

# SOLAR ECLIPSE NEWSLETTER

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### **The Solar Eclipse Mailing List**

The Solar Eclipse Mailing List (SEML) is an electronic newsgroup dedicated to Solar Eclipses. Published by eclipse chaser Patrick Poitevin (patrick\_poitevin@hotmail.com), it is a forum for discussing anything and everything about eclipses.

Thanks to the voluntary efforts of Jan Van Gestel of Geel, Belgium, the Solar Eclipse Mailing List (listserv) has been in operation since 10 December 1997. This is the first mailing list devoted solely to topic of solar eclipses on the internet.

You can send an e-mail message to the list server solareclipses@Aula.com, which will then forward your e-mail to all the subscribers on the list. Likewise, you'll receive email messages that other subscribers send to the listserv. Only subscribers can send messages.

## Solar Eclipse Mailing List

Dear Friends,

Another year passed. A year with two central eclipses. The total solar eclipse in June was for about everyone a true success. The annular, just passed since last week, was a success for only a very few. Most of the observers had clouds and could not witness the maximum phase.

The Solar Eclipse Newsletter celebrated this year November its 5 years celebration. Next year December the Solar Eclipse Mailing List exists 5 year.

We also have two central eclipses to look forward to. The annular of June 2002 and the total solar eclipse in December 2002. Many of us are still in a conflict between the choice of Africa and Australia for this total.

Many of us make plans for the 2003 eclipses, or even the Venus Transit in 2004. Let's not forget Totality Day 2003 on 8 February 2003 in the Open University of Milton Keynes in England. And in the same venue SEC2004, the International Solar Eclipse Conference in August 2004.

Christmas time is due. The children are home and many presents have been bought. Maybe a telescope, a sunspotter, or any other eclipse aid. Merry Christmas and a Happy New Year to all of you. May all your wishes come true.

Next year it will be still busy for us. Joanne is still studying at the University and we still have to catch up loads of eclipse archives. We hope to share all our files and findings with you. Keep tuned to the SEML and



SENL. As you will notice in this issue, even Laura, now 12 years old, stays addicted to solar eclipses.

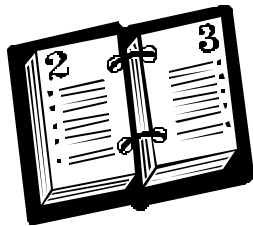
Keep those solar eclipse related messages coming .... Your contributions are more than welcome on the SEML but your pictures, graphs and contributions are wanted as well in this SENL.

All the best,

Joanne and Patrick

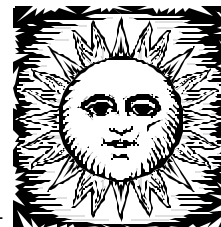


## SECalendar



Dear All,

Please find herewith the solar eclipse calendar for December. If you have any additional information, queries or remarks, please drop me a mail.



### December 2001

December 01, 1980 Minor Planet (3168) Lomnický štít 1980 XM. Discovered 1980 December 1 by A. Mrkos at Klet. Named for the meteorological and solar observatory in the High Tatras, where the discoverer worked for some 20 years. (M 23136; M 30819) Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

December 01, 1989 Minor planet (7176) Kuniji 1989 XH. Discovered 1989 December 1 by A. Takahashi and K. Watanabe at Kitami. Named in honor of Kuniji Saito (1913- ), who joined the Tokyo Astronomical Observatory in 1936 and was engaged mainly in research on the solar corona. Following his retirement in 1974, he has collected historical materials from Japan, China and other countries to analyze them from the viewpoint of modern astronomy, using computers. He named this field of research "paleoastronomy" and hopes that many other researchers will enter into this kind of research. He also served as president of the Astronomical Society of Japan. (M 32789; M 33151) Name proposed by the discoverers following a suggestion by A. Fujii and A. Tanno. Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

December 01, 2206 There will be 3 eclipses in 2206: A Partial Solar Eclipse on December 01 and December 30 and a Total Lunar Eclipse on 16 December 2206. There were 3 eclipses in December 1880: A Partial Solar Eclipse on 2 December and 31 December and a Total Lunar Eclipse on 16 December. Ref. SEML 06/00

December 02, 1989 Solar Max lost orbit and burned in Earth's atmosphere. Launched in 1980, Solar Max was repaired in the cargo bay of the Space Shuttle Challenger in 1984. Solar Max studied the Sun and discovered 10 comets skimming past or crashing into the Sun.

December 02, 1995 The SOHO satellite was launched in a halo orbit around the L-1 Lagrangian point between the Sun and the Earth.

December 04, 1983 A 1 percent magnitude partial eclipse was visible in Belgium. The eclipse was annular in Africa.

December 05, 1879 Sir William Abney proposed to the Royal Society a photographic map of the solar spectra in infra red. He made photographic emulsions which were sensitive at a wave length of 12000 Angstrom. This could not be copied for many years. Ref. DD 11/99



December 05, 1967 Launch of HEOS 1 (USA). Research of magnetic fields, solar wind and cosmic rays. Ref. DD11/99

December 06, 1631 The first transit of Venus as predicted by Johannes Kepler was observed.

December 06, 1695 Total solar eclipse visible on the Mount Everest (Chomolungma). At the same time as well on two other 8000 meter summits (14 in total): Lhose and Cho Oyu. Ref. PA 05/00

December 09, 1991 Minor Planet (5070) Arai 1991 XT. Discovered 1991 December 9 by S. Ueda and H. Kaneda at Kushiro. Named in honor of Ikunosuke Arai (1836-1909), the first director of the Central Meteorological Observatory. In his early days, he contributed to the triangulation of Hokkaido. In 1887 he observed the total eclipse of the sun at Sanjo, Niigata, and successfully photographed the event. (M 22506) Name suggested and citation prepared by H. Fukushima. Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

December 10, 1974 Helios 1 was launched to observe the Sun and its solar wind. It was constructed in West Germany and

(Continued on page 3)

## SECalendar

launched by the US from Cape Canaveral in Florida. Because it was equipped with special heat-dispersal systems, the spacecraft were able to withstand extremely high temp's, which reached an estimated 700 F (370 C). It was the closest any spacecraft has approached the Sun (28 million miles from the Sun).

December 10, 1997 Start of the Solar Eclipse Mailing List (Solar Eclipse List) on internet. This is the first worldwide Mailing List on Solar Eclipses. Jan Van Gestel from Belgium offers the server, Patrick Poitevin is the Solar Eclipse List Owner. After 3 years there are between 280 and 300 subscribers out of more than 35 different countries.

December 12, 0429 "Yuan chia region period, 6th year, 11th month, day chi-ch'ou, the first day of the month. The sun was eclipsed; it was not complete and like a hook. During the eclipse, stars were seen. At the hour of fu (= 15-17 h), then it disappeared (i.e. ended). In Ho-pei (province) the Earth was in darkness." Refers to a total solar eclipse of 12 December AD 429. From: Sung-shu (Chinese). Quoted in Historical Eclipses and Earth's Rotation, by F Richard Stephenson, Cambridge University Press, 1997, page 242.

December 12, 1871 Edward Walter Maunder mentioned an eclipse comet on December 12, 1871, observed by A.C. Ranyard. But he speaks " ... less convincing evidence ..." comparing with the eclipse comet of 1882 and 1893. On the drawing you can clearly see the dark lines visible in the corona. Edward Walter Maunder (1851-1928), his wife Annie Scott Dill (1868-1947) and his elder brother Thomas Frid (not an astronomer, assistant secretary of the BAA from 1890 to about 1928), observed and wrote numerous about solar eclipses.

December 12, 1871 Pierre Jules Cesar Janssen (1824-1907, France) uses spectroscopy from an eclipse in India to propose that the corona consists of both hot gases and cooler particles and therefore is part of the Sun. Jules Janssen discovered dark lines in the solar corona spectrum. (ref Rc 1999)

December 12, 1928 Jean Meeus birthday.

December 13, 1967 Launch of Pioneer 8 (USA). Research of the sun. Ref DD 12/99

December 13, 1974 Last solar eclipse on a Friday the 13 th. The next solar eclipse on a Friday 13 th is in July 2018. Both are partial solar eclipses. There are 24 solar eclipses on a Friday the 13 th between 0 and 3000. Of which 13 partial, 9 annular and 2 total solar eclipses. The most odd is the one of 13.03.313 which was an annular eclipse.

December 14, 1546 Birth of Tycho Brahe, Danish astronomer. His interest in astronomy started due to the observation of a solar eclipse in 1560. He died in 1601. Ref. DD 12/99

December 14, 1881 William R. Birt, English selenographer died. He founded the Selenographical Society and Selenographical Journal in 1878. He studied as well sunspots and the solar rotation. He was born in 1804. Ref DD 12/99

December 15, 1859 Gustav R. Kirchhoff distilled from the sun spectra which elements are present in the sun. Ref. DD 12/99

December 16, 1965 Pioneer 6 was launched to observe the Sun, orbiting between Earth and Venus in a 311-day orbit. The spacecraft is still functional to this day, and is the world's oldest surviving spacecraft.

December 19, 1973 Skylab took its now famous photo of a giant solar prominence loop.

December 20, 1876 Walter S. Adams, American astronomer was born. His spectroscopic research of sunspots and stars caused the discovery of a spectrometric method to detect the distances of stars. Died in 1956. Ref. DD 12/99

December 21, 1998 Solar and Heliospheric Observatory (SOHO) positioned in a safe mode because the last gyroscope failed. Any orbit corrections would need too much energy. They bused software to point the gyroscope. This was the first satellite successful in it. Ref. DD 12/99

December 22, 0968 "When the Emperor was waging war in Syria, at the winter solstice there was an eclipse of the Sun such as has never happened apart from that which was brought on the Earth at the Passion of our Lord on account of the folly of the

*(Continued on page 4)*

## SECalendar

Jews. . . The eclipse was such a spectacle. It occurred on the 22nd day of December, at the 4th hour of the day, the air being calm. Darkness fell upon the Earth and all the brighter stars revealed themselves. Everyone could see the disc of the Sun without brightness, deprived of light, and a certain dull and feeble glow, like a narrow headband, shining round the extreme parts of the edge of the disc. However, the Sun gradually going past the Moon (for this appeared covering it directly) sent out its original rays, and light filled the Earth again." Refers to a total solar eclipse in Constantinople of 22 December AD 968. From: Leo the Deacon, *Historiae, Byzantine*. Quoted in *Historical Eclipses and Earth's Rotation*, by F Richard Stephenson, Cambridge University Press, 1997, page 390, and, in part, in *Encyclopaedia Britannica CD 98*.



December 22, 0968 First clear description of the corona seen during a total eclipse, by a chronicler in Constantinople. The first mention of the corona may have been due to Plutarch, who lived from about AD 46 to 120. Plutarch's book 'On the Face in the Orb of the Moon' contains a reference to 'a certain splendour' round the eclipsed Sun which could well have been the corona.

December 22, 1828 Death of William Hyde Wollaston (1766-1828), British Doctor and chemist. He saw in 1802 the Fraunhofer lines in the Solar spectrum but considered it as a limitation of colors. (Ref Rc 1999.)

December 22, 1870 "From the first second of contact I watched with all the attention I could command for any change in the effect on the landscape and sky. The sky might then be described as dull, not particularly dark, with small light clouds passing rapidly across, the general tone being inclined to violet-grey. No change took place till within a few seconds of totality, when the light was very sensibly lessened. At the first moment of totality, sudden darkness came on; dark purple clouds appeared on the horizon, with streaks of bright orange between them. The distant town of Jerez, from white, became a dark rich blue. The corona was radiating, and not perfectly circular, and varied as totality progressed; it was never symmetrical, and much too vague to enable me to describe by a line, excepting where a curved opening on the left-hand lower limb of the moon occurred, as shown in the drawing. The colour of the corona was warm white, and I could perceive nothing approaching a defined edge to the bright light immediately around the moon; it simply became less bright as the distance increased from the moon, though the contrast of the dark moon with the brightest part of the corona might induce a less practised observer to call it a ring of light. The drawing I send with this was painted immediately after, and is truest in colour and general effect as anything I ever did." Refers to a total solar eclipse in Spain of 22 December 1870. From: Paul Jacob Naftel (official artist for the eclipse expedition, led by the Reverend J S Perry). Quoted in Paul Jacob Naftel by Furniss and Booth. Ref FE 01/01

December 22, 1870 Jules César Pierre Jules Cesar Janssen (1824-1907, France) uses a balloon to escape the German siege of Paris to study the December 22 eclipse in Algeria. He reached Aran (or Wahran), Algeria, but the eclipse is clouded out.

December 22, 1870 Photograph high level of sun spots in Eclipse/Bryan Brewer 1991 page 29 and sketch page 48. See also Young's description on the Fraunhofer lines in Total Eclipse of the Sun/J. Zirker 1995 p. 12+18.

December 22, 1870 Spain: Numbers of scientific experiments. Charles A. Young (US) was successful in Spain and revealed that the chromosphere is responsible for producing both the flash spectrum and dark line spectrum observed in Sun's photosphere. Corona was bright and suspect on relation to activity.

December 22, 1889 Father Stephen Joseph Perry, Director of Stonehurst College Observatory, Lancashire was a martyr to science and eclipse chasing. He lost his life to the eclipse of December 22, 1889. He led one of the two English expeditions organised by the Royal Astronomical Society. He was stationed on Iles du Salut, off the coast of French Guiana. He was stricken with malaria by the time of the eclipse and was already dying. He expired five days later on the ship Comus. Although he obtained photographs at this eclipse, his plates deteriorated due to the climate and the delayed development caused by his unfortunate situation. He chased other total solar eclipses plus both the Venus transits of the 18th century. Source: The Daily Telegraph Guide to the Eclipse (of June 1927). The 2006 annular eclipse can be observed from this location. Ref. Michael Gill 02/01

## SECalendar

December 22, 1975 Launch of Prognoz 4 (former USSR). Research of the sun. Ref. DD 12/99

December 22, 1989 Minor planet (7575) Kimuraseiji 1989 YK. Discovered 1989 December 22 by Y. Kushida and O. Muramatsu at Yatsugatake. Named in honor of Seiji Kimura (1932- ), an amateur astronomer who first suggested sending a solar eclipse expedition to the U.S.S.R. in 1968. Since then he has organized several overseas expeditions to observe total solar eclipses. Secretary of the committee of the Japan Amateur Astronomers' Convention for over 14 years, Kimura established the Herschel Society of Japan in 1984 and has been editing bimonthly newsletters promoting knowledge of the Herschels and keeping contact with the William Herschel Society in the U.K. (M 33789) Name proposed by the discoverers following a suggestion by S. Morikubo. Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

December 23, 1907 Death of Pierre Jules Cesar Janssen (1824-1907, France). Studied the Sun. Co-discoverer of the lines of Helium in the Sun, that time on Earth not yet discovered. Observed solar eclipses of which one from Algeria when he escaped Paris with a balloon during the war. (ref Rc 1999)

December 24, 1957 Very high Wolf number (sunspot number): 355. The next it was also 355. Ref. DD 12/99

December 25, 1581 Due to the de lunation period (29,5 days), over 2 following years, no phase of the moon can be on the same day. In fact neither a solar eclipse. Though, there was a solar eclipse on 25 December 1581 and a solar eclipse on 25 December 1582. The first visible in South America and the second in the south of Asia and in Australia. It was only possible because of the change from Julian to Gregorian calendar. In October 1582, there were 10 days eliminated. (ref. H 5/88)

December 25, 2038 Partial Solar Eclipse with magnitude of 0.845 on Christmas Island. On December 26, 2019 there is a partial eclipse of magnitude 0.658 on the same island. At Christmas Creek, Western Australia, both partial eclipses: a magnitude of 0.798 and 0.297. Christmas Creek will get a total solar eclipse on 22 July 2028 with almost 4 minutes of totality. The TSE starts in the Indian Ocean, crosses Australia NW to SE, and sunsets just after crossing S. Island New Zealand.

December 26, 1886 Prof. Theodor Ritter Oppolzer (1841-1886), professor in astronomy in Vienna and author of the monumental Canon der Finsternisse died in Vienna. He started his work October 22, 1885 and it was published spring 1887 after his death.

December 27, 1571 Birth of Johannes Kepler, German mathematician and astronomer. He predicted for the first a transit of Mercury. Died in 1630. Ref. DD 12/99

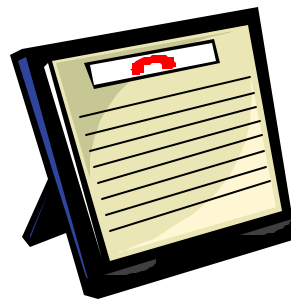
December 28, 1882 Birth of Arthur S. Eddington, British astro physician. In 1912 he was leading an expedition to a solar eclipse in Brazil. Eddington confirmed his observations (that light bends when it passes a heavy mass) at the solar eclipse of 1919, together with Sir Frank Dyson. He had organized for this , special an expedition to the island Principe. He died in 1944. Ref. DD 12/99

December 30, 1777 Eclipse observed by Captain James Cook (1728-1779), actual date December 29, during his 3 rd travel. Observation at Eclipse Island but currently called Cook Island (at the entrance of the lagoon surrounded by Christmas Island in the Pacific). It was a partial eclipse of max. 30% and at about 59 degrees altitude. (Ref. ENB 8)

December 31, 1719 Death of John Flamsteed (1646-1719) who observed the 1715 solar eclipse from Greenwich. (Ref. Rc 1999)

December 31, 1842 Annular eclipse on New Years eve. December 31, 1880 Partial solar eclipse on New years eve. December 31, 2195 Partial Solar Eclipse on New Years eve. December 31, 2233 Total Solar Eclipse of December 31, 2233 will be visible on New Years day, January 1, 2234 for the West Pacific. December 31, 2252 Total Solar Eclipse of December 31, 2252 will be visible on New Years day, January 1, 2253 for the West Pacific.

and ... keep those solar eclipse related messages coming ... Best regards, Patrick



## SEScannings

### Sky and Telescope December 2001

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com> To : SOLARECLIPSES@AULA.COM Date : at, 03 Nov 2001 17:17:06 +0000

Hot New Products of 2001 by the editors of S&T: Fun in the Sun (Sunspotter discribed earlier in the SEML and SENL); More Fun in the Sun (H alpha SolarMax of Coronado); page 39

More Space Artistry: Hardware The Art of David A. Hardy (lectures at TD2001); page 74

December's Annular Eclipse of the Sun by Paul Deans; page 104

From : KCStarguy@aol.com

Sky & Telescope Dec 2001 partial eclipse picture on P.64

Solar eclipse from Moon painting P. 85 (need to dig up the book that I saw as a child with a similar painting - maybe the same one?)



