

SETalk

I am not one of those people who thinks ancient religion was early or primitive science; I think ancient religions were ancient religions. The existence of astronomy is not established in ancient Egypt, until possibly the Late Period, depending again on how you define "astronomy." What is attested before that time in Egypt is religious material involving the sky. There is no evidence of knowledge of or particular interest in eclipses in ancient Egypt. Joanne Conman

From : Gary Thompson <gtosiris@MPX.COM.AU>

Hi Nick, To add a few other perceived problems with Hartner's Mesopotamian Lion-Bull constellation theory:

- (1) It is not established that the lion-bull iconography has a single intended meaning.
- (2) The lion-bull combat depictions are not consistent - in some of the earliest depictions both are depicted as achieving supremacy over each other.
- (3) There is a complete lack of any type of supportive evidence for an astronomical interpretation i.e., from written sources such as mythological themes.
- (4) The stylized lion-bull "symplegma" on an Elamite seal from 4000 BCE seems hardly convincing - the figures are barely touching and hardly make a convincing combat scene.
- (5) Hartner's earliest convincing Lion-Bull iconographic evidence (on a pitcher from Uruk) originated some 700 years later than the 4000 BCE seasonal marker date he identified.
- (6) The sheer variety of animal combatants depicted in iconography makes an astronomical interpretation difficult.
- (7) Splitting the lion-bull symplegma to interpret it is controversial and not a requirement supported by recent interpreters of animal combat scenes.
- (8) Hartner did not track the lion-bull to Elam - we do not know the culture responsible for originating the lion-bull symbolism.

Regards, Gary Thompson

How did ya'll get into this stuff?

From : Egan Mark <astrophoto@yahoo.com> To : SOLARECLIPSES@AULA.COM Date : Thu, 16 May 2002

side note: the "ya'll" is allowed here, since I'm from Texas. :-)

Anyway.... I've been following many of your websites for a while now, (in some cases, years)

and I look forward to finally meeting many of you at the HRC in PV on 6/9.....

I met Oliver Staiger tonight; he stayed in Houston overnight before he goes stormchasing for the next few weeks.....

we had dinner, along with a few of my friends here.

Basically, I'm curious..... how did each of you get into eclipses? I've read many of your reports of your first eclipse, and how you felt about it.

But what convinced you to go to your first total eclipse?

I saw my first in August 1999.... but I was convinced way back in 1991...

it was right around then that I became interested in astronomy, and 3 things made me want to go see a total eclipse:

1. In Sky and Telescope Magazine (November or December 1991) Dennis DiCicco wrote a review of the 1991 total eclipse..... the article itself was great-- especially the opening paragraph, actually written by Barry Slavin.
2. Someone I knew here in Houston (Dennis Zwicky-- recognize the name?) was describing how he led a tour group to Mazatlan for that eclipse. He told me that one couple on his tour said that the only thing better in their lives was seeing the birth of their child.

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3. Terence Dickinson's book "Nightwatch" was my first astronomy book. GREAT introductory book-- and the chapter on eclipses helped "the bug" bite me.

Anyway, what convinced you (ya'll :-)) to go see your first one?

BTW, if this topic has been brought up before, or if it's too general for the list, feel free to e-mail me privately at the address below. C- U later!

From : Geoff <gsims@iprimus.com.au>



Hey there, I haven't actually seen one YET.. but I have been interested in Astronomy for 3-4 years now (and am currently studying Astronomy and Astrophysics). The main reason I got into (both Solar and Lunar) Eclipses was because:

Lunar-- Australia got to see the extremely long Total Lunar Eclipse of July 2000. Having the chance to watch this got me extremely interested in Lunar Eclipses (both before it happened, whilst it happened, and up until the present)

Solar-- Australia will see the Total Solar Eclipse of December 2002, and it is the first Solar eclipse I have a chance of seeing (without flying OS).

