

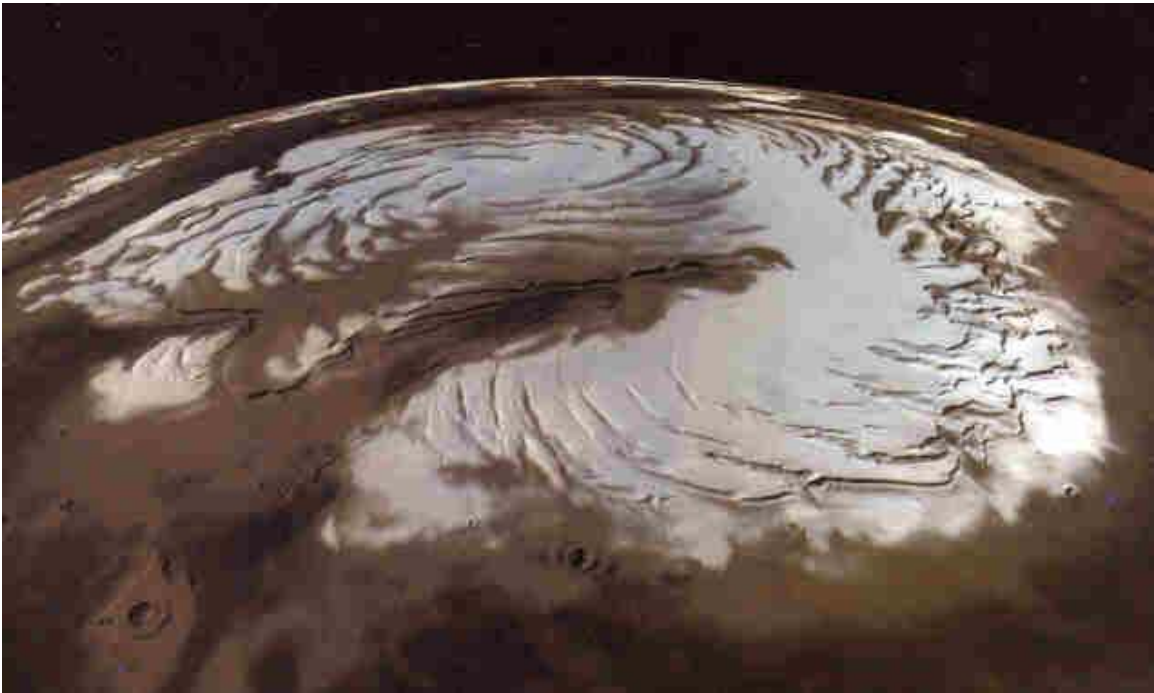


TRANSIT

The Newsletter of



12th September, 2003. Julian Day 2452895



Front page picture

The Red Planet is in the news at the moment, being at its nearest and shining more brightly than when the Neanderthals were around to see it. The polar ice cap seems to be eroding fast, as seen by NASA's Mars Global Surveyor.

Editorial

The Society Book Project. Articles should be well advanced by now. Don't leave it too long – please try to send them in by the end of September.

Keith's Video for CaDAS Members. More at the September, 2003 meeting. Keith Johnson's idea is that there is the potential for raising some funds for the Society's coffers, so he deserves a good measure of support for his initiative.

Boulby Deep Mine. A group of CaDAS members went to visit the dark matter research unit at the mine on September 4th. There will be a report on their adventure in next month's Transit.

The New Lecture Season will open on 12th September 2003, in Thorpe Thewles village hall, with Dr Fred Stevenson's talk on "Recent Developments in Cosmology", which was unavoidably postponed from last year

Astronomy Course in Middlesbrough. Dr Fred Stevenson's course in astronomy will start again soon. Details on page 4.

Gods in the Sky. There has been a mixed reception to the recent Channel 4 TV series by Allan Chapman. Some members were appalled that Dr Chapman should have been involved in such a puerile production. Others thought the presentation was probably his idea. It would be interesting to hear more views on these programmes.

Kielder Forest Star Camp. Sunderland Astronomical Society and the Forestry Commission are staging the camp between 23rd and 26th October, 2003. More details appear later in this issue (page 4).

Chairman's History of the Society. The penultimate section of Barry's History is included this month. Please send any comments or corrections as soon as possible.

Author congratulated. When one writes something for Transit, it is always difficult to know how it is received. What a terrific feeling it is when you find you are appreciated. See page 3 for a message from Brian Blakeley on Neil's series of "Basics" articles.

Distance Learning Courses. If you can't commit yourself to a regular lecture series, don't forget there are plenty of distance learning courses available, from the University of Central Lancashire, the John Moores University Liverpool and the Open University. If you need the contact addresses, please ask. Now is the time to get organised.

Mars. I trust you have all been enjoying the unusual views of one of our nearest neighbours at a very near approach. Keith Johnson has been taking some excellent pictures, which I hope he will include in his Society Video?

The Liverpool Telescope. In August, the 2-metre, robotic, remote-control telescope, situated on La Palma, came into action. I'm sure John and the Planetarium team will be taking advantage of it

Society Web Site. Ed Restall has been installing improvements – see later.

Request from the Planetarium Team. For temporary loan of a decent-sized carpet shampooer to clean the Planetarium carpet. Please contact John McCue or Bob Mullen at the Planetarium 01740 630 544 or at home 01642 324 929 with collection details.

The Cosmonauts are coming! Don't miss them. See John McCue's message on page 5.