## SETalk

### Robert H. van Gent's Homepage

From : Michael Gill  
<eclipsechaser@yahoo.com> To :  
"SOLARECLIPSES@AULA.  
C O M "  
<SOLARECLIPSES@AULA.  
COM> Date : Wed, 7 Nov 2001  
09:55:46 -0800 (PST)

If you haven't already done so, I would recommend that anyone on the SEML with an interest in eclipse periodicities checks out the following URL:

<http://www.phys.uu.nl/~vgent/calendar/eclipsecycles.htm> Michael Gill.

### Index SENL November 2001

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com> To : SOLARECLIPSES@AULA.COM Date : Sun, 25 Nov 2001 12:24:48 +0000

The index for the Solar Eclipse Newsletter November 2001:

Page Topic

.../...

The SENL will be soon on the webpages of Fred Espenak (see below). Comments or remarks? Please let me know. PP



## SETalk

**Eclipse pic of the week**

From : KCStarguy@aol.com To : SOLARECLIPSES@aula.com Date : Sat, 3 Nov 2001 13:18:06 EST

There is an astronomy pic of the day so I thought let's have a ..... Eclipse pics of the week.

I would like to display eclipse pictures of the week at my site at <http://members.aol.com/kcstarguy/blacksun/eclipsepicsweek.htm> starting around Thanksgiving.

I'd like to include possibly 1 to 3 or more that are people have each week. They can be submitted at any time for any eclipses including lunars. If they are good you can consider ones from the past etc.

The criteria for selection will be

- (1) Photo or video clip showing some unique aspect of an eclipse, environment, sky scenery, eclipse phenomenon (including shadow bands, bailey's beads. Must be original work of the person submitting. If published in a magazine, these can be submitted.
- (2) Good quality photo (Jpeg or gif). If Tiff or others submitted image, I will convert.
- (3) Comprehensiveness of paragraph write up to go along with the picture (see below).
- (4) Aspects of picture is one that has not been presented previously.

If you want to submit a photo/image (only one or two per month from anyone person so please do not send a batch of them), please send as attached with information below in email. The plan is to have submissions from many people so you may be limited to your bset 1 or 2 so consider and choose well.

Each person who has their picture displayed will receive an Black Sun icon award to post on their site if they wish.

? questions, let me know. Feel free to pass this notice on.

thanks Dr. Eric Flescher (KCStarguy@aol.com) webmaster Eric's Black Sun Eclipse website - <http://members.aol.com/kcstarguy/blacksun/eclipse.htm> -editor- Black Sun eclipse newsletter (eclipse and astronomy news) to subscribe send email to [blacksunnews-subscribe@egroups.com](mailto:blacksunnews-subscribe@egroups.com)

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return this portion with attached image  
Name:

Email :

Residence (town, state/country etc)

Picture/Image taken at

time

date

town/city/country

picture posted at your site/page url:

equipment used specifics:

comments (1 paragraph explaining unique nature of this photo/image.

Please note:

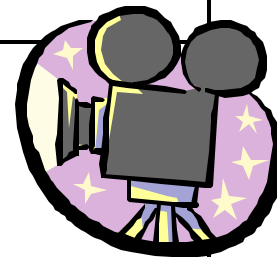
(1) Each person who submits image(s) retains the full copyright of the pictures /images.

(2) These pictures will not be shared with anyone else.

(3) Person submitting photo/image gives permission to Eric Flescher (KCStarguy@aol.com) to post his/her image on the site at <http://members.aol.com/kcstarguy/blacksun/eclipsepicsweek.htm> if his/her image is chosen when considering the criteria

(4) The pictures are selected when considering the criteria posted by Eric Flescher. He will judge and determine which are to be posted.

Date: \_\_\_\_\_ Name : \_\_\_\_\_

**Width of umbral shadow**

From : Hal Couzens <hal@dneg.com> To : <SOLARECLIPSES@AULA.COM> Date : Fri, 23 Nov 2001 12:23:00 +0000

Hi All, Does any one have a quick answer to what the average width of the umbra could be? And what its possible maximum is too? Much appreciated, Hal

**Delta T update**

From : Jean Meeus <JMeeus@compuserve.com> Subject : Delta T Date : Fri, 16 Nov 2001 06:49:54 -0500

Delta T, the difference between the uniform Dynamical Time and the Universal Time, was equal to 64.22 seconds on 2001 October 1. This value compares as follows with those of the preceding years :

|            |               |                     |
|------------|---------------|---------------------|
| 1997 Oct 1 | 62.79 seconds |                     |
| 1998 Oct 1 | 63.34 seconds | increase = 0.55 sec |
| 1999 Oct 1 | 63.71 seconds | increase = 0.37 sec |
| 2000 Oct 1 | 64.01 seconds | increase = 0.30 sec |
| 2001 Oct 1 | 64.22 seconds | increase = 0.21 sec |

## SETalk

**Cool Eclipse Facts**

From : "Carton, WHC" <Wil.Carton@corusgroup.com>  
 To : "solareclipses@aula.com" <solareclipses@aula.com>  
 Date : Mon, 5 Nov 2001 17:06:06 +0100

On 24 october I mailed: "Fotheringham found the solar and lunar accelerations were + 1.5 and + 10.8 arcseconds per century per century, respectively, when referred to mean solar time." And in a later mail of the same day: "I took the Fotheringham-value 1,6 msec/day\*century from a quote in my college dictate (Prof. G.B. van Albada, 1960-1961). The modern value, published by F.R. Stephenson in 1997 is 1,7 instead of 1,6. I do not understand its difference with Zirker's quoted value 1,5 arcseconds/cy \* cy... (Remember: one degree rotation = 4 minutes of time, so one arcminute = 4 seconds, so one arcsecond = 4/60 seconds."

Now I see the light (I think): The quote between parenthesis is related to the rotation of the Earth around its axis. But Zirker's value for the solar acceleration is related to the orbital motion of the Earth around the Sun. When this is measured with mean solar time (which prior to Spencer Jones 1939 had been thought to be uniform but in reality is slowing down, the sham effect is that it seemed that there is a small acceleration of the Earth's motion in its orbit around the sun = the small acceleration of the solar longitude. In fact Spencer Jones discovered that all the bodies of our solar system showed a similar acceleration, and that made awake his suspicion about the time measurements based on a clock defined by the Earth's rotation. Wil C.

**Islamic Mysterical Eclipses**

From : David Fideler <phanes@CRIS.COM> To HASTRO

I've been doing a lot of research into Sufism and Islamic and Persian mysticism recently.

What I'm wondering: are there any records of solar eclipses in Islamic or Persian literature before modern times where the eclipse was given any type of religious or mystical interpretation.

The goal of Sufism is fana -- annihilation of the ego in the divine -- and a total eclipse would symbolize this state quite well.

I haven't come across anything to this effect, but would be quite interested to learn about how total eclipses were interpreted in the Islamic world, from both scientific and mystical points of view. Thanks very much. David Fideler

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

Hi David, There is a detailed discussion on the astronomical aspects of eclipses in the article 'Kusuf' in the Encyclopaedia of Islam (vol. 5, pp. 535-537).

During a lunar or a solar eclipse Muslims are also enjoined to recite a special prayer that is known as the 'eclipse prayer' (salat al-kusuf); cf. the Encyclopaedia of Islam (vol. 8, p. 931).

You will find more on the eclipse prayer in the Sahih al-Bukhari and the Sahih Muslim, the two best known collections of the 'hadith' (the holy traditions) compiled by Abu 'Abdallah Muhammad ibn Isma'il ibn Ibrahim ibn al-Mughira al-Ju'fi al-Bukhari (810-870) and Abu 'l-Husain Muslim ibn al-Hajjaj al-Qushairi al-Nisaburi (817-875).

Both hadith collections are available on the internet at:

<http://www.usc.edu/dept/MSA/fundamentals/hadithsunnah/bukhari/>  
<http://www.usc.edu/dept/MSA/fundamentals/hadithsunnah/muslim/>

The relevant sections can be found by searching under 'eclipse' with the word search function.

More information on these and other traditional Islamic sources on the internet can be found on my Dutch web page <http://www.phys.uu.nl/~vgent/islam/islamsources.htm> Regards,

(Continued on page 9)



## SETalk

From : David Fideler <phanes@CRIS.COM>

Robert, Thanks a million for the references. I really appreciate it, and the hadith databases will be helpful for other topics I'm looking into as well.

I never thought that the Web would turn out to be a fabulous research tool, but was clearly wrong. I'd hate to give up books, but the kind of leads you can discover via discussion groups, Google, etc., is astonishing -- and, unfortunately, overwhelming! With best wishes, David Fideler

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

David Fideler wrote: I never thought that the Web would turn out to be a fabulous research tool, but was clearly wrong. I'd hate to give up books, but the kind of leads you can discover via discussion groups, Google, etc., is astonishing -- and, unfortunately, overwhelming!

Hi David, I would not start throwing out your collection of reference books yet. The internet is a useful research tool when it is used with a bit of common sense but it is not a substitute for a good library, at least, not yet. Best wishes,

From : Brian Whatcott <inet@INTELLISYS.NET>

At 12:12 AM 11/4/01 -0500, David Fideler wrote: I never thought that the Web would turn out to be a fabulous research tool, but was clearly wrong. I'd hate to give up books, but the kind of leads you can discover via discussion groups, Google, etc., is astonishing -- and, unfortunately, overwhelming! With best wishes, David Fideler

It will do no harm to mention that a ready means of greatly reducing the 100,000 search engine hits to a usable number is by the use of double quotation marks. Several keywords will trigger hits when found in any order. But a quoted phrase is selected in that form only. Islamic mystical versus "islamic mystical" produces the desired effect, for example.

From : Larry Ely <ldely@CROCKER.COM>

David, For your search regarding Islamic eclipses, I would point you to the work of Robert R. Newton. Newton did pioneering work on ephemeris time and delta-T using medieval and ancient data from cultures around the world. His work is very scientific and statistical, but he is not averse to being discursive so you may find some of the qualitative data you seek in his books, which are:

\*Ancient Astronomical Observations and the Accelerations of the Earth and Moon\*, Johns Hopkins U. Press, Baltimore,

1970.

\*Medieval Chronicles and the Rotation of the Earth\*, Johns Hopkins U. Press, Baltimore, 1972.

\*Ancient Planetary Observations and the Validity of Ephemeris Time\*, Johns Hopkins U. Press, Baltimore, 1976.

\*The Moon's Acceleration and Its Physical Origins\*, Vol. 1 (As Deduced from Solar Eclipses), Johns Hopkins U. Press, 1979.

\*The Moons's Acceleration and Its Physical Origins\*, Vol. 2 (As Deduced from General Lunar Observations), Johns Hopkins U. Press, Baltimore, 1984. Larry Ely

#### From the SEML Owner

Time to send a message again ... Quite a few people did send me a private mail in regard of a message with contaminated attachments. A few also tried to send a message about it to the entire SEML. These last messages have been removed from the SEML before they were sent to you all. We try to avoid messages about contaminations on the SEML. It causes continuous mails and discussions. Just send them to me and we are working hard on corrective actions. WE are working hard to be pro active. But ...

Please note that all messages are scanned on any virus or contaminations for 99.9%. No mail or message has been slipped through in this case. Though, the message you received was direct from the originator (not the SEML). Please check that message and you will notice that the contaminated message was sent by the sender and not the SEML.

The virus does send a random picked subject from his/her mail and send it to all addressees in his/her mailbox. That is the reason you see [SE] in the subject. Your address has been in his/her address book and you got the contaminated message. Please believe us, we are sure and check you that message!

It is not allowed to send attachments to the SEML. So please delete if you would receive anyway a message with an attachment. Our filter can not eliminate messages with attachment. Though virus messages or virus attachments can not pass through the server. The Server's main activity is scanning virus types, and we are pleased and proud the SEML is on this Server. We thank Jan Van Gestel to allow us being on his Server. Thank You !!!

If you still have remarks or questions, please feel free to send me a message. Do not reply on the entire SEML!!!

And ... keep those solar eclipse related messages coming...

## SETalk

**Saros cycles**

From : Bob Garfinkle <ragarf@EARTHLINK.NET> To : HASTRO-L@WVNVM.WVNET.EDU Date : Fri, 2 Nov 2001 20:03:58 -0800

November 2, 2001 Hi All, In the April 1956 issue of "Sky & Telescope" there is a review of the book "Periodicity and Variation of Solar (And Lunar) Eclipses" by George van den Bergh (1955). In the review, the reviewer mentions "A number of less-known cycles are discussed, such as the octon, tritos, inex, square year, and megalosaros, each containing an integral number of lunar synodic months, nearly commensurable with an integral number of draconic (nodical) half-months." The reviewer explains the inex, but does not do the same for the other cycles. I wonder if van den Bergh mentioned other eclipse cycles that the review did not include in the review.

I have been unable to locate a copy of van den Bergh's book locally or from an on-line bookseller, so if any one can define the other terms I have mentioned, I would certainly like to hear from you.

If any one knows of one a copy of this book for sale or has a copy of it and would like to offer it for sale, I would certainly be interested in obtaining a copy. Thank you.

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

Hi Bob, Even in the Netherlands Van den Bergh's books on eclipse cycles rarely turn up on the 2nd-hand book market but if I do see a copy I will let you know.

Some of the shorter eclipse cycles mentioned in the S & T review were already discussed in earlier articles in Popular Astronomy but many of the longer cycles were devised by Van den Bergh.

During the past few months I have been putting together a website listing all the eclipse cycles that I have been able to find in the astronomical literature with the relevant literature. You can find it at: <http://www.phys.uu.nl/~vgent/calendar/eclipsecycles.htm>

It is still far from complete and any suggestions for additions and improvement will be appreciated. Regards,

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

Hi Sepp, No, I have not done any research in that direction.

Perhaps some day in the future I will ferret out those periods as well. Regards,

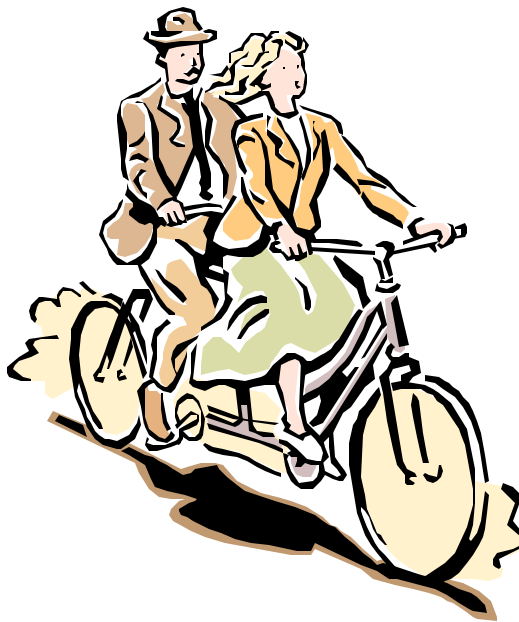
From : Herbert Prinz <hprinz@ATTGLOBAL.NET>

Hello Bob and Robert, I was about to give Bob the reference to Meeus, J., Mathematical Astronomy Morsels (Willmann-Bell Inc., Richmond, 1997),

when I saw that the subject of eclipse cycles is treated more exhaustively on Robert's homepage. In addition to the many references there (including chapters 9 & 16 of the above), I would also like to draw your attention to chapter 18, p.110 of same book, where an explanation of the "half-saros" can be found. It appears that the half-saros was first identified by Paul Ahnert, in his "Kalender fuer Sternfreunde", 1965. I should be pleased if this hint helps to eliminate the three corresponding question marks in Robert's table. Best regards

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

Dear Herbert Prinz, Thanks for the information on the Half Saros. I will add this to my webpage tomorrow. Best wishes,



## SETalk

### Solar Eclipse Team from Iran

From Babak A. Tafreshi, editor at Nojum (Iran Magazine for Astronomy)

Dear Patrick Poitevin, Thank you for your e-mail. I heard about your newsletter from friend of mine ,Mike Simmons (Mt Wilson Observatory Association) . I have observed three totality ,one in 1995 when I observe very totality at sunrise for 16 seconds in eastern border of Iran with Afghanistan (more peaceful place than today !) For The second we invited Mike and Sherri Simmons and few other eclipse chasers .we observed less than 2 minutes totality in city of Nahavand .That was very interesting point ,you have been in Iran on that time. Where did you observe the eclipse and which centre or astronomy club , have hosted you in Iran ? The third was less than 4 minutes totality in north west parts of Kafue national park ,Zambia. I co-operated in making a Film with Gernot Meiser and Pascale Demi who travelled from Germany by their own car .their report is in German available at [www.african-odyssee.de](http://www.african-odyssee.de)

I also made a documentary film of this eclipse for Iranian TV to earn the travel cost. Nojum Magazine which I'm the editor at it, is the only magazine for astronomy in middle east. It has been publishing for ten years (in black & white).Nojum is also the centre for organising amateur astronomy activities in Iran . you can check about the magazine ,and astronomy activities in Iran in our website [www.nojum.net](http://www.nojum.net) . Also In April 2001 issue of Sky & Telescope Magazine An article about our activities appeared (Amid the treasures of Persia ) .the article at Pdf format and also Mike's report on Eclipse In Iran is available at Mike Simmons home page : <http://webpages.charter.net/msimm/> Best Regards, Babak A.Tafreshi Editor at Nojum (Iranian Magazine for Astronomy).

