse in Britain, in 1927. If any Section member knows of someone who may have such reminiscences, please put me in touch.

Britain is a world leader in solar physics research, and in research on the Sun-Earth relationships. The SOHO spacecraft, which is in a stable orbit at the point where the Sun's gravitation is countered by the Earth's gravitation, can track the plasma emitted by solar events all the way to the Earth. It will also be possible for SOHO scientists to predict what the solar corona will look like at the time of the eclipse.

The public information meeting concentrated on the production of web sites, leaflets, funding, local authority plans, the media, and safety. Various sub-groups have been established, and further specific and general meetings are to be held next year.

Plans for the eclipse in Cornwall and Devon are being progressed, and planning is also taking place for the event in Guernsey and Alderney. Alderney will be the focus of events on the day of the eclipse.

One of the major events in Guernsey during the week of the eclipse will, of course, be the Royal Astronomical Society's National Astronomy Meeting. Planning, in association with the RAS has also started for a major exhibition at the Guernsey Museum in the summer of 1999.

Some members of the Astronomy Section are already planning to be in Alderney for the eclipse. I would be interested in hearing of any members who plan to stay in Guernsey, and who might be prepared to participate in a public eclipse-observing event. While the eclipse will not be quite total in Guernsey, the Sun will be 99.9% eclipsed, and conditions are expected to be very good for lengthy observations Baily's Beads (much longer than in the path of totality).

There is a huge amount of information available about the eclipse, both in printed form and on the Internet. I have placed a copy of the NASA Eclipse Bulletin for the 1999 eclipse at the Observatory. This runs to 120 pages, and contains just about everything anyone would want to know about the eclipse and how to observe it and photograph it.

Enclosed with this issue of Sagittarius is a list of World Wide Web sites for the 1999 eclipse, and for solar eclipses generally. This list is being continually updated, and I would be grateful for information on new sites which you may come across.

Watch out also for a revised version of the *Guide to the 1999 Solar Eclipse*, to be issued next month by the Royal Greenwich Observatory. Also out next month is *Sun in Eclipse* by Patrick Moore and Michael Maunder. (Both books are available from me, and the Section's funds will benefit from each sale.) ☆ ***David Le Conte***

Answers to *what do you know?*

1. *Mass* is the quantity of matter of a body. *Weight* depends upon gravitational force, so it is variable.

   Mass does not alter, but weight does. So, 60 Kg on Earth becomes 10 Kg on the Moon, in 1/16th gravity. The mass of the body is unchanged; the weight has changed.

2.

Atomic weight	Element
11	Sodium
20	Calcium
30	Zinc
92	Uranium
98	Californium

3. John Dalton gave his name to *colour blindness.*

4. 

   Hydrogen Oxygen

Phosphorous Copper

5. The last Apollo mission was no *17.*

6. The Lunar Roving Vehicle first appeared on the *Apollo 15 mission.* Scott Irwin drove it around the Apennines Sea.

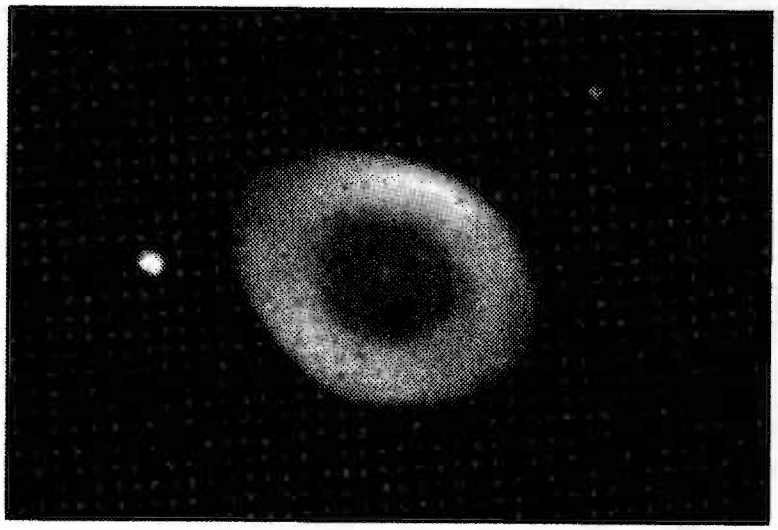
7. The handcart, used on Apollo 14, was the *Modular Equipment Transport.*

8. ASLEP was the *Apollo Lunar Surface Experiments Package.*

9. The last two astronauts to walk on the Moon were: *Dr Harrison II Schmidt* and *Cmdr Eugene Cerman* *(the last man on the Moon).*

10. Silicon.

DW



M57, the Ring Nebula in Lyra. CCD image © by Daniel Cave.
One of the many images now on the Astronomy Section's web site.

Solution to last issue's astronomical crossword

1 n	■	2 p	■	3 p	■	■	■	4 g	■	5 m	■	6 m
7 u	r	a	n	u	s	■	8 c	a	4 r	i	n	a
c	■	l	■	p	■	9 a	■	l	■	z	■	r
10 l	e	o	n	i	d	s	■	11 i	s	a	a	c
e	■	m	■	l	■	c	■	l	■	r	■	h
12 a	r	a	b	■	13 d	e	n	e	b	■	■	■
r	■	r	■	14 p	■	n	■	o	■	15 s	■	16 m
■	■	■	17 m	e	n	s	a	■	18 p	e	l	e
19 h	■	20 t	■	g	■	i	■	21 h	■	r	■	s
22 o	m	e	g	a	■	23 o	l	y	m	p	u	s
r	■	r	■	s	■	n	■	d	■	e	■	i
24 s	i	r	i	u	s	■	25 f	r	a	n	c	e
e	■	a	■	s	■	■	■	a	■	s	■	r

Visitors

Amongst our visitors to the Observatory recently have been Peter Findlay and his wife, from the Worcester Astronomical Society. We also welcomed Dr Chris Baddiley, also a member of the Worcester Astronomical Society. He was here for the lunar eclipse on the 16th September.

On the 24th September some 15 ladies of the Rohais Methodist Chapel Friendhip Circle visited the Observatory. They heard a talk with slides by David Le Conte, and then observed Jupiter and other objects through the telescopes.

Green flash seen

On the 1st September 1997 David Le Conte saw the green flash of the setting sun, from Perelle. Conditions were near perfect, although the Sun did disappear behind cloud shortly before sunset, to reappear in the crucial moments before it sank below the horizon.

David timed the event at 18h 52m 45s. It is interesting to compare this with the sunset predictions. One computer program written by David predicted sunset for 18h 52m, while another, more accurate one which he wrote predicted 18h 53m 45s.