Because I am a student with heavy studying commitments, and not enough money to be an "Eclipse Chaser", obviously I do not fly around the world annually to see Eclipses, but because I have been able to (and will be able to) see both Solar and Lunar eclipses, I am very interested observing and photographing them, and will be for a long time. --Geoff

From : "Chris O'Byrne" <obyrne@iol.ie>

I became interested in astronomy at an early age - when I was a kid, my father showed me the Milky Way one night, and explained to me that it contained innumerable stars very far away, and that we were *inside* it.

That just completely fired my imagination. I used to just look up at it and imagine millions of aliens looking back up at me :).

At age about 10 or so, I bought a book which had a map of the path of the 1999 total solar eclipse. I saw that it passed relatively close to Ireland, and I figured that, since I would be 30 years old when it happened and (hopefully) in a good job earning enough money, I should go and see it, so I made a promise to myself that I would.

Shortly after that, I suffered a personal tragedy, and fulfilling my promise to myself became somewhat important to me.

In the intervening 20 years, I read articles from people who had seen eclipses, and I became fascinated by the deep reaction they had to the event.

So, I was on Shabla beach in Bulgaria on 11 Aug 1999. And it was all downhill from there... :) Chris.

From : Evan Zucker <ez@AbacusTotality.com>

At 01:32 AM 5/16/02, Geoff wrote: Because I am a student with heavy studying commitments, and not enough money to be an "Eclipse Chaser", obviously I do not fly around the world annually to see Eclipses

It's been 23 years since I was a full-time graduate student, and I still don't have enough money to fly around the world annually to see eclipses. Plus, child care for young children further limits my opportunities to get away. I haven't seen a total solar eclipse since 1998, and I went 19 years between the 1972 and 1991 eclipses.

Nevertheless, I definitely consider myself an eclipse chaser.

From : "Odille Esmonde-Morgan & Warwick Lawson" <analog6@ozemail.com.au>

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I haven't actually seen one either! My first eclipse was the annular in Western Australia in 1999. I lived in a rural area until 4 years ago and to me an interest in that great sky dome was natural. I'm also very much into photography - so for me the lure is photographing the eclipses. But I'm really looking forward to experiencing my first in South Australia this December

From : Orionman1@aol.com

I could not get to the centerline in 1963 in Maine and my mother even took my scope away so I could not view partial stages!

I made a bad decision and missed 1970 which I will kick myself always. I then saw my first 1972 in Arasaig with the shadow coming up the Northumberland straits up our mountain (while others were clouded out to the North). I was hooked . 1998 my first video and those diamond rings. Now have seen 7 totals and finally in Hungary 1999 videotaped the incoming shadow and all phases of totality. The 2001 finally saw shadow bands and videotaped the ring of fire.

I won't travel to annulars , may miss Dec eclipse and can't afford 2003 so maybe until 2006 I will have to make due with my videos. Dr.Eric Flescher

From : "Richard Monk" <richard.i.monk@ntlworld.com>

Hey! I remember '63 - just. I was visiting friends on Bangor at the time. But what about the one in Khartoum in '53? Was too young to appreciate it! Rgds, Richard

Solar Filters

From: "Odille Esmonde-Morgan & Warwick Lawson" <analog6@ozemail.com.au> Reply -To: SOLARECLIPSES@AULA.COM
Date: Thu, 9 May 2002 04:58:13 +1000

I have a question which I hope one of you keen eclipse photographers might be able to answer. I have a 500mm mirror lens, on which the filters screw in at the back, before it is put on the lens. Do I need to put the solar filters here, or can I construct a tube like device to fit over the front for easy and quick removal/replacement in the 30 secs or so of totality in the coming eclipse? I did not have this lens for the last eclipse I went to so the question did not arise. Thanks in anticipation Odille Esmonde-Morgan

From : Jay.M.Pasachoff@williams.edu

The solar filter SHOULD BE IN FRONT. A slip-on tube is fine. Jay Pasachoff

From : "Olivier \"Klipsi\" Staiger" <klipsi@bluewin.ch>

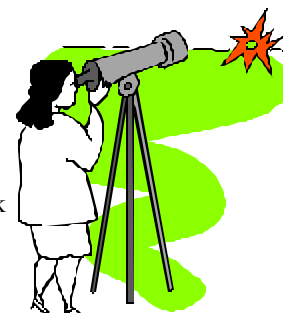
ALWAYS on the front. . Filter always first thing in "contact" with the Sun. If you put it inside you risk overheating inside lens. Klipsi

From : "Cliff Tuuk" <cliffturk@yebo.co.za>

Hello Odile, I agree with Jay. The solar filter MUST be in front of the lens to avoid heat build-up etc. etc.