Pictures:

1. My Talk and Slide show At RTMC 2001 about Astronomy In Iran .
2. Our Group in Kafue National park , after June 21 totality .
3. Some of our magazine staff holding our eclipse glasses and special, Solar eclipse issue ,few days before 99 solar eclipse .



SETalk



## SETalk

**Kepler**

From : "J.P. van de Giessen \(\fol\)" <janpieter@giessen.fol.nl> To : <SOLARECLIPSES@AULA.COM> Date : Sun, 4 Nov 2001 19:43:00 +0100

Hi all, I found in my archive the following part of a letter from Kepler: "Während ich mit der Bedienung meines Apparates beschäftigt war, den ich auf einer Bühne unter freiem Himmel aufgestellt hatte, ergriff ein anderer die Gelegenheit zu einer anderen Verfinsternung: nicht eine der Sonne, sondern meines Geldbeutels, dem er 30 Gulden entnahm. Beim Herkules, welch eine kostspielige Finsternis!"

In English: Kepler was observing a solar eclipse and someone "eclipsed"/stole his pocket with 30 Guildens.

Has anyone of you some more information about this letter and in which year this happens?

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de>

Hello, According to Kippenhahn/Knapp "Schwarze Sonne, Roter Mond" Kepler wrote that letter on September 9, 1600 to his old teacher Michael Maestlin in Tuebingen. The eclipse in question took place on July 10 the same year. It was total in the Southern Mediterranean Sea; Kepler observed a 60% partial in Graz, Austria. He used a camera obscura, mounted rotatable in two axles, for the observation; it is said that it was the first occasion where tracking was used in astronomy. I hope this helps. Marc

From : Assoc Prof J R Huddle <huddle@usna.edu>

I've appended my translation of Kepler's comment at the end. Jim Huddle

My German is not as good as it was when I studied it in college many years ago, but I got the sense that Kepler was making an eclipse joke, so I pulled out my German-English Science Dictionary. Here's my translation:

"While I was concentrating on my instruments, which I had set up on a platform under the open sky, another guy siezed the opportunity of another obscuration: Not an obscuration of the Sun, but of my coin purse, out of which he took 30 Guilders. By Hercules, what an expensive eclipse!"

This raises the questions: How much was 30 Guilders worth, back in 1600, and what was Kepler doing with guilders if he was in Austria? I thought they used "Schillings". And is Kepler's pun the first recorded eclipse joke? Jim Huddle

From : FRED ESPENAK <u32fe@lepvox.gsfc.nasa.gov>

Does anyone have any additional information about Kepler and his observations of the eclipse of 1600? I'd especially be interested in any references in the literature or books, and translated into English if possible. Thanks, Fred Espenak

From : "McCann, Stephen" <stephen.mccann@roke.co.uk>

Fred, If you use the keywords ☿ sonnenfinsternis kepler 1600 in google (<http://www.google.com>)

many references in German appear and google gives the ability to translate each one into English.

Hope it may help in some way. Cheers, Stephen

From : "Webmaster" <janpieter@giessen.fol.nl>

Jim and others, After some searching here some fact about guildens in that time. B.t.w. Guilden is derived from 'gold' \*) From Luther: Afterward his father, as a miner, acquired some property, and left at his death 1250 guilders; a guilder being worth at that time about sixteen marks, or four dollars. (<http://www.bible.org/docs/history/schaff/vol7/schaff88.htm>)

\*) In 1638, the city of Amsterdam determined that its silver currency should have slightly less than 10 grams of pure silver, a standard that remained unchanged until the 1930s. (<http://www.cba.uiuc.edu/l-neal/Econ238Fa01/howital.htm>) \*)Exchange rate project (<http://www.few.eur.nl/few/people/cdevries/project.htm>) gives much information.

Further, thank you all for the information about this subject.

From : "76630,2206" <76630.2206@compuserve.com>

Ten grams of pure silver today would be USD 1.40.

Were the 1250 gulden gold or silver? Monetary units historically were units of mass, not nationalistic nicknames. If 1250 gulden were silver, then that would be 420 silver dollars or USD 1770 melt or about 9,000 in purchasing power. If gold, that would be 138 ounces of gold in florins or abot USD 57,000 in purchasing power. -Robert B Slobins

From : "J.P. van de Giessen" <janpieter@giessen.fol.nl>

Fred and all, Some time ago we discussed about the solar

(Continued on page 14)

## SETalk

(Continued from page 13)

eclipse and Kepler. I found in the following book some information about his observations: Max Caspar, "Kepler, 1571-1630", Collier Books, New York, 1962 p. 155, 116.



First about how much 30 guldens was in that time: Kepler earns 200 guldens salary per year in 1599. But the loss of 30 guldens was much more, on 27 July 1600, the archduke of Graz published a decree: Anyone who was not Catholic, or did not pledge himself to become Catholic was banished and obliged to quit the country in a short period of time after payment of 10% of his assets. Kepler refused to become Catholic and had to leave the country within 6 weeks besides that he was worrying about a half-year's salary which was finally paid on 30 August.

Second about the eclipse: "... He made the solar eclipse of the impending July 10 the occasion for this composition. In addition to the calculation of this eclipse, the essay contains longer arguments about the theory of the moon's motion in which he discloses significant new ideas. He had not yet been able to see Brahe's material about the moon but had heard orally his methods and bases for computation of eclipses. It had become clear to him that he had to follow a different path regarding lunar theory. Brahe stubbornly insisted that the motions of the planets and the moon ought to be represented only by uniform circular motions resting one on another. Therefore he had introduced ever new epicycles in his theory of the moon, the motion of which exhibited especially striking and complicated inequalities. Previously, in Bohemia, against Brahe's violent contradiction, Kepler had opposed this theory because it seemed to him that 'simplicity is more in agreement with nature.' Consequently, he accepted a non-uniform motion of the moon in its orbit. Here he was guided by an entirely new and highly significant physical foundation for the phenomena of motion. 'There is a force in the earth which causes the moon to move.' (In Terra inest virtus, quae Lunam ciet.) However, this force becomes weaker, the further the moon withdraws from the earth; it will therefore move slower at a greater distance. No such theory had been heard before. We shall soon see how Kepler was led to his great discoveries by such conceptions. Besides this new theory, his essay also refers to the new method by which he wanted to arrange the observations of the eclipse. It rests on the principle of the image through small apertures. Although this procedure for observing was not new, up to then it had been applied only in very rough form. Now, however, Kepler had conceived and constructed an apparatus, with the help of which he could obtain exact numerical values of the progress and size of an eclipse. He hoped, thus furnished with the observation of the eclipse at

hand, 'to remedy any imperfections in Brahe's lunar theory and to be able to test his allegedly certain conclusions by the all-revealing experience.' Assuredly, the success which Kepler promised himself from the dedication of this essay failed to materialize. Ferdinand appears to have accepted it graciously and to have rewarded it with a gift. But there the matter rested. Lunar theory and eclipses were not at that time of overwhelming importance to the archduke. But Kepler could not forget his precarious position in his happiness at the heavenly spectacles. He erected his new instrument in the market place in Graz and with it, on July 10, observed the eclipse which he had previously calculated. In the days that followed, he energetically worked at evaluating his observations. Suddenly, on July 22, he clearly saw the optical reasons explaining the apparent diminution of the lunar disc at the time of solar eclipses. He found the laws which are valid with the pictures of small opening and thus overcame one difficulty which had caused Brahe much trouble. He intended to assemble his results as soon as possible for printing."

#### Behaviour of orb-weaving spiders during a solar eclipse

From : "J.P. van de Giessen" <janpieter@giessen.fol.nl>  
To : <SOLARECLIPSES@AULA.COM> Subject : [SE]  
Behavior of orb-weaving spiders during a solar eclipse  
Date : Sat, 17 Nov 2001 12:31:04 +0100

I found an abstract of the following book: Uetz, G.W., C.S. Hieber, E.M. Jakob, R. S. Wilcox, D. Kroeger, A. McCrate, and A. Mстром. 1994. Behavior of orb-weaving spiders during a solar eclipse. *Ethology*, 96: 24-32.

~ The behavior of colonial orb-weaving spiders (*Metepeira incrassata*) in tropical Veracruz, Mexico was studied during the total solar eclipse on July 11, 1991. Spiders behaved in a manner typical of daily activity until totality, when many began taking down webs. After solar reappearance, most spiders that had begun taking down webs rebuilt them. There was no significant difference in the overall activity patterns of spiders during totality across a range of colony sizes. Experimental illumination of part of a colony during totality altered web takedown behavior. While spiders in the darkness of totality began taking down webs, those spiders which were artificially illuminated did not. These observations suggest that the primary environmental cue responsible for the daily rhythm of web building in this species is light level.



## SETalk

### Delta T

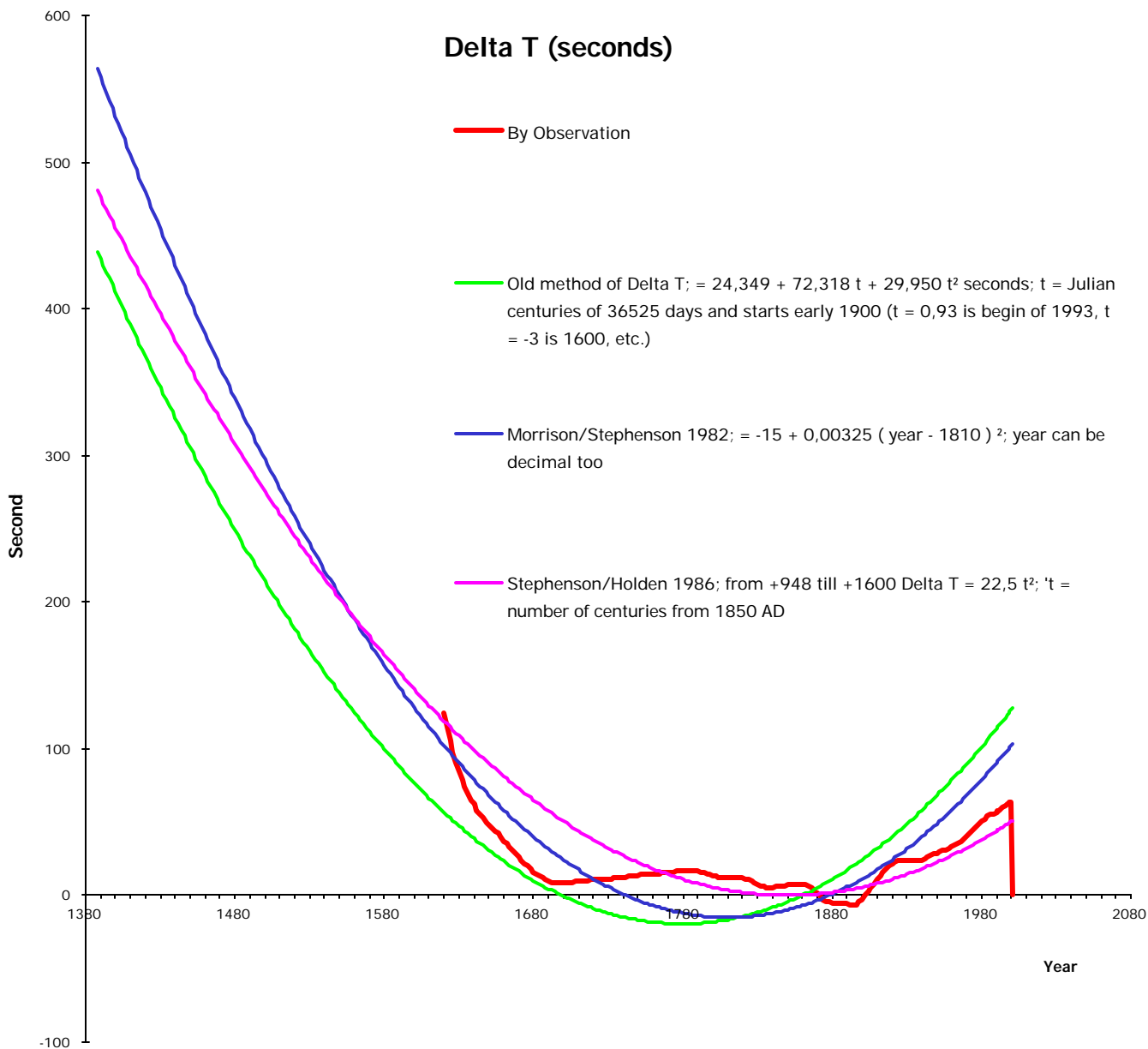
By PP

"By Observation"

"Old method of Delta T; =  $24,349 + 72,318 t + 29,950 t^2$  seconds; t = Julian centuries of 36525 days and starts early 1900 (t = 0,93 is begin of 1993, t = -3 is 1600, etc.)"

"Morrison/Stephenson 1982; =  $-15 + 0,00325 ( year - 1810 )^2$ ; year can be decimal too"

"Stephenson/Holden 1986; from +948 till +1600 Delta T =  $22,5 t^2$ ; 't = number of centuries from 1850 AD"



## SETalk

**Blue Moons**

From : Bob Garfinkle <ragarf@EARTHLINK.NET>  
 To : HASTRO-L@WVNVM.WVNET.EDU Date :  
 Wed, 31 Oct 2001 17:57:07 -0800

October 31, 2001 Hello to all. I am in the process of writing a major lunar observers' handbook and I have a section on Blue Moons in the first chapter. I am cutting into this message my write-up. It is a little long, but then again you asked for an explanation. Hope this clarifies the issue, again. Robert A. Garfinkle, F.R.A.S. 32924 Monrovia Street Union City, CA 94587 USA E-mail: ragarf@earthlink.net

1.3 Blue Moons—A Tale of Modern Lunar Folklore  
 namespace prefix = o ns = "urn:schemas-microsoft-com:office:office" /> When we hear the term "folklore" we usually associate it with old traditional customs, proverbs, or other unsupported notions. The term "Blue Moon" is an odd kind of lunar folklore, because its true origins and several of its multiple meanings are obscure, while several of its meanings are actually modern (but thought by the general public to be antique). Apparently, as many as eight general meanings have evolved over the last four to five centuries since the expression's apparent coinage.

The oldest meaning of the term "blue moon" probably came to life in England about the time of William Shakespeare (1564 1616). The phrase "once in a Blue Moon" appears to have meant that something was absolutely absurd, because having the Moon actually turn blue was considered to be an absurdity. From the time of the Elizabethans, this meaning seems to have evolved into the definition that something would never occur. The usual example given in the literature is something along the lines that "I will marry you when the Moon turns blue," indicating that the marriage will never happen.

In its most common usage today, the phrase "once in a blue moon" tends to mean that some rare event may occur, but only on a very infrequent basis. The origins of this meaning appear at this time to be lost, but it may have come into usage in the mid-eighteenth century. In the field of music, the use of the term "blue moon" in lyrics or song titles is usually associated with sadness or loneliness.

Another nonastronomical usage of the term comes from the world of alcoholic beverages. The Mr. Boston Official Bartender's Guide lists a drink called "the Blue Moon Cocktail." This drink consists of 1½

ounces of gin and ¾ ounce of Blue Curaçao liqueur, stirred with ice, and strained into a cocktail glass. A twist of lemon peel is added.[1]

The use of the term in astronomical usage seems to have its popular debut in an obscure regional publication, The Maine Farmers' Almanac for the Year of Our Lord 1937. At this time, it appears that this is the source for the designating the thirteenth Full Moon in a calendar year as a blue moon. Without giving its sources, this almanac tells that the monks "who had charge of the calendar," ran into a problem in naming the thirteenth Full Moon, when one occurred in a year. The monks had given the Full Moons names associated with the seasons, such as Yule Moon, Lenten Moon, or Harvest Moon. They had an additional problem, because this thirteenth Full Moon caused more than three Full Moons in a single season. All of this "upset the regular arrangement of church festivals. For this reason thirteen became an unlucky number." Because the extra Full Moon could occur in any season, it was impossible for the monks to provide a seasonal name; therefore, "It was usually called a Blue Moon." The almanac also states that "In olden times the almanac makers had much difficulty calculating the occurrence of the Blue Moon. This uncertainty gave rise to the expression "Once in a Blue Moon"." [2]

Based on the almanac's rules, the third Full Moon would be called a blue moon when there is a fourth Full Moon in that season. This rule keeps intact the proper name for the Full Moon that occurs just before a Christian festival. A problem for the Church developed because the Earth does not orbit the Sun in a perfect circle. The Earth's elliptical orbit makes the Sun appear to progress along the ecliptic at a variable rate during the year, thereby creating seasons of varying length. To solve this problem, the Roman Church in 1582, under the direction of Pope Gregory XIII (orig. Ugo Buoncompagni [1502 85]; Pope 1572 85]), established the ecclesiastical vernal equinox and fixed its date at March 21. This was accomplished as part of the calendar reforms worked out by German Jesuit, Christopher Klau Clavius (1537 1612). The reform disregarded the fact that the true Sun may or may not actually be at the ecclesiastical spring equinox point (0° ecliptic longitude) on March 21. This creates a fictitious Sun, which moves along the ecliptic at a constant rate and divides the year into four equal-length seasons. Ash Wednesday is 46 days before Easter and comes before the Lenten Moon, the last Full Moon of winter. The first Full Moon after the vernal equinox is the Easter Moon, which must occur in the week before Easter Sunday. Based on this rule, Easter can be as early as March 22 or as late as April 25. The Maine Farmer's Almanac based its calendar on the tropical year, which runs from one winter solstice to the next.