From Our Webmaster

Ed Restall

Dear All, Just a short note to invite comments on a revised feel to the web-site. Our current site was thrown together quickly to achieve a web presence for the new venture and to host the Society pages after John left Stockton Vith form. It uses "frames" which is not ideal, particularly from a search-engine point of view. I'm currently revamping things and would like to leave frames well behind, but still keep the reasonable refresh/loading times we currently have and keep navigation menus on screen all of the time. To this end I've prepared a few test pages:

<http://www.planetarium.btinternet.co.uk/test2.htm>

<http://www.planetarium.btinternet.co.uk/test3.htm>

<http://www.planetarium.btinternet.co.uk/test4.htm>

They all may look similar but they have subtle differences. Anyway, I know that the floating menu system won't be to everyone's liking so I'd like some opinions. If you have the URLs of any sites that keep navigation menus on the screen and that you like the feel of, I'd be interested in those too.

Best Wishes,

Ed.

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Introduction to Astronomy: Observational Cosmology

Neil would like you all to know about this.

Tutor: Dr. Fred Stevenson Venue: Friends' Meeting House, 131 Cambridge Road, Middlesbrough.

Times: Mondays, 7-9 pm, from 29 September for 22 sessions.

Fees: £160 full, £105 for over 60's, £10 for benefit claimants.

Course reference: C1106/03715

For further info or to obtain a registration form, contact:

School of Continuing Education, University of Leeds, Leeds. LS2 9JT.

Tel. 0113 343 3222 Fax 0113 343 3240/3246

E-mail: sce@leeds.ac.uk <<mailto:sce@leeds.ac.uk>>

Web site: www.leeds.ac.uk/sce <<http://www.leeds.ac.uk/sce>>

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Northumberland Star Party

A new star party will make its debut this autumn, offering access to the some of the darkest skies in the UK. Sunderland Astronomical Society have joined forces with the Forestry Commission to stage the Kielder Forest Star Camp between 23 and 26 October 2003. Covering an area greater than Manchester, Newcastle and Birmingham combined, Northumberland's Kielder Forest is the largest man-made woodland in northern Europe.

Almost free of light pollution, the site offers spectacular skies. Showpieces like the Hercules Globular Cluster M13 are visible to the naked eye!

Kielder's campsite will be specially opened for the event, offering pitches from just £8 per night for tents, caravans or motorhomes. The observing ground is a short walk from 18th century Kielder Castle Visitor Centre (a former hunting lodge of the Dukes of Northumberland). It will be the venue for trade stands, astro car boot sale, Starlab planetarium and barbeque on the main day, Saturday 25 October. There will also be talks by Dr Nigel Metcalfe (Durham University), David Sinden, and others. By day participants can explore the forest, with rangers on hand to point out the best walks, bike rides and places of historic interest.

The Star Camp website can be found at: <http://www.richarddarn.demon.co.uk> A free information pack on the event is available from Kielder Forest District, Forestry Commission, Eals Burn, Bellingham, Northumberland, NE48 2AJ. tel. 01434 220242, or email starcamp@richarddarn.demon.co.uk

The Cosmonauts are Coming!

The Planetarium Director, John McCue, writes:

Don't forget to book your seats for the cosmonauts on Saturday, 11th. Oct. 2pm, at the planetarium. Tickets £5, available from the Planetarium, Castle Eden Walkway, Thorpe Thewles, Co. Durham, TS21 3JG, 01740 630544, or 40, Bradbury Rd., Norton, 892446.

This is an open meeting, and public visitors to the planetarium are already buying tickets, so don't delay, get yours today!

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Website for Astro-Books

From Neil Haggath:

I've just been informed of a web site, which could be very useful for those who like books on astronomy and spaceflight.

http://nssdc.gsfc.nasa.gov/planetary/online_books.html

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Astronomy Basics by Neil Haggath

No. 14: Lunar And Solar Eclipses – Part 1

After my last few articles have taken us to the far reaches of space, it's time now to come right back home, and look at some phenomena which are among the most beautiful and spectacular in nature, yet are simply caused by the motions of our own Earth and Moon.

First, a little terminology. Astronomers define an *eclipse* as the obscuration or dimming of one body, due to its passage through the shadow of another. When one body passes in front of another and hides it from view, this is called an *occultation*. And finally, when a smaller body (in apparent angular size) passes across the face of a larger one, this is a *transit* – as in the transit of Mercury, which some of us observed last May.

So we can see that the commonly used term *solar eclipse*, or *eclipse of the Sun* – meaning the passage of the Moon in front of the Sun - is actually a misnomer. After all, how could the Sun pass through the shadow of anything? What we call a *total solar eclipse* should really be called an occultation of the Sun by the Moon, or perhaps a “solar occultation”, while an *annular eclipse* (defined later) is really a transit of the Moon! But the term is in such widespread use that we can never hope to change it; it was in common use for centuries, before astronomers formally defined the terms described above.

The term *lunar eclipse*, or *eclipse of the Moon*, is of course correct; this is caused by the passage of the Moon through the shadow of the Earth.

Now, we all know that the Moon orbits the Earth once per month. To be precise, its orbital period is 27.32 days. But because the Earth is also orbiting the Sun, the cycle of the Moon's phases lasts 29.53 days; that's the interval between successive New Moons or Full Moons.

New Moon, of course, is the time when the Moon passes between the Earth and the Sun, and Full Moon is the time when it's opposite the Sun in the sky. So why don't we see two eclipses every month – one of the Sun at every New Moon, and one of the Moon at every Full Moon?

The answer is simple; because the Moon's orbit doesn't lie in the same plane as that of the Earth, but is tilted at an angle of 5° . So at most New Moons, it doesn't pass directly between Earth and the Sun; it passes a few degrees above or below the Sun. And at most Full Moons, it passes just above or below the Earth's shadow.