BUT put an Orange filter at the back of the lens too - and you will get an orange Sun even if you only have aluminised Mylar in front. In June 2001 we held the Mylar on with an elastic band so it was easily removable for totality. The orange filter was left in place for totality and gave some delicately coloured corona effects which were very pleasing. (There just wasn't time to take it off!) Cliff

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



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You need to put the filter on the front of the lens; thus go and construct the tube. I have a similar lens, and the filter chamber is for normal photos. You risk overheating the filter so near to the focus.

The manufacturer does this because a full-aperture filter for such a lens, c. 100 mm diameter, would be very expensive, like over USD 100.

You need a magnifier for your viewfinder to obtain the precise focus. Your mirror lens focuses past infinity to compensate for temperature, which you will get a lot of in the outback. Make your final focus fifteen minutes before totality, using the crescent's cusps. Then tape the focusing ring with masking tape to ensure that the lens is not moved off focus until after totality.

Because you are using a mirror, you do not have the depth of field a lens has. Your focus must be precise. Also, limit your exposure times to get 1 solar diameter of corona; unless you have an expensive lens, you may likely get secondary reflections of the chromosphere, prominences, and inner corona...or hope for a thin veil of cirrus clouds over the eclipse for longer exposures. cheers/Robert B Slobins

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

Cliff and Odile: If you want an orange color to the photosphere, I strongly suggest that you use a gel filter like those used in the theater with the solar filter in front. That means that your totality images won't be off-color. --Robert B Slobins

From : Geoff <gsims@iprimus.com.au>

Odille, I too will be using a 500mm mirror lens to photograph the Eclipse (Tamron 500mm SP f/8). As people have already mentioned, you must put the filter over the top, it is quite easy to make a good filter mount too:

Firstly get some stiff cardboard (but flimsy enough so you can bend it). Cut a strip of it and wrap it around the lens. I made mine thick enough so it reached the "grip" for focusing, so that it would stay on better. Wrap it around so a little bit is overlapping, and then glue it down and wait for it to dry.

Then make another "ring" the same way-- but this time use a thinner piece of cardboard, and wrap it around the first ring you made. Don't make it fit TOO tight or else you won't be able to slip it on easily. Now cut out a piece of solar filter material, a few centimeters bigger than the large ring, and place it over the large ring. Then place the smaller ring on top of the large ring, which will hold the solar filter material in place. Then with the overhanging material, fold it up onto the outside of the smaller ring and sticky tape (or glue it) down. This way no light will get in.

Now you have a nice solar filter cell which can be easily put on and taken off the lens.

A question to Robert: what do you mean by a "gel filter like those used in the theater"??? I have no idea what you are talking about! :) --Geoff

From : Archer Sully <archer@meer.net>

I use PVC pipe that matches the size "close enough" and nylon set screws to secure it to the lens/scope. Then I use two toruses of matte board to hold the filter material. I get these cut at a frame shop: when you tell them its for a solar filter they'll give to you for free or only charge you a local currency unit or two. Archer Sully, Boulder, CO

From: "Richard Monk" <richard.i.monk@ntlworld.com>

Lots of responses to this one! and it is a pressing concern of mine.

I too have a Tamron 500mm f8 which is the mainstay of my eclipse trips. (I also took a Vivitar 500mm with me to Zimbabwe last year as reserve - but that lens was a disaster.)

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No time to play around with the small screw-in filter on the inside - I would have already removed it as the less glass the better. I usually use slip-on mylar filters over the front of the lens - separate ones of different densities (layers) for different partial phases and removing the last one half a minute before second contact. Problem here is losing focus - especially difficult when the mylar is held on with elastic band. You don't want to spend precious time resetting the focus during totality. Any clean delicatessen tub of about 85mm can be used to make such a filter (done the night before in the hotel room?)