The newest astronomical usage of the term "blue moon" is that it designates the second Full Moon in a single calendar month. This definition seems to have sprung to life in an article by ama-



## SETalk

teur astronomer James Hugh Pruett (1886-1955) in the March 1946 issue of *Sky & Telescope* magazine. Pruett appears to have misinterpreted the definition of a blue moon given in the 1937 *Maine Farmer's Almanac*, when he wrote that "Seven times in 19 years there were—and still are—13 full moons in a year. This gives 11 months with one full moon each and one with two. This second month, so I [Pruett] interpret it was called Blue Moon." With all of the months (except February) longer than the Moon's synodic month, all of the 30- and 31-day-long months must have at least one Full Moon. During the 19-year long Metonic cycle, there are usually seven times when a month can have two Full Moons. In both the nineteenth and twentieth centuries, there were 4 years in which February went without a Full Moon (1809, 1847, 1866, 1885, 1915, 1934, 1961, and 1999). Even rarer were the years (1809, 1847, 1866, 1885, 1915, 1961, and 1999) in which there were two months with two Full Moons.[3] The twenty-first century will not have a Full moon in February in 2018, 2037, 2067, and 2094. I have coined the expression "Twin Blue Moon" to define the Blue Moons when they occur in January and March of a single year, such as in 1809, 1847, 1866, 1885, 1915, 1999, and 2018.[4] The Blue Moons of 1961 were in January and April. Based on the longitude of the observer, the calendar day when a particular Full Moon occurs can vary around the world. For some observers, the Full Moon will be on the last day of the month, and for others it will already be the first day of the next month at the moment of Full Moon (when the Moon is 180° ecliptic longitude from the Sun). The moment of Full Moon (along with all of the other phases) is calculated according to the time of its occurrence in Universal Time (UT) at the prime meridian at the Greenwich Old Royal Observatory in Greenwich, England. [Universal Time used to be called Greenwich Mean Time (GMT)]. More information on time, the Metonic cycle, and the moment of New Moon is covered in the next chapter. Although a second Full Moon in a calendar month is actually a cosmological nonevent, enjoy it nonetheless.

The Moon can actually appear blue when atmospheric conditions are right. This involves massive amounts of smoke or dust particles high in the atmosphere, scattering the red rays of the incoming light and leaving only light at the blue end of the spectrum visible. Sightings of blue-tinted moons occurred during the two years after the volcanic explosion in 1883 that obliterated the Indonesian volcano Krakatau. The high-altitude dust from this explosion turned sunsets green, and occasionally both the Sun and the Moon were reported to have appeared blue. In 1951, the smoke from massive forest fires in Alberta, Canada reached high into the atmosphere. People as far away as Europe saw a blue Moon when it was behind the smoke particles. In the spring of 1991, the Mount Pinatubo volcano in the Philippines erupted, spewing a massive amount of dust and ash into the high atmosphere. For over a year, the ash cloud encircled the Earth, and we witnessed glorious violet sunrises and sunsets. I remember noticing a slight bluish tint to the Moon during that time. This was made possible by the dust particles scattering the red-to-yellow portion of the incoming Moon-reflected sunlight. The Moon took on this bluish cast, especially when it was low on the horizon. Watch for this next time there is a major volcanic eruption. Depending on the amount of air pollution in your area, the Moon can appear reddish to yellowish when rising.

[1] Elin McCoy and John Frederick Walker, *Mr Boston Official Bartender's Guide* (New York: Warner Book, Inc., 1984), 55.

[2] Daniel Robinson, *The Maine Farmers' Almanac for the Year of Our Lord 1937* (Augusta, ME: Charles E. Nash & Son, 1937).

[3] A fourth twin Blue Moon year in the twentieth century was missed when a Blue Moon occurred in December 1933 and March 1934, interspersed by a single Full Moon in January 1934, and no Full Moon in February. It was an unusual occurrence of 2 Blue Moons in a 12 month period.

[4] Robert A. Garfinkle, "SkyTalk, March 1999," *Mercury* (January/February 1999), C-4.

Original Message----- From: History of Astronomy Discussion Group [mailto:HASTRO-L@WVNVM.WVNET.EDU] On Behalf Of Len Berggren Sent: Wednesday, October 31, 2001 9:53 To: HASTRO-L@WVNVM.WVNET.EDU Subject: Blue Moons

Can anyone tell those of us who are enjoying the sight of two full moons in October why a 'Blue Moon' is so called?

Thanks, Len Berggren

Prof. J. L. Berggren Department of Mathematics Simon Fraser University 8888 University Drive, Burnaby, B.C. Canada V5A 1S6 Phones: 604-291-3335 (Office); 604-291-4947 (Fax) 604-936-2268 (Home)



## SETalk

## LOOKING BELOW A SUNSPOT'S SURFACE

From : "John Wagoner" <stargate@astromax.com> To : <skyline@astromax.com> Subject : [skyline] S&T's News Bulletin for November 9, 2001 Date : Sat, 10 Nov 2001 00:05:07 -0700

SKY & TELESCOPE'S NEWS BULLETIN - NOVEMBER 9, 2001

## LOOKING BELOW A SUNSPOT'S SURFACE

Using the Solar and Heliospheric Observatory (SOHO), astronomers have made the first three-dimensional map of the material circulating in and under a sunspot. From their observations, they conclude that sunspots are cool, self-perpetuating, shallow blotches that draw in surrounding material to remain stable, while diverting heat from below out to the sides.

Since Galileo and others discovered them in 1611, sunspots have been mysterious oddities. The dark, cool spots are regions of intense magnetic field that hold solar gas in their grips, cutting it off from convection (boiling) that would normally carry heat to the surface. The gas thus cools and darkens.

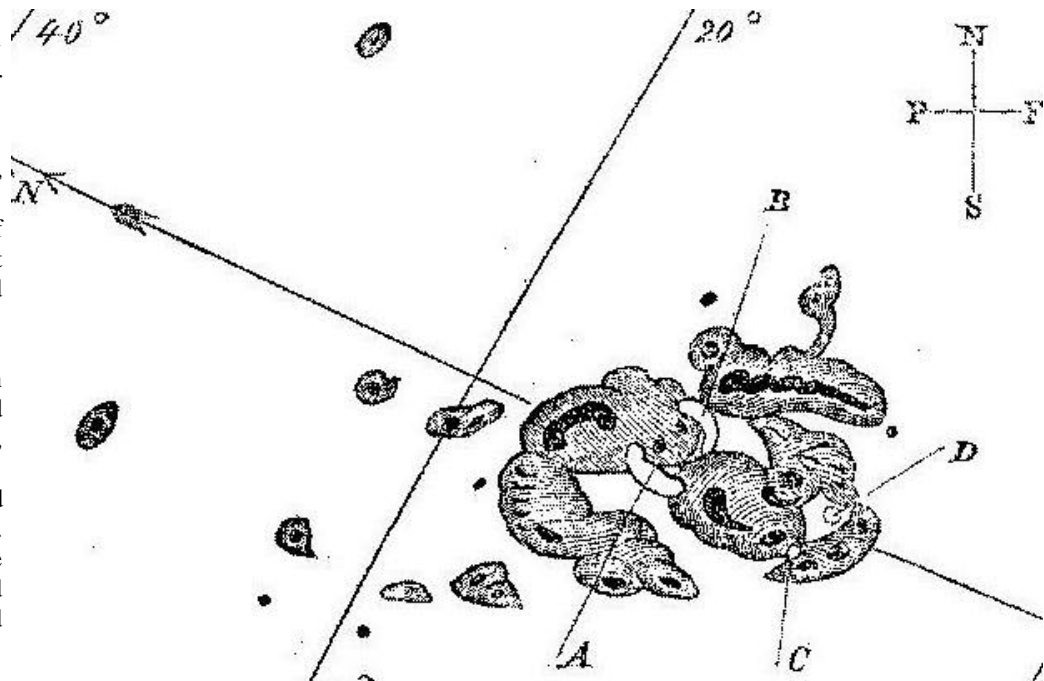
But sunspots shouldn't be stable, and most certainly shouldn't survive for weeks at a time. Parallel magnetic field lines, just like refrigerator magnets, naturally repel each other. Thus the collection of field lines in a sunspot should spread apart and dissolve quickly.

Using the Michelson Doppler Imager aboard SOHO, Junwei Zhao, Alexander G. Kosovichev (Stanford University), and Thomas L. Duvall, Jr. (NASA/Goddard Space Flight Center) measured the speed of sound around and under a sunspot in 1998. Sound waves travel

faster through hot gas than through cooler gas. The team also mapped the complex bulk motions around the spot. The temperatures and gas motions showed that solar blemishes act like drains, drawing in surrounding material at 4,000 kilometers per hour and driving in below the Sun's surface; as the gas cools, it becomes denser and sinks. Field lines that would normally dissipate are held together by the force of the inflowing material.

Meanwhile, convection continues from below. However, the hot, deep internal gas cannot rise and break through the cool, magnetic region. According to Kosovichev, it collects underneath, compresses the spot from below, and spreads around the outside to the surface. The spot studied in 1998 only had a depth of about 4,000 km, less than one percent of the solar radius.

Gas flow from underneath sunspots also helps explain the seemingly paradoxical fact that the Sun is slightly warmer and brighter covered with pox. Despite the cool blemishes, the heat still gets out efficiently.



## SETalk

**Saros 142**

From : Sheridan Williams <sheridan@clock-tower.com>  
 To : SOLARECLIPSES@AULA.COM Subject : [SE] Saros 142  
 Date : Wed, 14 Nov 2001 23:50:12 +0000

The Dec 2002 TSE is a member of Saros 142. It may interest British, Dutch, German and Polish members of this group that 21 further eclipses in this Saros on 22 July 2381 it produces Britain's second longest total eclipse (5m 9s) in 3,000 years.

Using delta T of 17 minutes (the default) makes it just miss Amsterdam, but Bremen gets 5m21s totality, Krakow gets 5m30s totality.

However, having been studying Jean Meeus' delta T figures it is more likely to be delta T of 4 minutes, which gives Amsterdam 4m 24s of totality but reduces Bremen to 4m 15s of totality. In this case Leipzig gets 5m 28s.

May be Jean could tell me what is a more likely value for delta T in 2381. Sheridan Williams

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com>

And what if you tried the delta T formula Richard Stephenson is using in his book of 1997?

From : Jean Meeus <JMeeus@compuserve.com>

Of course, nobody can predict what will be the value of Delta T in the year 2381, but the value of 4 minutes suggested by Sheridan Williams seems much too small.

It is true that Delta T is now increasing by only 1/4 second per year, but certainly this is only a temporary situation. Remember that Delta T did almost not vary from 1928 to 1940, while from 1970 to 1980 it increased by 1 second per year.

Because, generally speaking, the value of Delta T should increase more and more rapidly towards the future (as the square of the time elapsed since 1900), I expect that soon Delta T will begin to increase more rapidly. Normally speaking, the value of 4 minutes should be reached by about A.D. 2100. Jean Meeus

From : Sheridan Williams <sheridan@clock-tower.com>

I did try the formula in Stephenson's book. All sensible values of delta T give it passing through the countries I mentioned and also of it being long duration. Sheridan

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com>

With the different formulas, I got following Delta T values

1. For the eclipse of 2 September 2817

| Year    | (2)    | (3)    | (1)    |
|---------|--------|--------|--------|
| 2817.76 | 3285.6 | 2107.2 | 3210.7 |

2. For the eclipse of 22 July 2381

| Year    | (2)    | (3)   | (1)    |
|---------|--------|-------|--------|
| 2381.64 | 1047.0 | 635.9 | 1067.4 |

Formulas being:

1 = "Old method of Delta T; = 24,349 + 72,318 t + 29,950 t<sup>2</sup> seconds; t = Julian centuries of 36525 days and starts early 1900 (t = 0,93 is begin of 1993, t = -3 is 1600, etc.)"

2 = "Morrison/Stephenson 1982; = -15 + 0,00325 ( year - 1810 )<sup>2</sup>; year can be decimal too"

3 = "Stephenson/Holden 1986; from +948 till +1600 Delta T = 22,5 t<sup>2</sup>; 't = number of centuries from 1850 AD"

From : "Carton, WHC" <Wil.Carton@corusgroup.com>

Dear Patrick, I fear that your Delta-T information below, isolated from its relationship with the lunar acceleration in longitude n-dot (that you didnot mention), can be applied wrongly.

The "old" formula (1) belongs to a n-dot value of -22,44 arcsec/cy \* cy, that appears in the formula of the Lunar longitude as coefficient -11,22 in the term of T-square. The formula (3) belongs to a n-dot value of -26,0 arcsec/cy \* cy, that appears in the formula of the Lunar longitude as coefficient -13,0 in the term of T-square. About formula (2) I do not remember what the corresponding n-dot value is.

Consequence: You must know, using certain Besselian Elements for eclipse computations, before you calculate hapazardly Delta-T values with those formulae, WHICH lunar acceleration coefficient had been used for those Besselian Elements. Or you must on beforehand compute the lunar position entirely with algorithms of which you know the coefficients, and next derive your own Besselian Elements. Jean Meeus and F.R. Stephenson are the experts in these subject. Wil Carton



## SETalk

**Venus project**

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de> To : Finsternisliste <solareclipses@aula.com>  
Subject : [SE] VenusProject Date : Wed, 14 Nov 2001 19:53:13 +0100

Dear eclipse chasers, if you consider observing the 2004 transit of Venus (well, who doesn't?), please take a look at the following site: <http://www.uni-koblenz.de/~backhaus/VenusProject.htm> .

A few words about the background: Transits of Venus are very rare events. Past transits have been used to determine the astronomical unit. That required large-scale expeditions demanding great personal sacrifice. These efforts have become science history.

Today there are astronomy amateurs distributed all over the world. They can often access quite powerful equipment (compared, at least, to the equipment of those days) and can easily communicate via the internet. The VenusProject wants to use this potential to gather and evaluate observations from many parts of the world in order to reproduce the determination of the AU. Unfortunately, until now observers are concentrated around 15° Eastern longitude.

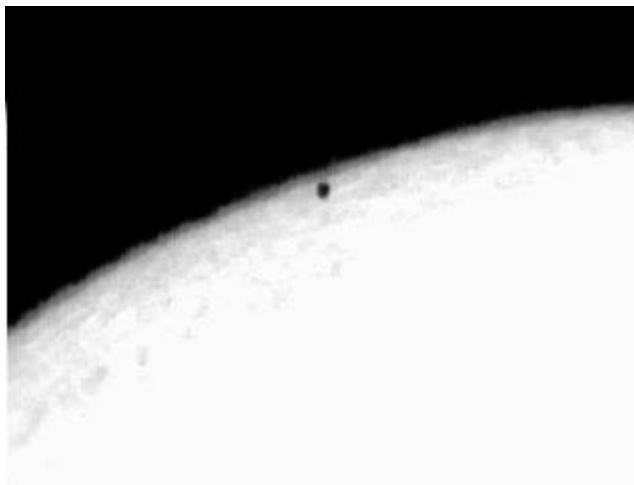
So, if you're going to observe the event, perhaps even from a different location, or if you want to contribute to the fields of theory, evaluation or photography, you'd surely be welcome. Best regards, Marc

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de>

Dear eclipse chasers, some supplement to my own posting about the VenusProject: The VenusProject is not an idea of mine but was initiated by Prof. Udo Backhaus at the University of Koblenz. He has recently changed to the University of Essen, so now the URL of the project is <http://didaktik.physik.uni-essen.de/~backhaus/VenusProject.htm> and via [udo.backhaus@uni-essen.de](mailto:udo.backhaus@uni-essen.de) you can reach him by email. Best regards Marc

**Picture**

Transit Mercury by Barbara Becker



Mon Nov 15 21:55:05 GMT 1999

**Genesis science begins**

From : "John Wagoner" <stargate@astromax.com> To : <skyline@astromax.com> Subject : [skyline] S&T's News Bulletin for November 23, 2001 Date : Sat, 24 Nov 2001 16:47:24 -0700

**GENESIS SCIENCE BEGINS**

On November 16th the Genesis spacecraft reached its destination -- Earth's L1 Lagrangian point, 1.5 million kilometers (930,000 miles) away -- and has begun to collect material from the solar wind. From its new home, Genesis will cast a "net" of ultrapure silicon and sapphire wafers in the hopes to capture and return to Earth between 10 to 20 micrograms of coronal material.

However, the mission may be in jeopardy due to a malfunctioning thermal radiator on the sample-return capsule. Engineers at the Jet Propulsion Laboratory believe that a contaminant in the radiator's white paint has degraded after constant exposure to ultraviolet sunlight and, as a result, ruined the radiator's ability to dissipate heat. Consequently, the battery needed to operate the return capsule in the critical final hour of the mission is overheating well beyond its design limit. The beleaguered battery should survive this ordeal, but no one will know for sure until the parachute deploys during Genesis' 10.5-km-per-second reentry above the Utah desert in September 2004. Meanwhile, the capsule's lid, having opened to allow the collector panels to deploy, is currently being kept almost closed to shade the battery as best as possible.