An eclipse can only occur when the time of New or Full Moon happens to coincide with one of the two points in each orbit at which the Moon crosses the plane of the Earth's orbit – which we call the *Ecliptic Plane*. These two points are called the *nodes* of the Moon's orbit – the *ascending node* when it crosses the Ecliptic Plane from south to north, and the *descending node* when it crosses it from north to south.

Eclipses are, in fact, quite common. Taking eclipses of all kinds together, there are always between two and seven in any given year; the reason for this is beyond the scope of this article. They often occur in pairs, with a lunar and a solar eclipse 15 days apart. It's easy to see why this is; if a given New Moon coincides, either exactly or very nearly, with one node of the Moon's orbit, then it's obvious that either the preceding or following Full Moon will also coincide pretty closely with the opposite node – and vice versa.

Now we'll look at lunar and solar eclipses in turn.

Naturally, any body which is illuminated by the Sun casts a shadow in the direction opposite the Sun. This shadow is a long, narrow cone, which tapers off with distance from the body. Fig. 1 shows the Earth's *shadow cone*; the arrowed lines indicate the paths of light coming from points on the circumference of the Sun's disc, and it's easy to see

why the shadow is conical in shape. (In Figs. 1, 2 and 4, the relative sizes and distances of the three bodies are hugely distorted!)

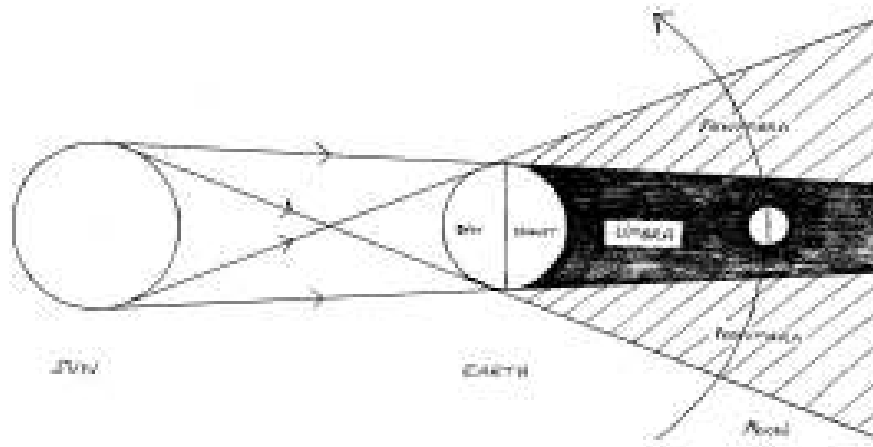


Fig. 1

When Full Moon corresponds with a node of the Moon's orbit, the Moon passes through the Earth's shadow cone (Fig. 1), and we see a lunar eclipse. The dark shaded area is the conical *umbra*, or region of complete shadow; surrounding it, and represented by the hatched area, is the *penumbra*, or region of partial shadow, in which the Sun's light is reduced, but not totally blocked.

At the Moon's distance, the diameter of the umbra is two and a half times that of the Moon, so the Moon takes an appreciable time to pass through it; the total duration of a lunar eclipse can be as long as about four hours. The *total phase* – the period during which the Moon is entirely within the umbra – usually lasts around an hour, but the maximum possible is 1 hour 42 minutes. The duration varies according to how closely the Full Moon is aligned with the node; we see a longer eclipse if the Moon passes through the centre of the shadow cone, and a shorter one if it's offset towards one side of it. There's also a smaller variation, due to the fact that the Moon's orbit is elliptical, rather than circular; its distance from the Earth varies by a few percent, and therefore so does the corresponding diameter of the shadow cone.

When the predicted times of a total lunar eclipse are published in astronomical literature, the times are always given for four *contacts*, as follows. *First Contact* is the moment at which the Moon's leading edge first touches the edge of the umbra, i.e. the beginning of the *partial phase* of the eclipse. *Second Contact* is the moment at which the trailing edge enters the umbra, i.e. the beginning of the total phase. *Third* and *Fourth Contacts* are the corresponding times when the leading and trailing edges leave the umbra, marking the end of totality and the end of the eclipse.

During a total lunar eclipse, the Moon doesn't disappear from view altogether. This is because a certain amount of sunlight is refracted through the Earth's atmosphere, around the curve of the Earth, and still manages to illuminate the Moon – so the Moon is considerably dimmed, but not completely darkened. It's mainly red light which is refracted – blue light is scattered in the atmosphere, which is what makes the daytime sky blue – so the Moon is reddened during totality. Sometimes it actually appears distinctly red, though the colour is more usually coppery, and sometimes dark brown. Occasionally,

we get an exceptionally dark eclipse, when the Moon is darkened so much as to be almost invisible. The colour and degree of darkening are unpredictable, and are influenced by conditions in the Earth's atmosphere; for example, very dark eclipses sometimes occur soon after a major volcanic eruption, as the dust and ash suspended in the atmosphere absorb some of the refracted light.

Naturally, each lunar eclipse is visible from a very large area of the Earth's surface – roughly half of it, in fact, as it's visible from anywhere where the Moon is above the horizon. They happen, on average, about once every eight months, so from any given location, they can be seen with about half of that frequency.

Of course, not all lunar eclipses are total. Sometimes, the Moon's path just skirts the edge of the shadow cone, and its disc is never completely immersed in the umbra, so we see a partial eclipse. There are also *penumbral eclipses*, where it misses the umbra altogether, and just passes through the penumbra; the result is just a slight dimming, which is barely noticeable.