The problem this year (in the Australian outback) is going to be focussing just before totality. I suspect that from at least one minute before you will see nothing through a lens with a mylar filter over the front and do you really want to waste any of the precious 30 seconds of totality trying to focus? I intend to set a focussing mark on the lens barrel during the early partial phases and trust its position when I remove the filter - unless anyone has better ideas.

I wonder whether it is worth investing in one of 1000 Oaks lighter density solar filters - any opinions? Richard Monk

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

Richard: What I have done is to focus my lens with the filter on, of course, from 10-15 minutes to totality. Then I use masking tape to secure the focus. I have had no problems with totality going out of focus during the last 15 minutes; the temperature does not change that much.

With three minutes to go, I then position the eclipse in the viewfinder anticipating where the eclipse would cross the center. Then I remove the filter and cover the lens with a cloth.

With 40 seconds to go, I uncover the lens. If I use a camera with a removable pentaprism, then I can check where the eclipse is and adjust the tripod accordingly.

A 30-second eclipse is easy. It's the long ones that are a pain, because with a long focal length, the one-solar-diameter's worth of movement (on average) is significant in the viewfinder. Robert B Slobins

Then I remove the filter and cover the lens with a cloth, ensuring that the cloth will not blow off the lens. Also, no one is allowed in front o

From : Geoff <gsims@iprimus.com.au>

Hey there, With all this speak of 500mm Mirror lenses, I was wondering if any of you guys have any pictures you have taken with these lenses, or any websites? So far I have only come across one image of totality (on MrEclipse.com) but would love to see some more.

Also, do you think it would be worth coupling this lens with a teleconverter? Or is it best to have a smaller better quality image. 1000mm is tempting (especially for partial phases), but I think f/8 would be much better to shoot Totality than f/16!! Any help would be appreciated! Thanks, --Geoff

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

Geoff: Here is my "two cents" worth:

I am partial ;-) to extremely high quality lenses. Totality is a great test of lens quality, especially regarding anti-reflection coatings and baffling. A quarter second exposure at f/4 on ISO 400 film WILL show

- 1) at least 1 solar diameter of corona and
- 2) any reflections of the inner corona and prominences if the eclipse is in a clear sky.

Generally, there is no Santa Claus in optics. You do get what you pay for.

I do have a 600/8 Vivitar Series I mirror lens that is excellent but out of production. I hope that someone can recommend

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you an equivalent to this lens formula. I do not know of the 500mm mirror lenses.

DO NOT USE A TELECONVERTER!!!! That adds glass, distortions, and reflections. On a 35mm format, you have to be very precise aiming or pre-aiming your lens of such a focal length. And if it is during totality, I hope you can keep your head while doing this task, to the exclusion of anything else.

I doubt that most people on this list can maintain one's cool during totality. I would not trust myself to do anything but press a button on a remote shutter release; indeed, I would use a motor drive and an intervalometer back on a Nikon F-3, pre-aim the 500mm mirror lens and expose at f/8 at 1/4-1/2 second on ISO 400 Fuji NPH PRINT film. I would use a Bogen or Gitzo tripod with a sizable head rated at least twice the load you intend to mount on it.

Are you thinking of buying a lens for this event? Or do you already have the mirror lens. cheers/Robert B Slobins

From : Geoff <gsims@iprimus.com.au>

Robert, I already own a Tamron 500mm f/8.

I wasn't really planning on using the teleconverter because of the loss of speed and quality, I just thought I'd see what people thought.

What did you mean by the "gel" filter you spoke of earlier? I am trying to work out easy ways to make the sun's disk orangey.. but I can't find any 85mm threaded filters for my lens. --Geoff

From : "Richard Monk" <richard.i.monk@ntlworld.com>

Thanks Robert - masking tape!! Geoff: I still have my 500mm Tamron photos on site. Check them on <http://homepage.ntlworld.com/rimonk/index.htm> promptly as the pages are about to undergo major revision. The pictures were taken automatically over the whole event, using a home designed microcontroller (long story). You will observe the problems I had with focussing. Richard

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

Tamron has an excellent reputation. You can shoot stars with them one-stop

short of wide-open and get stars that look like stars over most of the frame.