## SETalk

**Solar eclipse path maps**

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL> To : HASTRO-L@WVNVM.WVNET.EDU Date : Wed, 28 Nov 2001 19:09:53 +0100

Hi, Edmond Halley's map of the path of the solar eclipse of 22 April 1715 (and 11 May 1724) across Southern England is often claimed to be the earliest of this type.

However, an earlier example of such a map, depicting the path of the solar eclipse of 12 May 1706 across Europe and Northern Asia, is found as an inset to the "SYSTEMA SOLARE ET PLANETARIUM ex hypothesi Copernicana secundum elegantissimas Illustrissimi quondam Hugenii deductiones novissime collectum & exhibitum", drawn by Johann Gabriel Doppelmayr and published in 1707 in the "Neuer Atlas" of Johann Baptista Homann.

It was reprinted in Homann's "Atlas von hundert Charten" (1712), his "Grossen Atlas" (1716) and in Doppelmayr's "Atlas Coelestis" (1742).

The web page <http://www.phys.uu.nl/~vgent/doppelmayr/doppelmayr.htm> provides Links to websites showing this map. Does anyone know of earlier maps of this type depicting the path of a solar eclipse? Regards,

From : Herbert Prinz <hprinz@ATTGLOBAL.NET>

Hi Robert, There is some evidence that Dom. Cassini had the idea in 1664, but the proof may be hard to find.

O. Neugebauer, "A History of Ancient Mathematical Astronomy", Part Three, VI B 6. Eclipses, p.1093 remarks: "The idea of investigating the total path of a solar eclipse [...] is of modern origin - probably developed in the time of J. Cassini under the influence of the great theoretical interest of the Venus transits of 1761 and 1769. " He does not share with the reader the evidence that would support his supposition. He then has this rather puzzling footnote (n2, p1093): "According to Lalande (Astron. II, p. 358, No.1799; Bibl., p. 256, 1644) Dom. Cassini constructed in 1664 for the first time the path of a solar eclipse (visible in Ferrara) on a terrestrial map. But there was no total solar eclipse in 1664 and no publication of Cassini with the title quoted by Lalande seems to be known."

However, according to F. Espenac, <http://sunearth.gsfc.nasa.gov/eclipse/SEsaros/SEsaros149.html>, there was a partial eclipse visible in the northern hemisphere on 1664 Aug 21.

I don't have Lalande's *Astronomie* handy, so I cannot now check the first reference. As for the second one, "Bibl. p. 256, 1644" is obviously a typographical error in Neugebauer for "1664". Under this year, we find in La Lande's "Bibliographie astronomique", on p. 256:

"Ferrarae, in -fol. Jo. Domenici Cassini Osservatione del eclisse solare fatta in Ferrara l'anno 1664, con una figura intagliata in rame, che rapresenta uno nuovo metodo di trovar l'apparenze varie che fa nel medesimo tempo in tutta la terra. Weidler, p. 527. = Astron. art. 1808." ('Weidler' would be a reference to Jo. Friderici Weidleri *Bibliographia astronomia*, Wittenbergae, 1755, a supplement to his *Histoire de l'astronomie* from 1741. La Lande, in his preface, warns us thus about Weidler: "Il s'est trompé sur plusieurs dates".)

Note that there is no mention of totality in the above, which would somewhat neutralize Neugebauer's scepticism. We learn from this description that there was some kind of a drawing engraved in copper that would show the phases of the eclipse "at the same time" (i.e. at a given time?) all over the world. But, without seeing it, we can't be sure whether the diagram was overlaid on a map. It could have just shown diagrammatically some relation(s) between phases, time, latitude and longitude. Regards Herbert Prinz

(Continued on page 22)

## SETalk

From : "R.H. van Gent" <r.h.vangent@PHYS.UU.NL>

Hi Herbert, Thanks for the reference to Neugebauer and Cassini. This certainly may be an earlier candidate for a pre-1706 solar eclipse path map.

> O. Neugebauer, "A History of Ancient Mathematical Astronomy", Part Three, VI .../...

According to the maps in Oppolzer, there was a very prominent solar eclipse visible from Ferrara on 30 March 1661 and the path of totality went over North Africa, the Eastern Mediterranean Sea and the Black Sea before it ended in Central Asia. Perhaps the year "1661" somehow got corrupted into "1664".

> I don't have Lalande's Astronomie handy, so I cannot now check the first .../...

I can easily check Lalande's Astronomie tomorrow in the observatory library.

> "Ferrarae, in-fol. Jo. Domenici Cassini Osservatione del eclisse solare .../...

[snip]

I will do some checking tomorrow on the Cassini publication and also look in the Huygens correspondence (he knew Cassini and may have been familiar with Cassini's publication). Regards,

From : Herbert Prinz <hprinz@ATTGLOBAL.NET>

Correction: Just in case anybody wonders... Weidler, Johann Friedrich, 1691-1755, being a good German, wrote in Latin. The correct title of his History of Astronomy is "Historia astronomiae, sive, De ortu et progressu astronomiae liber singularis.", Vitembergae, Sventibvs Gottlieb Heinrici Schwartzii, 1741.

The incorrect French citation slipped in as I was (not) translating from Lalande's book.

### 5 minutes of fame

From : <sjstone@mildram.co.uk> To : <eclipse@hydra.carleton.ca> Date : Tue, 27 Nov 2001 12:15:13 +0000

hi, i'm a journalist writing for Room magazine in the UK, and i'm trying to find an eclipse chaser in or around london who would be willing to talk about their obsession and maybe share some photos with us.

any takers? if soon, drop me a line asap - definitely before december 20, 2001. thank you sarah johnstone

From : Don Fleming <Don.Fleming@epsb.ca>

Hello Sarah. I have been chasing eclipses since 1979. I'm not from the UK, I'm from Canada. I have seen seven eclipses to date. I've gone to Mongolia, Bolivia, Turkey, Zimbabwe, Mexico, Aruba, Saskatchewan and that's just part of the story. The whole process of chasing eclipses changed in 1994 with the Hawaii/Mexico eclipse when the millions of Californians with their \$\$\$ started to follow eclipses because they had actually seen one. It's never been the same since. With the advent of the new entrepreneurs, the costs of a "packaged" trip continues to escalate. If I was writing a story, I'd write about the people who, in spite of the financial costs of packaged trips, continue to travel by the least expensive methods, who regardless of social position, continue to travel as backpackers and who believe that the reality of the visceral experience of a total solar eclipse is worth the journey -- who in fact, believe it is the journey. It's never about the event, it's always about the journey. And the most rewarding experience for those who have seen an eclipse is the experience of sharing the event with those who have never seen one before. Have you ever seen a good total eclipse? My wife was in Cornwall while I was in Turkey so I am aware of the "English experience." If you want to follow an evolving story, try to find out who is going to Antarctica for that eclipse. Cheers, and best wishes to you. Don Fleming

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1**TSE pictures webpage updated**

From : Fred Bruenjes <fred@moonglow.net> To : solareclipses@Aula.com Date : Tue, 06 Nov 2001 22:41:31 -0800

Hello all, I've added some new items to my webpage about the 2001 total solar eclipse as seen from Landless Corner, Zambia. My page may be new to many of you, I don't believe it has been mentioned on the SEML before.

The biggest addition is an Adobe PDF version of my full trip report, which is nicely formatted and easier to download. I also cooked up a photomosaic that approximately shows the maximum eclipse at locations all over Africa, and I added video of 3rd contact which had some Baily's Beads action. Please take a look, I think you will enjoy it!

My webpage is here: <http://www.moonglow.net/eclipse/>

Fred Bruenjes Ramona, CA

From : David Makepeace <imoon@interlog.com>

Fred has done an excellent job with his web page. Check out the photomosaic of Africa!! It's great!! Congrats Fred!! David Makepeace

From : "Peter Tiedt" <rigel@stars.co.za>

The latest update to tge Africlipse website features the following:

Weather Satellite Images (Metosat 7) of the southern African continent. These start from November 20 and will cover the period up to 20 December, so providing a decent bracket around 04 December. Visible, I-R and Water Vapour images are available.

[www.eclipse.za.net/html/2002\\_wx.html](http://www.eclipse.za.net/html/2002_wx.html)

Also, for those really interested in long range planning, I have uploaded maps for:

Hybrid Solar Eclipse of 2013 - [www.eclipse.za.net/html/2013\\_maps.html](http://www.eclipse.za.net/html/2013_maps.html)

Great Total Solar Eclipse of 2027 - [www.eclipse.za.net/html/2027\\_maps.html](http://www.eclipse.za.net/html/2027_maps.html)

Total Solar Eclipse of 2030 - [www.eclipse.za.net/html/2030\\_maps.html](http://www.eclipse.za.net/html/2030_maps.html)

Enjoy! Peter Tiedt, [rigel@stars.co.za](mailto:rigel@stars.co.za), Visit my website at <http://www.eclipse.za.net>



# ECLIPSE REPORT

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On the 21<sup>st</sup> of June 2001 there was an eclipse in Africa. When we arrived in Africa it was very different to England because it was hot and it is quite cold in England. A few days later we went to the eclipse site in Chuchumba where we went to watch it with the rest of the group. As time got nearer we watched it go into 1<sup>st</sup> contact and then 2<sup>nd</sup>. As I was watching it on the sunspotter I kept going over to the telescopes so I could see it clearer, but as it went into diamond ring I stayed at the telescopes because I wouldn't of been able to see it on the sunspotter. Suddenly totality was amazing I had never seen anything like it. It was my first total eclipse and was very pleased because it was clear and bright. The diamond rings were great and very bright as well. As it went into 3<sup>rd</sup> and 4<sup>th</sup> contact it became light and every one clapped and cheered. The rest of the holiday was excellent and I can't wait for the next eclipse in Africa in December 2002.

This report was written by Laura Appleton (11 years).



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1**New Web Site for 2001 Dec 14 Annular Eclipse**

From : FRED ESPENAK <u32fe@lepvax.gsfc.nasa.gov> To : SOLARECLIPSES@AULA.COM Date : Mon, 5 Nov 2001 09:26:56 -0400

Is it possible to use some Besselian elements to calculate local circumstances in case of annular eclipse? If yes, where is it possible to have those related to 2001 Dec 14 Annular Eclipse?

Yes, I do have the Besselian elements for the annular eclipse of 2001 Dec 14. Anyone interested in receiving them should email a request me off line of the SEML mailing list. I will then email a text file containing the Besselian elements. They are in the same format as appears in recent NASA eclipse bulletins (Tables 1 and 2). - Fred Espenak

From : FRED ESPENAK <u32fe@lepvax.gsfc.nasa.gov>

I've just made some new updates to my web site on the 2001 Dec. 14 solar eclipse. You will now find global maps of eclipse visibility in three resolutions: low, medium and high.

I also added a map of eclipse visibility for the USA, which is available in low, medium and high resolution. These maps should be especially helpful to teachers and the media. - Fred Espenak

From : FRED ESPENAK <u32fe@lepvax.gsfc.nasa.gov>

Sorry but I neglected to give the URL: <http://sunearth.gsfc.nasa.gov/eclipse/ASE2001/ASE2001.html> Please let me know if you find any errors, typos or bad links. Thanks, Fred Espenak

**Stand-alone calculator for 2001 Dec 14**

From : "Chris O'Byrne" <obyrne@iol.ie> To : SOLARECLIPSES@AULA.COM Date : Tue, 6 Nov 2001 15:21:08 -0000

I've created a version of my stand-alone calculator for the annular eclipse of Dec 14 at

<http://www.chris.obyrne.com/Eclipses/AnnularCalculator.html>

I've noticed that the match to Fred's calculations is not as good as it has been with the other calculators. Fred, presumably this is because of slightly different values of delta T between us?

To use the calculator without being connected to the Internet, choose "File ... Save" in your browser and save the calculator to your hard drive. Chris.

**Costa Rica report and webcast**

From : "Olivier \"Klipsi\" Staiger" <olivier.staiger@span.ch> To : <eclipse@hydra.carleton.ca> Date : Mon, 3 Dec 2001 20:58:38 +0100

Dear friends, I am leaving tomorrow for Costa Rica. I plan to report about what I see at <http://eclipse.span.ch/2001ase.htm> some images will be uploaded at <http://eclipse.span.ch/liveshow.htm> and there's also a nice frame page <http://eclipse.span.ch/liveframe.htm>, where the live webcast might occur.

However, when doing a live webcast, my server often slowed or crashed because of huge webtraffic :- ) and many folks could not access the live webcast. Thus, it is possible that the live webcast will be done on [www.icstars.com](http://www.icstars.com). We are currently testing various technical details. I suggest you keep this message and check out both sites on Eday. I will have to test webcasting from Costa Rica before we know for sure.

The eclipse begins shortly after 21:00 UT, but probably I will not be live for the first contact, but starting around 22:00 UT, a good half hour before annularity. I will decide on the spot depending on various parameters.

also: there seems to be no GSM cellphone network in Costa Rica, so I cannot webcast freely (through my GSM card). Thus I will need a land-phoneline, so probably I'll try to webcast from my hotel. However, if the weather looks bad at my location, I might drop live webcasting in order to drive to clear skies. In that case there would be no live images, but near-live uploads shortly later.

Whatever: live or near-live, we hope to entertain you. best regards, and good luck and clear skies for all other Costa Ricans. Klipsi on mission for [www.icstars.com](http://www.icstars.com)

**Annular Eclipse Webcast**

From Sylvain Rivaud <lepithec@caramail.com> To : <SOLARECLIPSES@AULA.COM> Date : Sat, 01 Dec 2001 13:33:04 GMT+1

Hi ! I am searching some links of live webcasts during the next annular eclipse, in 14th December.

Some webcams will be online ? Klipsi, of course, will be present, but what about others eclipse chasers ?

Thank you in advance for the links ! Sylvain, France.

From : Alejandra León-Castellá <leonale@racsa.co.cr>

Hi! We will be doing a WEbcast too. I have been very quiet lately because the campaign in Costa Rica has absorbed all my time. But we are almost ready with the page regarding the Live WEB Cast.

It will be functional on Wednesday December 5th!! The address is the following: <http://eclipse.ice.go.cr>

We will transmitting from 4 - 5 pm (22-23 UT). It will be transmitting mainly from Nosara Beach, where our headquarters will be, close to the central line. But it will also have shots and information from the other sources in other areas of the country.

This has been organized jointly with the support of the local TV Station -Teletica Canal 7- the Costa Rican Electrical Company and CIENTEC (our organization). For this specific event and the transmission, our Electrical Company has invested in new equipment to support a massive visit. We are all very excited.

Next week I will be informing yet from another site in Costa Rica, from the National Tourism Bureau, that will have a live web cam showing time lapsed still images of the eclipse too.

We will also have 2 presentations with Olivier "Klipsy" Staiger in 2 different cities in the central plateau (San José and Cartago) prior to the eclipse on "Following and Live Web Casting of Natural Phenomena throughout the world", next Thursday and Friday.

We appreciate your support in including this address in your sites to promote its viewing. More information, next week. Thank you in advance for your help. Alejandra León Castellá Fundación CIENTEC San José, Costa Rica <http://www.cientec.or.cr>

**Space available-3 different locations- Annular Eclipse**

From : Alejandra León-Castellá <leonale@racsa.co.cr> To : SOLARECLIPSES@AULA.COM Date : Sat, 01 Dec 2001

Dear eclipse followers, CIENTEC is helping to organize 3 different viewing sites for the Annular Eclipse. We still have space in the different locations.

**NORTHERN LIMIT**

aprox. 10°51' Lat 85°38' Long. One group will be going to the northern limit. This group includes Daniel Fisher, his colleagues from Germany and some local journalists. They will stay at the hostel in the Santa Rosa National Park, a dry forest in the Pacific Coast. They will be viewing from Playa Naranjo. Access to this beach within the park is limited to 4 wheel drive vehicles. But the park is quite easily accessible from the main Interamerican Highway and about 4 hours drive from San José.

**LIBERIA**

aprox. 10°38'lati. 85°25' long. The capital of the province of Guanacaste, a city in the northern pacific region- only 3 hours away from San José- is a good location for last minute arrivals. An amateur astronomer from the community -physics school teacher- is organizing an eclipse viewing from the Soccer stadium. Liberia is very flat with little obstructions to the west and good climatic prospects. Also a very good bus service.

NOSARA

This will be the headquarters of our team. Its very close to the center line but it takes 7 hours drive from San José. We will leave very early on Thursday (3am) from San José. We hope to see the Geminids the night before, plan for the equipment and transmission and enjoy the beautiful beach. We still have some space available. If any of you is interested, please contact me SOON. Clear skies, Alejandra Alejandra León Castellá Fundación CIENTEC San José, Costa Rica

P.S. A reminder that we have much information on the eclipse displayed in Spanish in our website.

### Solar limb observations during annular eclipses

From : "McCann, Stephen" <stephen.mccann@roke.co.uk> To : "SOLARECLIPSES@AULA.COM" <SOLARECLIPSES@AULA.COM> Date : Wed, 28 Nov 2001 11:39:55 -0000

Dear All, aFter looking at various pictures taken during non-total events (e.g. primarily annular eclipses), it's clear that various limb observations can be made by NON-visual methods.

Prominences and even the corona have been photographed with the photosphere also in view, for example :- <http://www.mreclipse.com/ASE99reports/A99B07s.JPG>

Has anyone considered the likely hood of being able to do this, during future annual eclipses ? I seem to re -call that it's better to travel to the northern or southern limit during annularity to do this, but perhaps not at the exact edge where the 'bailey beader's are to be found. (10km inside, 15km inside ??)