By the way, if you watch the partial phases of a lunar eclipse, with the edge of the umbra advancing across the Moon's disc, it's very plain to see that the Earth's shadow is circular. This is how the ancient Greeks first deduced that the Earth is spherical.

When New Moon corresponds with a node of the Moon's orbit, the Moon passes directly in front of the Sun as seen from the Earth, and its shadow cone falls onto the Earth, resulting in a solar eclipse (Fig. 2).

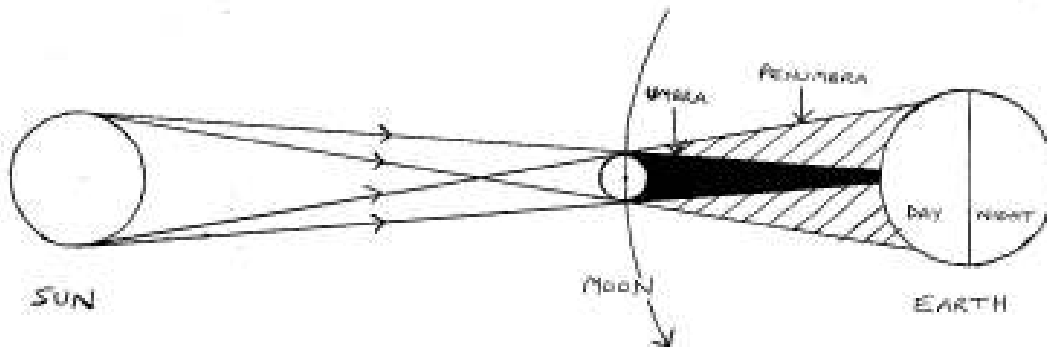


Fig. 2

The fact that total solar eclipses, as we know and love them, can occur at all is due to a remarkable astronomical coincidence. The Sun is about 400 times the diameter of the Moon, and is also about 400 times further from the Earth; therefore they both have very nearly the same apparent angular size – roughly half a degree. So the Moon is only just capable of completely covering the Sun; if the Moon was slightly smaller or slightly further away, then we could never have a total solar eclipse. If it was slightly bigger or closer, then they would occur more often, but would be much less interesting, as the Sun's beautiful corona, and the prominences around its edge, would be hidden from our view!

In fact, due to the fact that both the Earth's and Moon's orbits are elliptical, the apparent diameters of both Sun and Moon vary, so that the Moon sometimes appears slightly bigger than the Sun, and sometimes slightly smaller. Fig. 2 shows the former situation, which results in a *total solar eclipse*.

Due to the Moon's small size, its shadow cone is very narrow by the time it reaches the Earth. The diameter of the umbra on the Earth's surface averages around 160 km; its maximum possible is 272 km. Any place on the Earth which lies within the umbra sees a total eclipse. Places within the much wider penumbra see a partial eclipse; the closer you are to the umbra, the greater the proportion of the Sun's disc which is covered.

Of course, while this is happening, the Moon is moving in its orbit from west to east, so its circular shadow sweeps from west to east across the Earth's surface. So the locus of all the points on the Earth which can see the total eclipse is a long, narrow track, several thousand kilometres long, but only a couple of hundred wide. Either side of this track is a broad zone, up to several thousand kilometres wide, within which a partial eclipse is seen – the proportion of coverage diminishing with increasing distance from the track of totality.

It takes a couple of hours for the Moon's shadow to sweep across the Earth, but it passes over any given location in only a few minutes – or sometimes only a matter of seconds. A typical total eclipse, as seen from any given place, lasts between two and three hours in total, including its partial phases – but the total phase lasts just those few minutes. That's why eclipse observers have to make meticulous preparations before the event; all their observations and/or photography have to be done within those frantic few minutes!

The shortest possible total eclipse would last just a split second, if the apparent diameters of Sun and Moon were exactly equal. The longest possible duration of totality is 7 minutes 31 seconds, if an eclipse occurs when the Earth is exactly at its *aphelion* (furthest point from the Sun), and the Moon at its *perigee* (closest point to Earth) - i.e. if the Sun has its smallest possible apparent size, and the Moon its biggest. This has never happened in recorded history; the longest totality so far observed was 7 minutes 8 seconds, on 20 June 1955 in the Philippines.

Obviously, the further east you are along the track of an eclipse, the later in the day it occurs, as measured by your local time. Every eclipse track begins at a place where the eclipse occurs at sunrise, and ends at a place where it occurs at sunset.

Note also that the duration of totality varies along the track; it's slightly longer near the middle of the track than at the ends, because the shadow is slightly wider there, due to the curvature of the Earth. If you travel to observe a total eclipse, you also need to get as close as possible to the *centreline* of the track – the line along which the centre of the shadow travels. The closer you are to the centreline, the longer totality you will observe.

Fig. 3 shows an example of the track of a total eclipse – the one of 11 August 1999, which no-one saw from Cornwall! (I saw it from Bulgaria; it was the only one I've seen so far.)

The thin dark line, passing through Europe and the Middle East, is the track of totality; as you can see, it began in the western Atlantic, just off the coast of North America, and ended just off the east coast of India. The track was a mere 112 km wide, and the maximum length of totality, in Romania, was 2 minutes 24 seconds. The map is centred on the point of maximum eclipse.

The broad zone on either side of the track, extending north to the Arctic and south to the Sahara, is the region in which a partial eclipse was seen.

So we can see that any given total solar eclipse is seen from only a *very* small fraction of the Earth's surface. They occur about once every 16 months on average, but as seen

from any given place or region, they are very rare. From any given location, a total eclipse occurs only about once every 300 years. A big country, such as the USA, sees one somewhere within its territory once every decade or two, but small countries like ours are much less fortunate. The 1999 eclipse was the only total one visible from the UK in our lifetime; the previous one was in 1927, and the next doesn't occur until 2090! So people who have the "eclipse chasing bug" often have to travel considerable distances to observe them.

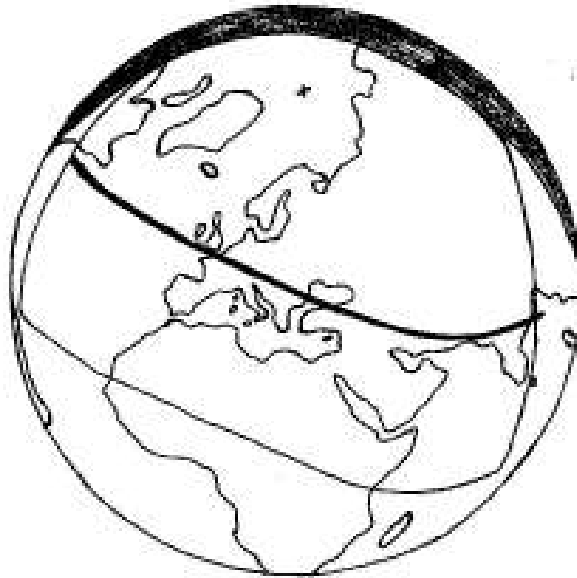


Fig. 3

As for a lunar eclipse, the predicted timings for a total solar eclipse are always given for four contacts. *First Contact* is the moment at which the Moon's leading edge first touches the edge of the Sun's disc; *Second Contact* is the moment at which the trailing edge touches the Sun's limb, and totality begins. Again, *Third* and *Fourth Contacts* are the corresponding times marking the end of totality and the end of the eclipse.

Now I must digress a little from the scientific explanations, and wax lyrical for a while. It's impossible to describe the beauty and splendour of a total solar eclipse in a few short paragraphs, but I'll have to try! During the last few minutes before *Second Contact*, as the Sun's visible part shrinks to a narrow crescent, the light level drops noticeably, and so does the temperature; at our site in Bulgaria, it dropped by 10°C. Strange things happen around you at this time; for example, animals and birds go to sleep, thinking night is falling. If you're in a rural location, birds stop singing, crickets stop chirping, and everything suddenly becomes deathly quiet.

In the final few seconds before *Second Contact*, it becomes obvious that the Moon isn't a smooth sphere. Because its edge is irregular, with mountains and valleys; the last thin sliver of sunlight is broken up into a string of bright points, known as *Baily's Beads*. Then the beads disappear, and totality begins.

Contrary to some people's naïve belief, it doesn't simply "go dark" during totality! The whole point of travelling across the world to see an eclipse is to observe phenomena which can't be seen at any other time. Around the edge of the Moon's disc, *prominences*

can usually be seen, looking like pink or red flames. These are huge eruptions of incandescent gas from the Sun's surface, thousands of kilometres high. These can be seen at other times, by observing the Sun through a hydrogen- α filter – but the most beautiful feature of a total eclipse can't be seen at *any* other time. This is the brilliant, pearly white halo of the *corona*, the Sun's tenuous outer atmosphere, which can be about as bright as the Full Moon. Its shape and extent vary considerably between eclipses; some might think that “when you've seen one eclipse, you've seen them all”, but in fact, no two are ever quite the same.

Third Contact, the end of totality, is marked by what is surely *the* most magnificent and breathtaking sight in all of nature – the *Diamond Ring*. Now that your eyes have adapted to the reduced light level, the first point of sunlight which reappears beside the Moon's trailing edge – the first Baily's Bead, in fact – seems to explode into view as a dazzling white jewel. The combination of this and the white ring of the corona really does look like a diamond ring hanging in the sky; it lasts for just a few seconds, before the expanding sliver of sunlight destroys the illusion, and the corona fades out of sight. The Greatest Show on Earth is over.

Now it's time to return to the technical stuff! When an eclipse occurs with the Moon near its *apogee*, or greatest distance from Earth, its apparent size is slightly smaller than that of the Sun, so it can't quite cover it. The tip of its shadow cone doesn't quite reach the Earth's surface (Fig. 4), so we see the dark disc of the Moon, with a bright ring of sunlight around it.

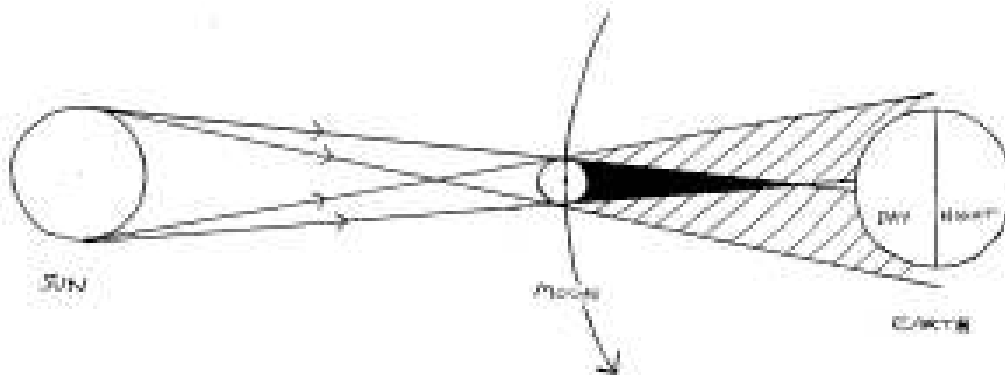


Fig. 4

This is known as an *annular* eclipse, from the Latin word *annulus*, meaning a ring. (We use the word in mathematics, to describe the region between two concentric circles, like a washer.) It's obviously much less spectacular than a total eclipse, but I imagine that it's still an interesting event to observe. (I haven't seen one yet; my recent attempt in Orkney was completely clouded out.)