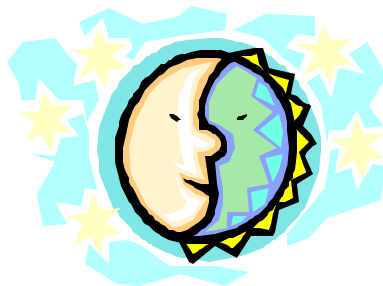
I suppose it's basically a question of what length of chord along the solar-lunar contact point will be possible. Above a certain length the moon can dim the effects of photospheric glare to allow observation of the sun's limb along that chord. Any comments ? Kind regards Stephen McCann Southampton UK

From : Evan Zucker <ez@AbacusTotality.com>

One problem would be that a lot more photosphere is visible at most annular eclipses than in the photo you linked to. That would make it more difficult to see limb phenomena but not necessarily impossible. Obviously, the higher the magnitude of annularity, the better your prospects. Evan H. Zucker San Diego, California

From : Daniel Fischer <dfischer@astro.uni-bonn.de>

See <http://www.geocities.com/skyweek/aus99/story.html> for my own experiences in chromospherography during an annular eclipse. I'll try to do it again next month in Costa Rica where I'll travel to the northern limit of the annularity zone. Fortunately this location (in the Santa Rosa National Park) coincides with the region that has the best weather statistics in December, and the Costa Rican amateurs will gather there, too. Apart from us four from Germany - anyone else on this list heading for the Santa Rosa NP? Daniel Fischer



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**Partial Eclipse viewing**

From : Evan Zucker <ez@AbacusTotality.com> To : SOLARECLIPSES@AULA.COM Date : Tue, 27 Nov 2001 19:00:37 -0800

I plan to set up 2 telescopes at a local school for viewing the December 14 partial solar eclipse. My 8" LX200 will have an 8" glass solar filter over the objective for direct viewing.

I'd like to use my unguided 4" Meade 2045 to project the solar image onto the side of a building (for the kids who don't have parental consent to view directly), but I'm concerned about the possibility of overheating the elements of the telescope. I could mask the objective end, but I'm guessing that wouldn't significantly reduce the temperature, and I don't know what effect that would have on the image (very little effect, I'm guessing).

On a related note, instead of projecting onto a wall, I've seen people projecting onto a sheet of paper or other flat surface attached to the telescope by some sort of bracket. Is this something that's commercially available or do I need to fabricate my own? (I'm not very handy.) I would like to use the SunSpotter, but I just can't justify spending \$300 to buy one.

I would appreciate any advice (or links to web sites containing an answer) you folks can offer. Evan H. Zucker San Diego, California

From : "Jean-Luc L. J. DIGHAYE" <jdighaye@epo.org>

Here are some thoughts about solar projection using a moderate aperture telescope:

> I plan to set up 2 telescopes at a local school for viewing the December 14 .../...

I understand that the Meade 2045 is a 4" f/10 Schmidt-Cassegrain. Quite probably you have a 1.25" 90° star diagonal for it (I mean, a prism or a mirror so that you can see images at right angles to the optical axis). The only elements of the telescope that risk overheating are the eyepiece and, to a lesser degree, the star diagonal. Eyepieces without cemented lenses near the focal plane (Huygens, Ramsden, Dollond...) are safe, at least with 4" aperture scopes. If you have a cheap eyepiece of at least about 20mm focal length, even if you don't know whether it contains cemented lenses or not, it's worth taking the risk of trying it for solar projection together with the star diagonal. Quite probably the lenses should withstand the heat. Another cheap alternative: department store scopes usually have a cheap 20mm eyepiece in a .965" barrel, try to procure one and make it fit to your 1.25" star diagonal. If the eyepiece cracks or melts, it's

not dangerous for the public! I'm skeptical about projecting on the side of a building, because the side must be correctly oriented for projection without too much distortion. (The scope's axis is parallel to the Sun, hence the image projected at 90° must also be formed on a plane more or less parallel to the scope's axis). Also, the projection distance must not be too large, otherwise the image becomes too dim. Let's consider a 50cm diameter image (it's a maximum) projected by a 20mm eyepiece yielding x50 magnification. The image of the Sun subtends about 25°, hence the maximum projecting distance is  $50\text{cm} / (2 \tan 12.5^\circ) = 1.1\text{m}$ .

> On a related note, instead of projecting onto a wall, I've seen people .../...

So, I'd rather project the image on a sheet of paper or a white screen protected from direct sunlight by a shield. The screen need not be attached to the scope, but it's easier for observing. Ask your astronomical equipment dealer, such brackets/screens do exist but not necessarily for your instrument.

From : Ole Nielsen <onielsen@planet.nl>

I disagree here. The critical component is the secondary mirror which will be subject to a lot of heat and could get damaged. And that would be much worse than a cracked eyepiece! To quote from a website:

"Do not use the C5+ to do solar projection. The internal optics and their mountings are simply not designed to withstand such concentrated heat. The failure mode is both sudden and catastrophic: You can seemingly be going about just fine, when <clang> the secondary falls out of its mounting and smashes into the primary. Not a fun way to learn about the internals of your scope.

(Continued on page 29)

(Continued from page 28)

Use a full aperture solar filter instead."

(from Brian Tung's home page at <http://astro.isi.edu/c5plus/tips.html> )

Another site with a similar warning: <http://www.acseal.freemove.co.uk/solarequip.htm>

So NEVER use Schmidt-Cassegrains, Maksutov-Cassegrains and similar designs for solar projection. You risk permanently ruining the instrument (secondary mirrors are not easily replacable in Cassegrains). Smaller or stopped down refractors and Newtons on the other hand are fine for projection. Regards, Ole Nielsen The Netherlands

From : Evan Zucker <[ez@AbacusTotality.com](mailto:ez@AbacusTotality.com)>

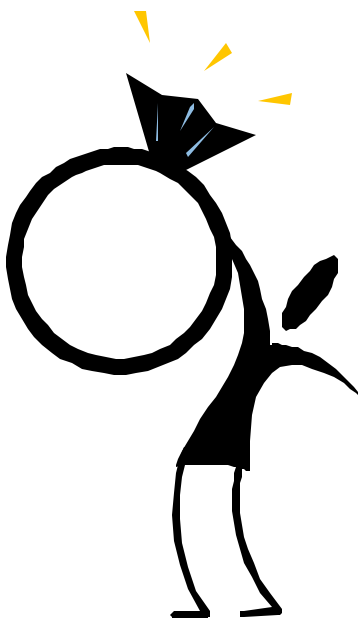
Thank you very much for the warning. I had already corresponded privately with Jean-Luc about his suggestion, and even his comments leave open the possibility of damaging the eyepiece or diagonal. Obviously, you're quite correct that damaging the internal optics would be far more serious.

It looks like I had better use binoculars mounted on a tripod -- that's the closest I can get to a refractor. I assume that would avoid most of the dangers you and he mentioned, although there's still the concern about the prism overheating. I figure I can cover the objective end every few minutes to let them cool off. The main safety concern is physically preventing anybody from looking through the binoculars. Evan H. Zucker San Diego, California

From : "Jean-Luc L. J. DIGHAYE" <[jdighaye@epo.org](mailto:jdighaye@epo.org)>

The failure of the secondary mirror assembly referred to by Ole is quite a rare thing - it happens with some Schmidt-Cassegrains whose secondary mirror mounting or baffle does not withstand heat. A typical instrument used by countless eclipse chasers is the Russian 1000mm f/10 Maksutov-Cassegrain for which I'm not aware of such limitations. However, since that failure is fatal, it's better to stay on the safe side and not to try with your instrument. Generally speaking, it's better to cover the objective of any instrument aimed at the Sun from time to time, including binoculars. (Avoid giant binoculars due to the severe overheating of the prisms and eyepieces). The trouble is, many people will come and want to observe again. Not to mention those willing to look directly at the Sun through the binos (\*). Think about a "security officer" capable of re-pointing the binos, covering them when not in use, preventing incidents etc.

(\* ) An anecdote: I saw a would-be solar observer looking downwards at the projection screen through the bino's objective. Safe but weird!



**2002 ring of fire**

From : Evan Zucker <ez@AbacusTotality.com> To : SOLARECLIPSES@AULA.COM Date : Thu, 29 Nov 2001 00:15:38 -0800

I plan to use the 14 Dec 01 solar eclipse as a warm-up for the 10 Jun 02 eclipse, which will be a much deeper partial eclipse in much of the U.S. The June 10 eclipse is very reminiscent of the 4 Jan 92 ring of fire annular eclipse here in San Diego, and it also has echoes of The Big One on 11 Jul 91 because southern Baja and the western coast of Mexico are perhaps the best places to observe it. (I was in San Jose del Cabo in 1991.)

I'm wondering how many of you folks are planning to observe from Mexico. While it will be a very deep 79% partial eclipse just before sunset in San Diego -- the best eclipse since 1991 -- that won't compare with seeing the complete (or mostly complete in Baja) annulus just above the ocean horizon.

As I recall from 1991, the western Mexico coast doesn't have nearly as good weather prospects as southern Baja, although there could be differences in the forecast from 1991 due to the eclipse occurring late in the afternoon as compared with noon. Has anybody looked into this yet?

I'd be interested in flying to Mexico, but I'd probably have to do it as a same-day or overnight trip for child care reasons. I recall there were a number of same day flights in Mexico in 1991, although the ring of fire sunset, spectacular as it is, can't hold a candle to The Big One. Evan H. Zucker San Diego, California

From : "Olivier \"Klipsi\" Staiger" <olivier.staiger@span.ch>

I plan to go there (Puerto Vallarta). Klipsi

From : "Joel M. Moskowitz, M.D." <moskowi@attglobal.net>

Craig Small and I will be there. We should get together. You know Craig from the "double occultation" on Ascension Island. --Joel M. Moskowitz, M.D. 7 (total) eclipses and counting

From : "76630,2206" <76630.2206@compuserve.com>

Without any information as to what the lunar profile would be like at the maximum point for this annular, I can say very little about what the eclipse would look like.

However, I would have to say that at central eclipse, viewing the chromosphere would be difficult. I guess that if there will be a very bright eruptive prominence at the right time, it would be briefly visible just before or after central eclipse.

If one makes images before 2nd and after 3rd contacts, then he MAY get an eclipse image like what Wendy Carlos did in 1984. However, Wendy got her images on land.

Also, one could obtain a flash spectrum, but would need to get only the spectrum and use a slit. Without a slit, the photosphere would make a mess of everything. You can refer to my image in S+T, 8/1984, p. 105 for the spectrum image to get an idea of what was visible. My guess is that less of the chromosphere will show this time. It looks as if a trip to Mexico for pretty sunset pictures would be the order 'of the day' here. -Robert B Slobins

From : "Jörg Schoppmeyer" <schoppy@kwsoft.de>

I will be there..... See you in Costa Rica Joerg

From : "Jean-Paul GODARD" <jean-paul.godard@noos.fr>

Hello dear EclipseChasers, Martine and Jean-Paul will be in Nosara (CR) in the Nicoya peninsula. Anyone else? We will be happy to meet you at this occasion...

Cordialement, Regards, Martine & Jean-Paul, tlouzeau@noos.fr jean-paul.godard@noos.fr

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**ASE 2002**

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de> To : Finsternisliste <solareclipses@aula.com> Date : Thu, 29 Nov 2001 22:14:05 +0100

Dear shadow chasers, the discussion about solar limb phenomena during an annular eclipse leads me straight to the question: What, actually, will the ASE 2002 (June 10, 2002) look like? Maximal magnitude will be 99.6% at a path width of only 13.5 km. Will that be a beaded annular, with Bailey's beads appearing and melting away all over the lunar limb? Will there be a lot of chromosphere visible?

Since the antumbral path will be hard to reach I hardly dare to ask: Is anyone here going to observe from annularity? Good luck for SATURday! Marc

From : Evan Zucker <ez@AbacusTotality.com>

That will depend in large part upon where you are along the path. I assume you're talking about somewhere near maximum eclipse.

Without having done any detailed study of this, I would guess that it will be similar, but not quite as dramatic as, the 30 May 84 annular eclipse. That one was about as close to totality as you can get without ever being total. See Fred's photos at <http://www.mreclipse.com/SEphoto/SEgallery1/A1984Mosaic.JPG>.

At 99.6%, I would imagine there will be a lot of Baily's Bead and some chromosphere, but I wouldn't expect to have continuous Baily's Beads all the way around the sun.

As I indicated in my post earlier today, I'm thinking of observing the eclipse at sunset, which will be very accessible in southern Baja or the west coast of mainland Mexico. Also, the beginning of the path at sunrise is also over land, in Indonesia (which is certainly harder to reach from the U.S., but not from places in the western South Pacific. Evan H. Zucker San Diego, California

From : "Joel M. Moskowitz, M.D." <moskowi@attglobal.net>

I am planning on being on the west coast of Mexico with Craig Small. -- Joel M. Moskowitz, M.D. 7 (total) eclipses and counting



**Update to Africlipse Website**

From : "Peter Tiedt" <rigel@stars.co.za> To : "Solar Eclipse Mailing List" <SOLARECLIPSES@AULA.COM> Date : Thu, 8 Nov 2001 21:34:52 +0200

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I have made a major update to the Africlipse website.

For those who had their appetites whetted for Africa while here in June 2001, I have provided some more temptaiton.

Preliminary information is provided for the central eclipses of 2005, 2013, 2016, 2017, 2020, 2027 and 2030, all of which traverse Africa.

For 2030 I have additionally included some detailed maps.

Main link: <http://www.eclipse.za.net>

Other pages are:

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2005 - <http://www.eclipse.za.net/html/2005.html>

2013 - <http://www.eclipse.za.net/html/2013.html>

2016 - <http://www.eclipse.za.net/html/2016.html>

2017 - <http://www.eclipse.za.net/html/2017.html>

2020 - <http://www.eclipse.za.net/html/2020.html>

2027 - <http://www.eclipse.za.net/html/2027.html>

2030 - <http://www.eclipse.za.net/html/2030.html>

2030 Maps - [http://www.eclipse.za.net/html/2030\\_maps.html](http://www.eclipse.za.net/html/2030_maps.html)

More information will follow shortly

I have also added some more tours to the 2002 tours page - see [http://www.eclipse.za.net/html/2002\\_tours.html](http://www.eclipse.za.net/html/2002_tours.html) Please advise any problems / broken links etc.

From : "Crocker, Tony (FSA)" <Tony.Crocker@transamerica.com>

Your 2002\_tours page is a broken link now.

**Sunrise TSE**

From PP

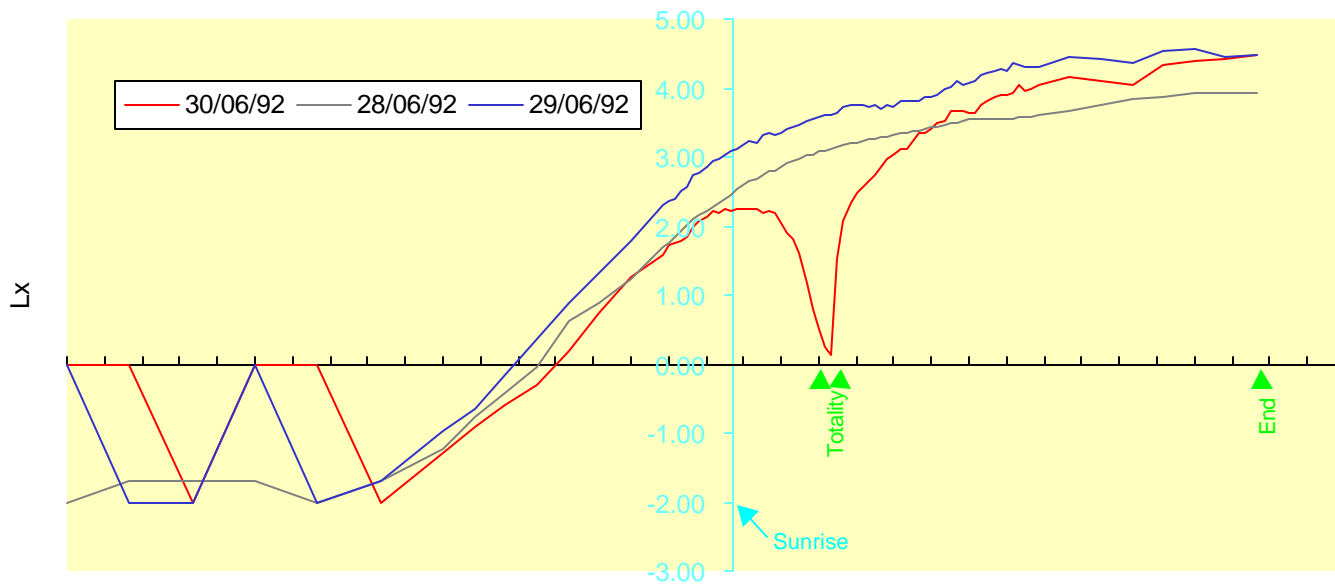
To compare skybrightness of a sunrise TSE, in preparation of the Australian TSE2002, please find herewith graph I made for the successfull Uruguay TSE on the beach of La Paloma in Uruguay.

As you will notice a very good comparison, with one clear morning on 29 June, one clouded morning on 28 June and a clear eclipse morning on 30 June 1992.

Totality was about 14 minutes after sunrise. The Y axis is at sunrise, the marks are for totality and the end of the partial phase. The scale for the skybrightness is logarithmic and in Lux. The time scale is decimal.