Annular eclipses occur only slightly more frequently than total ones. Once again, the one which occurred in northern Scotland on 31 May this year was the only one visible from the UK in our lifetime.

Like a total eclipse, an annular is seen only from within a long, narrow track, with a partial eclipse seen from a broad region either side of the track. The maximum possible duration of an annular is 12 minutes 24 seconds, if the Moon is at apogee and the Earth at *perihelion* (closest point to the Sun).

You don't take the x-ray pictures or interpret them? That's right, although some interpretation is inevitable. We use x-rays, linear accelerator and cobalt source machines to direct radiation of various energies at the tumours. The x-ray pictures tell us where to direct the beam for best effect. The modern direction of technology is to use MRI scans for diagnosis instead of CT scans (x-rays) and to use linear accelerators more and more.

What did you think of the "lobster eye" as a means of focussing x-rays? It was a fascinating talk but we don't need the means of focussing x-rays. Our beams are quite narrow and directable anyway. Very clever physics, nevertheless.

When were you engaged? On the 31st of May, 2003 in Iceland. My fiancée is a computer programmer from Bristol and he had gone to Iceland to see the annular eclipse with me. He actually proposed by giving me a jigsaw to solve, made up of a montage of photographs. We both agreed that an annular eclipse was a good model of a ring!

Congratulations and best wishes for the future.

I remember that you gave a talk one Member's Night on a visit to Africa to see an eclipse. Are you an eclipse chaser? My first try was in France for the 1999 total eclipse but I didn't see the eclipse on that occasion. In June, 2001, I went to Africa – Zambia and Zimbabwe – with Exodus and saw a wonderful eclipse. In Australia, in 2002, I went with the Explorers organisation and was again successful. Stephen and I met in Australia. He was on the same tour. Then in 2003 came my fifth eclipse trip and the fourth successful one.

What made you go to Iceland? Well, at first I was going to go to Orkney. I am doing a course in Bronze Age archaeology and wanted to see Skara Brae and all the other wonderful ancient sites in Orkney. However, the Explorer's Group was going to Iceland. Trips to Orkney were cancelled because the Americans dropped out. I hadn't been to Iceland before, so that was it. When we got to the hotel in Reykjavik it was unfinished and there were all sorts of problems but Explorers sorted them out. We went up north, to Akureyri, to see the eclipse. We went to the right place; an awful lot of people went all the way to Iceland and didn't see a thing!

What do you use to observe the eclipses? On these trips there are always people with telescopes and projection systems. I have binoculars and a solar projector, which I take with me. We all try to get photographs with ordinary cameras – here's one of Stephen's efforts. *Julia showed me a large picture taken by Stephen in Iceland of the annular eclipse nearly central.*

Do you have a telescope at home? No. In the middle of Stockton the light pollution makes any deep sky observing impossible. I just use binoculars at night and the solar projector for looking at sunspot groups.

How long have you been in the Cleveland and Darlington Society? It must have been about 1990 when I joined. I'd done an O level course in Astronomy at the 6th Form

College in Acklam. Then I did Fred's course and studied with him for two years. During the course we went to the Observatory at Thorpe Thewles and met a lot of the members. I joined the Society soon afterwards and have enjoyed it ever since.

What's your sort of Astronomy – practical or armchair? I am a practical astronomer. I made a sundial when I was living in Thornaby. The house I was living in was over the old iron mine workings and when I came to take compass bearings to set up the sundial I found the needle was all over the place!! There must be a lot of iron ore still left underground, which interferes seriously with the magnetic deviation.

Are you a local lass, born and bred? I was born and brought up in Sunderland. I went to South Shields for primary, then finished secondary schooling at St Anthony's, which was the old grammar school. I went to Cambridge to read Medicine. When I was at school I studied Physics, Chemistry and Maths. I considered doing an Astronomy degree at one time. My Dad used to take me out fishing at night. From Saltburn you can sometimes see the Northern Lights. During the electricity strikes in the 70's, you could see the Milky Way and lots of stars in the north east. He introduced me to the night sky. Whitby was good for the views of the night sky as well.

Do you have brothers or sisters? Two sisters, one in Brecon, South Wales and one in Stockport, and two brothers, one in South Shields and one in London in the Met. We still keep in touch and see the local family quite often.

Have you travelled away from the North-East very much? After my degree in Cambridge my first job was in Ayr, on the west coast of Scotland. Then I worked in Newmarket down south, Leeds, Edinburgh and South Shields. In 1994 I went to James Cook Hospital and have been there ever since.

You have mentioned taking courses in astronomy and bronze age history. You sound like a life-long learner to me. Yes. I enjoyed school. My mother is a sci-fi fan and introduced me to all sorts of interesting authors. I took a Biology O level and at one time I was going to take degrees in Medicine and Geology, with a view to being an astronaut. In all the NASA visits to the Moon, there was only one geologist ever got to the surface. Crazy! It was difficult to do anything else during medical training but now it's a lot easier to take evening classes. The social side is as important as the studying to me.

Have you any ambitions for future travelling? Yes, I like travelling abroad a lot. I've been to Egypt and seen the pyramids. We are planning to go to Egypt for our honeymoon, on a Nile cruise paddle steamer. There's a lunar eclipse on the last night of the trip; I hope we can see it from Egypt! I'd love to go to Mexico to see the Aztec ruins and study the ancient civilisations there.

Do you have any heroes? Oh, my biggest hero is Patrick Moore. Then there's Terry Pratchett and Disc World – I've read dozens of his novels.

What are you reading at the moment? The latest Harry Potter, having read all the others. I've read Piers Anthony, who writes about the Xanth world, which connects with Earth at the Florida Keys. A combination of magic and science. I still have the sci-fi bug from my Mother.

What about music, dancing and the cinema? I go to Line Dancing at Redcar Bowl and enjoy that. Ceilidhs are good fun, too – we're going to have a ceilidh on the evening of the wedding. I have learned to play the violin, the guitar and the recorder but I don't play much now. I go to the cinema a lot. I've just been to see Terminator3. I was fascinated by the way they wove the story in such a way that time fulfils itself, despite all the attempts to interfere with the future.

Where does your enthusiasm to do all the things you do come from? I've no idea. I just keep finding interesting things and pursuing them. I don't think about why I am enthusiastic at all.

Who has influenced you the most? (After a short moment for thought, Julia replied:)
The biggest influence in my life is not so much a person as my faith. Theology is not a logical argument for the existence of God, it's a matter of Faith. The Big Bang and then the fact that the Universe was flooded with light and then Evolution flowered are all consistent with there being a God. I hate the way Richard Dawkins lets his atheism get in the way of his science writings. He ruins the discussion of evolution and his books are badly written because they need re-visiting to make sense. Stephen thinks Dawkins is wonderful but I think he is poor value for money.

I always put the Interviewee in the position of being World Dictator and having to solve the most urgent problem of Mankind. I always think that the economy of the World is very shaky and unstable. There is a fatal imbalance in the whole business of trade and jobs. The imbalance between the North and the South of the equator is totally unfair and kept that way by the domination of the West. It also applies in our national economy. Some people are working all the hours there are and others are unemployed. As World Dictator I would address and solve that imbalance.

Whom should I interview next? I'm afraid I don't know many members. I don't even know those very generous people who bring their telescopes to the Observatory on a Friday night and show us all the wonderful sights. I wish I knew their names. The good things about the Society are the lectures, the Observatory and the Planetarium. One lack is the social side and meeting others, having time to talk to like-minded people. There is never enough time at the meeting nights.

When and where is your wedding, Julia? On the First of November at Stockton.

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A History of the Cleveland and Darlington Astronomy Society
Part 7

This extract from Barry Hetherington's history covers the start of the Scarborough Star Party, the Federation of Northern Astronomical Societies, the Darlington Telescope and the total eclipse of the Sun in 1927. Please send any comments and corrections to me or Barry.

Scarborough Star Party

On 17th August, 1991, the Scarborough Astronomical Society held its first Star Party at Basin Howe Farm, Sawdon, near Pickering, where they were made welcome by Chris and Sheila Anderson. The all-night event attracted about 100 people from as far apart as Stevenage and Edinburgh. The 50 or so telescopes which were brought to the event made good use of the clear skies. This is now established as an annual event.

The event in 1992 was totally rained off, as was the one in 1993.

'Local' National Events

The Federation of Astronomical Societies Northern Convention was held on 3rd August, 1991, at Trevelyan College, University of Durham. Six professional astronomers told of their work at the frontiers of astronomy: Carlos Frenk - *Dark Matter in the Universe*: Richard Ellis - *Formation and Evolution of Galaxies*: John Major - *Martini - sharpening of Star Images*: Richard Stephenson - *Modern use of Early Astronomical Records*: Stephen Rayner - *Very High Energy Gamma Ray Astronomy*: Nigel Metcalfe - *Galaxy Counts at the Edge of the Observable Universe*.

The Darlington Telescope

In September 1904, the Rev. Walter E. Stewart of Hurworth on Tees, Darlington, offered for sale to the Darlington Corporation a 5-inch equatorially mounted refracting telescope by T. Cooke & Son of York.

It had a cast iron pillar, brass tube, rack and pinion focusing; 1½-inch finder; eyepieces of powers 60, 120, 200, 300, and 400, with sunshade in mahogany box; first surface reflection prism (for the sun); total reflection prism for the stars; comet finder; transit eye-piece; prismatic illuminating apparatus for bright field of the micrometer, and for reading the declination circle; declination circle and hour circle (of silver) with verniers read by microscopes; clock for driving the telescope giving equatorial motion; slow motions in R.A. and declination; brought down to eye end; clamps in R.A. and declination; filar micrometer with 4 eye-pieces; position circle on telescope.

The original cost to the Rev. Stewart was £374, complete with equipment and observatory, and he was offering it complete for £80. Although the Corporation declined to purchase it, a group of local citizens bought it and presented it to the town on the understanding that Darlington would find a suitable site for it and see to its maintenance.

Eventually, in 1906, the telescope found a permanent site in the South Park where it remained until 1936. For the general public to use it there was a charge of 6d. for each quarter hour, with a minimum charge of 1/6d., and where more than one party wished to use it on the same night, each party was limited to one hour's use.

In 1936 it was removed to the Grammar School Playing Field in Abbey Road where it remained until the early 1990's when a fire destroyed the observatory and the telescope was dismantled. It is believed that the 5-inch lens is in the keeping of the Sixth-Form College.

Total Eclipse of the Sun, 29th June, 1927.