TOTAL ECLIPSE URUGUAY  
June 30, 1992



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**Post 2002 Eclipse - Kruger Park Visit**

From : "Peter Tiedt" <rigel@stars.co.za> To : "Solar Eclipse Mailing List" <SOLARECLIPSES@AULA.COM>  
Date : Tue, 27 Nov 2001 20:23:10 +0200

Hi List, There has been quite an expression of interest, both among the group and to me directly for an "semi-organised" post eclipse tour to Kruger Park.

This is not in any way to detract from the proposed Zimbabwe Conference.

For those visiting Africa for the 2002 eclipse I propose organising the following:

This will not be a tour operator organised trip, but I am prepared to make the KNP bookings on behalf of those who want to join.

Kruger National Park - 4 nights, 5 days  
=====

- 5 December - (afternoon) - Gather at Letaba Camp - central Kruger
- 5 December - (evening) Informal meet/greet/beer - optional evening Game Drive
- 6 December - (day) Game Viewing - Olifants, Satara and nWanetsi areas.
- 6 December - (evening) - barbecue (braaivleis in SA) and eclipse recollections
- 7 December - (day) travel to Skukuza, game viewing en-route, lunch at Tshokwane Picnic Spot.
- 7 December - (evening) - al leisure - optional barbecue/restaurant/game drive
- 8 December - (day) - Game viewing, including Bird Hide, Lower Sabie, Kruger Tablets (optional departure by road or air)
- 8 December - (evening) - farewell barbecue and 2003, 2005 and 2006 plans.
- 9 December - disperse by road/air.

This could be flexible and there is no compulsion to have any or all of the above. I see it as a loose arrangement of friends travelling together.

Those travelling by air - Letaba Camp can be accessed via Phalaborwa which is served from Johannesburg, or charter flights. All car-hire companies are represented. Skukuza Camp is served by it's own airport (ex Johannesburg and a few others places), and car hire companies are represented at Skukuza.

If travelling by road, enter Kruger at either Phalaborwa (50km to Letaba) or Orpen (116km). Punda Maria is possible, but is a long drive to Letaba (~190km).

Any 4/5 seater sedan vehicle is OK. Sharing of vehicles could be an option - I will co-ordinate if there is a demand. For those who want to share, VW Kombis are available at Skukuza and Phalaborwa and seat 6 in comfort.

Accommodation: Letaba has a full range of bungalows (single room with shower/toilet), huts (single room with shared ablutions) and cottages (multi bedroom with shower/toilet). Also a magnificent elephant museum / exhibition

Skukuza has the same, except the huts are replaced by safari tents. Skukuza is the park headquarters. Also has a golf course for those who want an esoteric golf experience, as well as a magnificent library and other sights of historical interest.

Both camps have a shop, restaurant, filling station, and fast food facility. Each accommodation unit has it's own barbecue facility, and all linen including towels are supplied.

The best game viewing in KNP is in the area between Letaba and Skukuza.

Please remember that school holidays (our summer holidays) begin on 6 December and Kruger will fill up rapidly after that date. I therefore propose having a first close about 20 December, although I will make bookings as and when they come in, and advise the costs to be paid direct to Kruger to secure the booking. Payment is usually required by KNP within 30 days of booking.

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Rates are in the order of (all in US\$ - about US\$1 = ZAR 10) These could be slightly out

Huts - 1 - 2 persons \$15, plus \$5 per additional person up to 4 per night  
Bungalows - 1 - 2 persons \$30, additional \$10 per person per night up to 4  
Cottages - 1 - 4 persons - \$60, additional \$15 per person per night up to 6

All these rates are room only.

If I have left anything out, yell direct to me and I will do my best to answer.

Please reply off list to [rigel@stars.co.za](mailto:rigel@stars.co.za) and put "KNP2002" in the subject line please Peter Tiedt [rigel@stars.co.za](mailto:rigel@stars.co.za)  
Visit my website at <http://www.eclipse.za.net>

#### Africlipse Website Update - Meteorsat WX Images



From : "Peter Tiedt" <[rigel@stars.co.za](mailto:rigel@stars.co.za)> To : "Solar Eclipse Mailing List" <[SOLARECLIPSES@AULA.COM](mailto:SOLARECLIPSES@AULA.COM)> Date : Wed, 28 Nov 2001 22:12:38 +0200

Meteorsat images of the southern African sub-continent, taken at 06h00 UT in the visible and I-R, and also water vapour images can be found at [www.eclipse.za.net/html/2002\\_wx.html](http://www.eclipse.za.net/html/2002_wx.html)

Images are available from 10 November to 28 November, and more will be added (probably every 2nd day) until we get to 20 December. Main site: [www.eclipse.za.net](http://www.eclipse.za.net)

2002 Main Page - [www.eclipse.za.net/html/2002.html](http://www.eclipse.za.net/html/2002.html)



2002 Tours - [www.eclipse.za.net/html/2002\\_tours.html](http://www.eclipse.za.net/html/2002_tours.html)

2002 Maps - [www.eclipse.za.net/html/2002\\_maps.html](http://www.eclipse.za.net/html/2002_maps.html)

#### Proposed Eclipse conference 2002

From : "F.Podmore" <[podmore@science.uz.ac.zw](mailto:podmore@science.uz.ac.zw)> To : [solareclipses@aula.com](mailto:solareclipses@aula.com) Date : Tue, 27 Nov 2001 14:54:40 +0200 (CAT)

Hello Eclipse Colleagues, I have been given approval by Patrick to send out the following message, which I initially sent to him for comment.

Please reply to me at [podmore@science.uz.ac.zw](mailto:podmore@science.uz.ac.zw)

with any comments, positive or negative. It would be especially interesting and important for us to know how many people are definitely, or probably, coming to Zimbabwe (or southern Africa), and willing to come to a conference.

And any suggestions about CONTENT, SPEAKERS/TOPICS you would like to hear, OFFERS of speakers/topics, preferred DATES, etc would be gratefully received. I look forward to hearing from you. Best regards, Francis

From : "Jean-Luc L. J. DIGHAYE" <[jdighaye@epo.org](mailto:jdighaye@epo.org)>

Dear Dr. Podmore, The EurAstro team still has sweet memories of your brilliant presentation in Antwerp. Yet we (6 persons) went to Lusaka for the last TSE - and next time, as you write/fear, we (another 6 persons) intend to be in the Australian outback. Best regards, J.-L. Dighaye, Chairman, EurAstro Association

From : [Kidinvs@aol.com](mailto:Kidinvs@aol.com)

I would be a willing participant at the conference. I plan on bringing a group of about 65 people to Zimbabwe, arriving on about Nov 29th, and departing Dec 6th. I am sure that many people in my group would be interested as well. However, please do consider the venue of Victoria Falls. We have no real intention of spending much time in Harare... perhaps if others feel the same way, Vic Falls may be a better venue. Eric Brown [www.eclipsesafaris.com](http://www.eclipsesafaris.com) ...and Francis... I arrive in Harare on Sunday morning, and will be in Zimbabwe until Dec. 7th.

**Low angle eclipses - atmospheric refraction effects**

From : Eric Pauer <pauer@bit-net.com> To : Solar Eclipse Mailing List <solareclipses@aula.com> Date : Tue, 13 Nov

Does anyone know of a rule of thumb or calculation for determining the effects atmospheric refraction? For the upcoming solar eclipse on 14 Dec 2001, only Maine and New Hampshire in the U.S. will miss the partial eclipse. But, I live in New Hampshire. However, the sunset terminator is only about 70 km west from my location (42.7 N, 71.7 W). Will atmospheric refracting effects "project" the sunset terminator east enough for me to see the very low angle eclipse, weather/clouds permitting? This may also be a factor for those going to Australia for the total solar eclipse in December 2002. Eric

From : "McCann, Stephen" <stephen.mccann@roke.co.uk>

Eric, Although I cannot answer your direct question, would the addition of some height also help (e.g. in the hills of Vermont) Regards, Stephen McCann

From : "Glenn Schneider @ Home" <gschneider@mac.com>

Hi Eric, See: [http://nicmosis.as.arizona.edu:8000/ECLIPSE\\_WEB/ECLIPSE\\_86/ECLIPSE\\_86.html](http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ECLIPSE_86/ECLIPSE_86.html)

The white-on-black graphic in the "How Important is Atmospheric Refraction, Anyway?": section should give you a feeling for how to answer this question. The family of curves, which are for solar elevations in degrees WITHOUT refraction, tell you how for the center of the disk is refracted normal to the horizon (in arc minutes) for different altitudes (of the observer) above ML. The same page describes how this was derived. Glenn Schneider

From : "Jean-Luc L. J. DIGHAYE" <jdighaye@epo.org>

I'll investigate this possible effect as soon as possible. There are classical formulas for atmospheric refraction vs. zenith angle, atmospheric pressure (that's why the height is important, as Mr. McCann said), temperature and relative humidity. Accurate planetarium programmes (I use Guide 7) usually take atmospheric refraction into account. A good idea would be to run one of these for your exact location and expected weather conditions. P.S.: I'm personally interested since I intend to be in the Australian outback on Dec 4, 2002 (and perhaps even on the Antarctic pack the year after).

From : Eric Pauer <pauer@bit-net.com>

Looking at your Atmospheric Refraction chart, if I'm on a local mountain peak (elevation 2290 ft / 698 m), the center of the setting sun without refraction effects (at 0 deg altitude) will actually appear 31 arc minutes higher, about 0.5 degree. Would that that would prolong the sunset by about 2 minutes (sun moves its own diameter every two minutes)? I wonder if Fred Espanek already accounted for this in his eclipse calculations?

Would I also benefit from horizon dip as well? Jay Ryan described this effect in his Oct 2000 Skywise column in Sky and Telescope: <http://www.skypub.com/tips/skywise/0010skywise.html>

Eric P.S. I think that some of the people on the SE list might be away/offline, traveling for the upcoming Leonid meteor shower/storm.

From : "Jean-Luc L. J. DIGHAYE" <jdighaye@epo.org>

My opinion:

1. Yes, it will prolong the time the Sun is above the horizon by about two minutes if the Sun sets vertically, and even more (inverse sine law) if it sets obliquely; and
2. Yes, in addition to that, you will benefit from the horizon dip effect.

About Espanek et al. calculations: I looked at Espanek's previous eclipse sites. Most of the time, he neglects atmospheric refraction because he says that the effect is negligible as long as the Sun is high above the horizon. When the Sun is low, he says that

*(Continued on page 37)*

calculations should be made taking into account the atmospheric properties at the site of interest. Right, isn't it?

From : JohnLX200@aol.com

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When preparing for the 1999 TSE at sunrise, I found out from Fred that his numbers do account for the shape of the geode, but not for atmospheric refraction.

I observed from a location where at sea level, the center of the sun was over 0.2 degrees below the horizon before considering refraction. From 41,000 feet the horizon was well depressed, which was necessary for me, because as you can see from Glenn's graph, the refraction effects are significantly reduced with altitude. In my own case, I had to draw the tangent and figure the refraction effects on both sides of the lowest altitude the rays coming to me passed through, rather than my own altitude. Then I had to also account for the part of the refraction in one direction (namely that above me) which I wasn't looking through.

I forget the exact numbers, but it was something like the refraction for 25,000 feet looking at 0 degrees, times two, minus the refraction for 41,000 feet at some non-zero positive angle which the curving ray coming from 25,000 feet passed up through the airplane at.

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I think that using a planetarium program (e.g., The Sky, etc.) to predict (with or without refraction) sunset times for the proposed observing location on days in November, and going there to observe the actual sunset times, would be the best idea. It would also help you sort out the local horizon effects, especially if you make a careful note of how the azimuth will change from "test day" to "eclipse day". John Hopper USA Eclipse Flight '99

From : "Jörg Schoppmeyer" <schoppy@kwsoft.de>

There is an easy formular to calculate the horizon dip : Square root of height in meter times 0.03 gives the result in degrees.

in 10000 meters elevation, the horizon dip is  $100 \cdot 0.03 = 3$  degrees  
in 100 meters elevation, the horizon dip is  $10 \cdot 0.03 = 0.3$  degrees Joerg

From : FRED ESPENAK <u32fe@lepvox.gsfc.nasa.gov>

> Does anyone know of a rule of thumb or calculation for determining the effects atmospheric refraction? For the upcoming solar eclipse on 14 Dec 2001, only Maine and New Hampshire in the U.S. will miss the partial eclipse. But, I live in New Hampshire. However, the sunset terminator is only about 70 km west from my location (42.7 N, 71.7 W). Will atmospheric refracting effects "project" the sunset terminator east enough for me to see the very low angle eclipse, weather/clouds permitting? This may also be a factor for those going to Australia for the total solar eclipse in December 2002.

The nominal refraction at the horizon is 34 arc minutes. The Sun's azimuth at sunset from Albany, NY is 238 degrees. For southern New Hampshire, you'll have approximately the same sunset azimuth. Using my map at <http://sunearth.gsfc.nasa.gov/eclipse/ASE2001/ASE2001gif/ASE2001USA-3>. GIF

you can shift the 'eclipse begins at sunset curve' 34 arc-minutes in the azimuth direction 58 degrees ( $238 - 180 = 58$ ). You'll need to get the angular scale from another US map since it's not included in the map above. This should give you an idea of whether you have a chance of seeing any of the eclipse from New Hampshire.

But why not make a relatively short trip to central or western NY to catch much more of the sunset eclipse, especially if the weather forecast is favorable? By the way, I include refraction in the eclipse circumstances I give at <http://sunearth.gsfc.nasa.gov/eclipse/ASE2001/ASE2001city1/ASE2001city1e.html>

However, my times of 'sunset' are actually for the Sun's lower limb instead of the more traditional upper limb. It makes sense to define it this way for the eclipse so that you can see the entire sun's disk at the quoted time of maximum eclipse from each city or location. Clear skies! Fred Espenak

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Extract from Getaway Magazine weekly e-newsletter

From : "Peter Tiedt" <rigel@stars.co.za> To : "Solar Eclipse Mailing List" <SOLARECLIPSES@AULA.COM> Date : Wed, 28 Nov 2001 22:15:39 +0200

Extract from Getaway Magazine Weekly e-newsletter

--- begin ---

Total solar eclipse If you're wanting to see next year's total solar eclipse on 4 December, the path of totality of which passes overhead in the Northern Province, you should start thinking about booking accommodation now.

++ Check map of the eclipse's path through Africa <[http://www.getawaytoafrika.com/content/news/features/eclipse\\_dec2002.asp](http://www.getawaytoafrika.com/content/news/features/eclipse_dec2002.asp)>

The Kruger National Park has already pre-sold most of its accommodation in the north to scientific research groups and says there are now only a handful of places left at Shingwedzi camp site and Mopani rest camp. South African National Parks now allows you to make reservations 11 months in advance, so if you want to book for December next year you can do so in January.

++ Visit the SANParks website <<http://www.parks-sa.co.za>>

++ Check our accommodation listings for the Northern Province <[http://www.getawaytoafrika.com/adscript.asp?WhereAmI=Region&XREGION\\_ID=33](http://www.getawaytoafrika.com/adscript.asp?WhereAmI=Region&XREGION_ID=33)>

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Getaway Magazine is South Africa's leading travel and leisure magazine. [www.getawaytoday.com](http://www.getawaytoday.com)

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### NASA webpage 2003

From : FRED ESPENAK <u32fe@lepvox.gsfc.nasa.gov> To : SOLARECLIPSES@AULA.COM, eclipse@hydra.carleton.ca  
Subject : [SE] NASA 2003 Eclipse Web Site Date : Fri, 9 Nov 2001 16:40:10 -0400

Greetings eclipse chasers - I know that many of you are already looking ahead to future eclipse expeditions. I've begun work on the manuscript for the NASA bulletin covering the total solar eclipse of 2003 November 23 and annular solar eclipse of 2003 May 33. The current plan is to have this publication ready in spring of 2002.

I have just established a new NASA web site for the 2003 total eclipse. At the moment, you will find several eclipse maps in both low and high resolution. The URL of the web site is: <http://sunearth.gsfc.nasa.gov/eclipse/TSE2003/TSE2003.html>

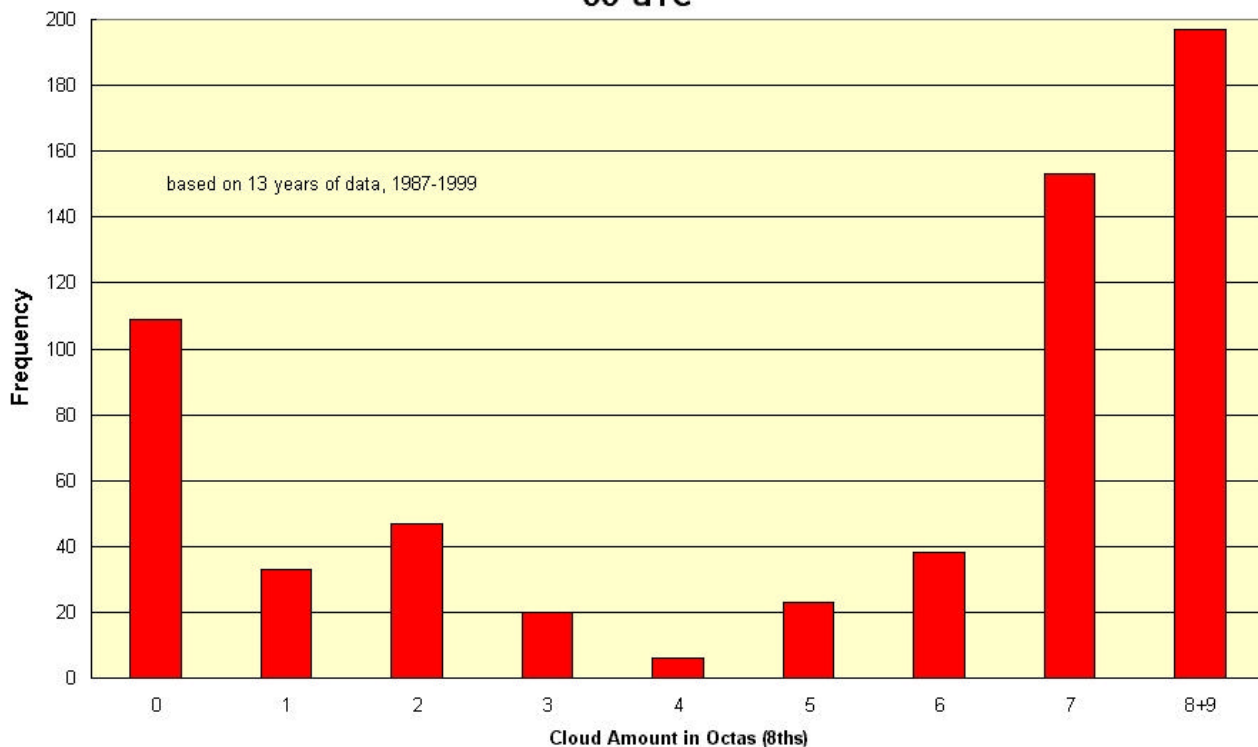
I will add additional material to this site in the coming months and will also establish a separate web site for the 2003 annular eclipse.

Please let me know of any problems (typos, bad links, etc.)  
Thanks, - Fred Espenak



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**Cloud Frequency at Mirnij  
November & December Average  
00 UTC**



**Flights SE2003 Antarctic**

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com> To : "SE Mailing List" <SOLARECLIPSES@AULA.COM> Subject : [SE] Flights for 2003 Antarctic Date : Wed, 14 Nov 2001 19:28:50 -0000

From: Antarctic Non-government Activity News (ANAN) No. 59

BULK DISTRIBUTION News as at 0600 UTC, Wednesday, 14 November 2001.

AVAILABLE ON LINE TWENTY-FOUR HOURS A DAY: ANAN archive (including this issue with its built in links): <http://www.antdiv.gov.au/goingsouth/tourism/News/default.asp> Coming events related to non-governmental activity:

<http://www.antdiv.gov.au/goingsouth/tourism/Research/BibConf/Confer/default.asp> Links to tourist industry web sites: <http://www.antdiv.gov.au/goingsouth/tourism/Industry/default.asp>

News in this edition: 59-04. 2003 eclipse overflight 'definitely' planned.

2003 ECLIPSE OVERFLIGHT 'DEFINITELY' PLANNED [ANAN-59/04]

Australian company Croydon Travel, which has operated half-day tourist overflights of East Antarctica since 1994, says that it is "definitely planning" to operate a flight to observe the eclipse of the sun that is due to occur over the coast of Queen Mary Land

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on 24 November 2003. The tour ship 'Kapitan Khlebnikov' is also planning to be in the eclipse area around that time as part of a four-week voyage that is being offered to eclipse enthusiasts and general tourists (ANAN-57/02, 24 October 2001).

Croydon Travel, which usually charters aircraft operated by the Australian airline Qantas for the overflights, told ANAN that they have been discussing the 2003 flight with numerous 'eclipse chasers' over the last two years and that they "already have many potential participants listed" for the event. Plans call for the flight to depart Perth, Australia, late on the evening of 23 November 2003 so that the aircraft is in position near Russia's Mirny station for the early morning local-time event the next day.

After the eclipse ends, the flight is to undertake normal overflight Antarctic sightseeing. Coastal areas along the 2,000km-strip from China's Zhong Shan station in the Larsemann Hills of Princess Elizabeth Land in the west, to Australia's Casey Station on the coast of Wilkes Land in the east, could be overflown. The exact post-eclipse sightseeing area will depend on just where the best ground-viewing conditions are on the day. The aircraft will return to Perth at the end of what is expected to be a twelve- to fourteen-hour flight.

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Costings for the flight have yet to be finalised but tickets are expected to start at around \$US700 ex Perth with premiums applying to those who wish to have window seats during the actual time of the eclipse. Registration for the flight can be made via E-mail to: Ant@croydontravel.com.au. Final cost details are expected to be available by March 2002.

Croydon conducted the first East Antarctic overflight of the 2001-02 season on 4 November, up to six more being scheduled over the next two-and-a-half months (ANAN-52/06, 1 August 2001). Over the past six years, more than 20,000 passengers and 1,200 crew members have flown on the overflights over East Antarctic coastal regions between Russia's Mirny station in Wilhelm II Land in the west and the Cape Washington area of Victoria Land (ANAN-42/09, 28 February 2001).

From : "76630,2206" <76630.2206@compuserve.com>

Patrick: Let's check the dates... I thought that the eclipse was on 23 November 2003, not 24 November 2003.

(Elisabeth and I will have been married 8 years on 23 November...this would be the honeymoon--in the Antarctic) - Robert B Slobins

From : "Patrick Poitevin" <patrick\_poitevin@hotmail.com>

I mentioned the message as From: Antarctic Non-government Activity News (ANAN) No. 59

It is quite obvious that the text is not made up by me.

Though ... I can not check it right now while I am travelling, but wouldn't it be possible that for that location the eclipse path crossed the date line? Who can check and reply? PP

From : Michael Gill <eclipsechaser@yahoo.com>

Greatest eclipse is at 22:49UT on November 23rd 2003. Since the flight will be operating from Perth, Australia the local date will be November 24th. Michael Gill.

From : "Matthew Poulton" <mpoulton@hotmail.com>

Robert Slobins wrote: Let's check the dates... I thought that the eclipse was on 23 November 2003, not 24 November 2003... and further to Michael Gill's recent posting:

I believe time zones get a bit confusing in Antarctica, as not only do they converge but different bases may refer to their countries' own particular time zone.

However, I believe from various internet sites that "everyone in Antarctica officially goes by New Zealand time". This explains



why the eclipse which starts at 22h19 Universal Time (2nd contact) on the 23rd may also be quoted as being on the 24th November. I trust the flight operators will realise this in time!

Can anyone give an unbiased opinion of viewing TSE's from an aircraft. Are the problems of too many people and too few windows as great as I imagine them to be? I always intended to view the eclipse from land, but given the cost (18,000USD +) and the November weather prospects:

<http://www.wunderground.com/global/stations/89592.html>

<http://www.wunderground.com/global/stations/89512.html>

perhaps flights will be a better option. Additionally, does anyone know if local flights from one of the Antarctic bases will be possible if weather conditions are not favourable for land viewing? Matthew Poulton

From : Michael Gill <[eclipsechaser@yahoo.com](mailto:eclipsechaser@yahoo.com)>

I'll try and give an unbiased opinion based on my experience of one total solar eclipse observed from an aircraft.

Some advantages of an airborne eclipse chase:

- Very high probability of witnessing the event. If your aircraft can reach high altitudes, then you have a platform that will take you above most weather systems.

- Depending on the flight plan chosen, most eclipse flights should prolong totality to a certain degree. The exceptional case was Concorde 001 on June 30th 1973 which was inside the lunar umbra from 10:49UT to 12:03UT. My airborne eclipse flight (one Metonic cycle later) extended totality to 6 m 15 s thanks to the navigational skills and planning of Glenn Schneider.

- You have a vantage point that can allow prolonged observation of the Moon's shadow. I had probably my best ever view of the Moon's shadow on that 1992 TSE flight.

- The high altitude should enhance observation of coronal details. When you are flying at altitudes of >10km there is less light scattering.

Some disadvantages

- Your photographic/video programme is likely to be greatly restricted, as you cannot bring as much equipment as you might for a ground-based observation. We couldn't set up our equipment until the seatbelt sign was switched off.

- Likely to be vibration or motions on board

- The quality of the material in aircraft windows may be variable. Scratches or marks may be present.

- Other eclipse related phenomenon such as the drop in temperature can't be sensed from inside a pressurised aircraft

The 1992 TSE airborne eclipse-chase on a VASP airline's DC-10 is documented on Glenn Schneider's web site. That expedition was well planned with the portside seats removed to give each passenger easier access to the windows. Passengers had their own window.

[http://nicmosis.as.arizona.edu:8000/ECLIPSE\\_WEB/ECLIPSE\\_92/ECLIPSE92\\_REPORT.html](http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ECLIPSE_92/ECLIPSE92_REPORT.html)

Another flight that day, on a VASP airline's 737, was featured on Brazilian TV that night. I imagine it must have been quite chaotic, as there were rows of six passengers to each window so some sort of rotation would have been needed. There was negative media coverage of one of the Concorde flights at the 1999 TSE, with some passengers apparently missing totality.

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Not all airborne eclipse expeditions are equal - even at the same eclipse. Clearly, an important factor to be considered in an airborne eclipse-chase is the people organising it and how much access to the windows that passengers will have.

I would never say that a total solar eclipse observed from the air was better than one observed from the ground. If given a realistic choice, I would always choose land. But some eclipses are suited to the aircraft option if their tracks are inaccessible (like 2003) or the weather prospects are poor (like 1992).

I would only consider going by air if I had ruled out other alternatives due to poor weather prospects or high cost of getting to the track.

I would suggest that everyone on the list observe at least one TSE from the air in his or her lifetime. If you get to see an eclipse that you might not have otherwise reached then surely that would justify the decision. The different perspective might impress you. Michael Gill.

From : Vic & Jen Winter <webmaster@icstars.com>

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Greatest eclipse is at 22:49UT on November 23rd 2003. Local time in New Zealand is UT+12hours the eclipse would occur locally on the following day, Nov. 24th, 2003

As I recall, Fred has already updated the NASA website to include some information on the 2003 event at <http://sunearth.gsfc.nasa.gov/eclipse/OH/OH2003.html>

Matthew Poulton wrote: "perhaps flights will be a better option. Additionally, does anyone know if local flights from one of the Antarctic bases will be possible if weather conditions are not favourable for land viewing? "

Flights which actually land on the continent are subject to a very much higher level of scrutiny and permissions to do so can only be obtained through several strict steps of application. Those organizations now able to provide access by land and sea have already performed the intricate and strict process required to attain these tourism permissions years ago. Those only other flights to and from local bases are for scientific purposes and would require lengthy approval to modify their usage for tourism purposes, and I suspect be in fear of losing their existing scientific permissions granted.

The Antarctic Treaty has been in place since 1959. In 1991, the Antarctic Treaty Consultative Parties adopted the Protocol on Environmental Protection to the Antarctic Treaty, which designates the Antarctic as a natural reserve.

That information can be located at: <http://www.antdiv.gov.au/goingsouth/tourism/Research/TreatySys/ATCM/Year/1994ATCM18/ATCMrec1b.asp>

Tourism operators must "obtain a permit, where required by national law, from the competent national authority of the appropriate Party or Parties, should they have a reason to enter such areas, or a monitoring site (CEMP Site) designated under CCAMLR)."

In addition, they must "Ensure that expedition leaders and passengers are aware of the location and special regimes which now apply to Specially Protected Areas and Sites of Special Scientific Interest (and on entry into force of the Protocol and Antarctic Specially Managed Areas) and of Historic Sites and Monuments and, in particular, relevant management plans. "Clear Skies, Jen Winter - Owner (913) 432-4636

From : Glenn Schneider <gschneider@mac.com>

Michael Gill has already pre-empted me on replying to Matthew's query (see what being 7 time zones ahead does...) and echoes much of what I would say, so I thank him for allowing me to be brief.

I have done (planned, organized, and executed) two eclipse flights, though a third well planned never went into execution, and for the first time I will publicly comment on the later here. First, though, before considering flight #3 my attitude toward airborne observations was "only if there is no other way" but is heavily biased by my desire to capture the phenomena (as best one can) on film. That task, as Michael has addressed, is very difficult from an aircraft. I really prefer to observe from terra firma, and the firmer the better. That said, I really saw no viable land, or sea based option for the 1986 or 1992. I won't comment further on those, but refer you to:

[http://nicmosis.as.arizona.edu:8000/ECLIPSE\\_WEB/ECLIPSE\\_86/ECLIPSE\\_86.html](http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ECLIPSE_86/ECLIPSE_86.html)

and [http://nicmosis.as.arizona.edu:8000/ECLIPSE\\_WEB/ECLIPSE\\_92/ECLIPSE92\\_REPORT.html](http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ECLIPSE_92/ECLIPSE92_REPORT.html)

other than to say that the meter of success in such an endeavor is dependent on the level of thought and detail in planning.

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With that in mind I now follow up on several points:

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1. The geometry and circumstances of the 21 June 2001 eclipse gave rise to the possibility of achieving over an hour of totality by a tailored chase with a Concorde. This included the intriguing possibility of overflying the shadow allowing three discrete epochs of totality (and seeing the second third contact in reverse) and "hanging" the diamond ring in the sky for about 4 minutes and allowing it to "slide" along the edge of the moon azimuthally to sample the limb profile. Intrigued? So was I. So much so that this ALMOST became a reality, and likely would have if the tragic crash of the AF Concorde outside of Paris had not happened. This enterprises was in the very mature planning stages, and indeed I was within about 2 weeks of announcing it and detailing it on SEML, when the AF Concorde crash occurred. Indeed, after many months, FAX's, phone calls, and e-mails with Air France's flight operations folks, particularly Cpt. Jean Prunin, chief pilot for the Concorde fleet, I had a meeting scheduled in Paris to nail down the final details (cross the i's and dot the t's so to speak). My office at Steward Observatory began to look like a flight ready room with my shelves lines with Concorde air operations and technical manuals, etc. That horrific accident occurred only days before I was schedule to leave for Europe for that meeting. At that point not only had due consideration been given to the flight itself (which had to be curtailed in duration to just a tad under an hour, as the Angolans would not give permission to overfly their airspace), but we had secured permission from the governor of Ascension Island to base the flight from there. As an example of what was in discussion, for historical (and future!) interest please now see: [http://nicmosis.as.arizona.edu:8000/ECLIPSE\\_WEB/ECLIPSE\\_01/CONCORDE\\_ECLIPSE.html](http://nicmosis.as.arizona.edu:8000/ECLIPSE_WEB/ECLIPSE_01/CONCORDE_ECLIPSE.html)

When the crash occurred my heart stopped, not as you may think because this effort would likely be so abruptly and unexpectedly dashed, but due to the awful loss of life, which we sadly have so recently endured again. But, indeed, this did spell the end of that effort. Things were so much in flux at that chaotic time that I had gone to Europe, and while in my hotel in Manchester, England (where I went before my scheduled Paris meeting), I received a FAX from Jean and while still in bereavement over the loss of his friends and associates, the meeting was of course, canceled, as was the Concorde eclipse chase of 2001. In is FAX, with the Concord in flight embossed on the letter head, he proclaimed that "the day will come when Concord fly again!" And, prophetically, now it does! I met with Michael Gill in Manchester shortly after and we commiserated over the lost opportunity. I had not felt right about publicly discussing this on SEML, or elsewhere, until the day of Jean's prophecy day arose, which it now thankfully has.

Today, prompted my Matthew's question, is that day, so please do see my now obsolete 2001 proposal synopsis (web link above). Not all eclipses are created equal, and not all would so greatly benefit from a supersonic chase. But, the issue of (implicitly subsonic) flight for 2003 has arisen, and indeed I have had some email exchanges with Cryoden over the past year, and need to pick that back up. Anyone SERIOUSLY interested in future flight possibilities, looking for planning assistance, please contact me by email directly.

2. The 2003 eclipse again may be an opportunity (necessity) for a flight. While the path does go over Myrney, I have found little enthusiasm (thus far) in replies to my inquiries to what is left (to my knowledge) of the financially stressed Russian Antarctic program, and the possible use of that facility. Perhaps others might have more success. The logistics (and cost) would be difficult (but not at all impossible) obstacles to overcome, but the predilection for high winds, blown snow, and cloud cover that time of year is not confidence inspiring. As a marginally related note, though possibly of interest to some here, on Antarctic cloud cover see: <http://nicmosis.as.arizona.edu:8000/PUBLICATIONS/JOC/JOC.html>

Having worked two austral summer seasons at the Amundsen-Scott South Pole Station, I do have a first-hand appreciation of the difficulties in Antarctic logistics... and that is a comparatively easy place to work.

I also had look into viewing at sea. I am even less inspired by (a) the cost of doing so on "conventional" near and circum antarctic tourist "cruises", and (b) the sea-going weather off the Antarctic coast that time of year. Last year I had made some inquired to the operators of several Japanese merchant marine fishing vessels which harvest krill and other food sources in those waters. Securing passage on one of those ships would be less costly, but would require a LONG time at sea, something I think few would prepare to

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Joanne & Patrick

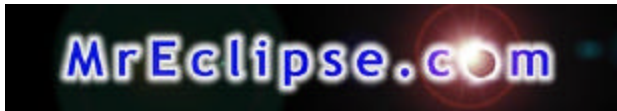
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do (but you never know with us Umbraphiles).

So, air may be the way for 2003 As I said, Cryoden seemed very receptive, and now it is time to follow up... Glenn Schneider



### Index ECLIPSE COMETS

Solar eclipses are rare events to observe. The rather recent observations of comet Hyakutake and Hale-Bopp proved that comets are rare events as well. What a beautiful present would it be, having a Solar Eclipse AND a Comet at the same time in the sky? These are called Eclipse Comets. Over many years, publications have mentioned Eclipse Comets. Different listings have been published. Please find herewith the research performed in 1996 by Dr. Jan Cuypers (Astronomer at the Royal Observatory, Brussels) and Eclipse Chaser Patrick Poitevin.

See <http://www.MrEclipse.com/SENL/SENLinde.htm>

1893 eclipse comet