It is very rare indeed that in a persons lifetime a total eclipse of the sun will occur in his own locality. In our area this happened on 29th June, 1927. The line of totality passed through or close to Criccieth, Southport, Giggleswick, Richmond, Darlington and Hartlepool; the limits of totality were through Sunderland and Saltburn. Totality occurred at 6.24am summer time and lasted for 23 seconds, a relatively short time when one considers that the maximum possible duration is about 7 minutes.

From Richmond, at 6 o'clock, a gap in the clouds revealed the sun half obscured by the moon, but this was only a fleeting glimpse. Fifteen minutes later fleeting glimpses of a thin silvery crescent were obtained through gaps in the cloud. Some 30,000 people had been denied a view of totality.

At about 6 o'clock the observers at Gilling had quite a good view of the partial phase but cloud intervened thereafter. Dr. Lockyer, of the Norman Lockyer Observatory, Sidmouth, said that it was an intense disappointment.

From Reeth and Arkengarthdale, a good view was obtained of the partial phase but totality was obscured by cloud. Higher up Swaledale a better view was obtained during totality. In Wensleydale they were clouded out, as were Hartlepool and Middlesbrough, but the corona was glimpsed from Northallerton and Sunderland.

A belt of cloud robbed the waiting thousands of people who gathered at Stapleton, Barton, Coniscliffe Moor, Sadberge, Brafferton, Aycliffe and elsewhere in the district surrounding Darlington. The best views, of the corona, were obtained from several places in the town.

Over 250,000 flocked to Southport where a hazy but fair view was obtained, but at nearby Colwyn Bay observations were prevented by clouds. The Astronomer Royal, Sir Frank Dyson, and his party went to Giggleswick where they had a splendid view.

Several aeroplanes cruised above the clouds and the occupants were able to obtain perfect photographic records.

Darlington & Stockton Times; 1927 June 25, p13; July 2, p6.



Light Pollution Issues

The following message from the British Astronomical Society was received by Barry Hetherington recently. It shows the Campaign for Dark Skies is still lobbying as hard as possible on our behalf. Several of our members made submissions to the Select Committee.

BAA electronic circular No. 00112 <http://www.britastro.org/>

Select Committee on Light Pollution: forthcoming report.

Your help is requested. The committee hearings have now been concluded, and the eleven MPs took evidence from many amateur and professional astronomers, from the lighting industry, local govt., CPRE, PPARC, the Highways Agency and other interested parties. Having heard their deliberations, I am sure that they will present a positive report to Parliament in September, and will recommend action on light pollution. However, the two government ministers (Keith Hill, Office of the Deputy PM, and David Miliband, Education) who appeared before them showed that:

- a) they knew little about the subject;
- b) their departments still favour the laissez-faire approach of "education not regulation".

The Campaign for Dark Skies is determined that the Select Committee report should fall on ground which is as fertile as possible, and would be grateful if you as an individual or any astronomical group to which you belong could write before September to the departments concerned (Education, DEFRA, Office of the Deputy PM) stressing the benefits that proper control of lighting can bring, both to the starry sky and here below.

Dept for Education & Skills: <http://www.pm.gov.uk/output/Page1488.asp>

DEFRA: <http://www.defra.gov.uk> ODPM: <http://www.odpm.gov.uk>

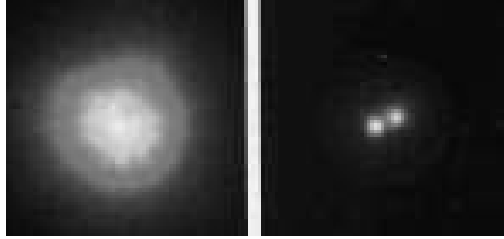
Thanks for any help you can give. For further advice on possible action, see the CfDS website (<http://www.dark-skies.org>), contact Bob Mizon via the site, or see section 3 of Bob's book "Light Pollution: Responses and Remedies" (Springer, 2001).

Bob Mizon, BAA Campaign for Dark Skies Co-ordinator



Adaptive Optics on the VLT

The components of the 10th magnitude star HIC 59206 are separated by 0.12 arcseconds. On the left is the image of the system taken without the new adaptive optics. On the right is an image with the adaptive optics switched on. From the European Southern Observatory's Very Large telescope.



Transit Tailpiece

Quote/Unquote

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time
T. S. Eliot

Perplexity is the beginning of knowledge
Kahlil Gibran

Custom Telescopes UK. For your telescopes, binoculars and accessories of all kinds, go to Glen Oliver, a long-time member of the Society. He operates from Hartlepool and has a website www.goliver.freemove.co.uk. Glen also supplies Astronomy and Space books of all kinds. Don't forget to visit his website soon.

CaDAS Website Now at www.planetarium.btinternet.co.uk and the society email address is planetarium@btopenworld.com. Everyone is encouraged to visit the site and tell your friends about it.

Sunderland AS Contact them at www.sunderlandastrosoc.com to see how they are progressing with the new Observatory at Washington Wildlife Centre. If you wish to attend their meetings you are assured of a friendly welcome.

York AS have a website at www.yorkastro.freemove.co.uk and an excellent programme of lectures, if you wish to go along.

Post and Email If anyone wishes to change the way they receive their Transit, please let me know. If any member is not receiving a copy, please let me know.

Articles Please send contributions for the newsletter to Alex Menarry, 23, Abbey Road, Darlington, DL3 7RD, 01325 482597 (a.menarry@virgin.net) or to John McCue, 01642 892446 (john.mccue@ntlworld.com). Copy deadline date is the 1st of each month

The Back Page Picture



Enigmatic landforms on Mars showing a surprising rate of erosion.