I can not vouch for the mirror lens, however. --Robert B Slobins

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

Geoff: A 'gel' filter is a gelatin filter, although these days they may be made of plastic--that I do not know. Gel filters are used to color theater and movie lighting. Go to a theater supply store or inquire of film-makers or TV stations for suppliers.

I explained them in more detail in a previous post. --Robert B Slobins

From : "Odille Esmonde-Morgan & Warwick Lawson" <analog6@ozemail.com.au>

Thanks to all for your helpful replies, which confirmed my thoughts on where the solar filter should go - but I wanted to check well in time. If any Aussie list members know of suppliers here for filter material, and threaded filters for lenses, could they please let me know to my personal email (so as not to clog up the list). Thanks.

Regarding using teleconverters with a 500 mm mirror lens. I have done it for a lunar eclipse, but had problems with the weight and tripod slipping. (As a result I've purchased a heavy duty Manfrotto tripod.) The pictures looked quite sharp, however, but focussing was a big problem. I think the idea of making a mark on the barrel is a good one, I'll have a 'dry



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run' at full moon and see how it goes. I have not scanned these images but will do so and put some on my website. I'll try to do it this week but have to find them first!

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

Odille: Not only do you need a heavy duty Manfrotto tripod, you also need a heavy duty Manfrotto head.

I would *NOT* use a teleconverter.

I strongly suggest that you get a viewfinder magnifier for your camera if it is available for that camera. That will allow you to be more precise in focusing the lens. Once you get the image focused, then tape the lens in focus with masking tape (or duct tape if you don't mind the cleanup afterwards) being careful that you do not disturb the lens settings or focus in the process. -Robert B Slobins

From : Fraser Farrell <fraser@trilobytes.com.au>

On Mon, 13 May 2002, Odille Esmonde-Morgan & Warwick Lawson wrote: Aussie list members know of suppliers here for filter material, and threaded filters for lenses, could they please let me know to my personal email (so as not to clog up the list). Thanks.

See the dealers listing at astronomy.trilobytes.com.au/scope.htm for potential suppliers of filter material. Some are already selling for this year's eclipse. For camera filters in general, check out your local camera stores.

>looked quite sharp, however, but focussing was a big problem. I think the idea of making a mark on the barrel is a good one, I'll have a 'dry run' at full moon and see how it goes.

Why wait until full moon? Or dark, for that matter? Just about any other phase provides a wealth of shadows and detail to check your focusing; and the moon is often visible during the daytime. It's trivial to extrapolate your photographed crescent/semicircle/whatever to the full disc. Approximate exposure times for ASA100 film range from 1/125 sec (full moon) to 1/4 sec (crescent).

Use your index mark to try a range of exposure positions around "infinity focus" and make notes of your settings, so that you can reproduce them for the eclipse. Also be aware that the waxing moon is low in the northern sky this month, so don't photograph through your neighbour's chimney or airconditioner plume!

I expect focusing on this eclipse will be a challenge even for the experienced. Low in the sky, at the end of what will probably be a warm day...the atmosphere will not be cooperative. cheers, Fraser Farrell

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

Gel (gelatin or plastic) filters are put on the front of stage or movie lights to create special color effects. Manufacturers like Lee actually provide samples with spectral transmission information at times. Check out movie and theater supply shops.

Sky & Telescope had an article about the use of such filters for visual observations back in 1988 in advance of the Mars opposition. It is an inexpensive alternative to glass. Of course, test before the eclipse.

Another example of such filters is the Cokin system, although the Cokin filters may be too small for a 100mm aperture.

You may also investigate the Kodak Wratten line of gel filters.

You may also want to stop down the aperture during partial phases. I'll bet that the seeing in the late afternoon in the outback will be sub-optimal and that will limit your resolution. I can vouch for that after doing months of H-alpha work in Laredo, TX. --Robert B Slobins

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From : Geoff <gsims@iprimus.com.au>

Thanks for the info Robert. As for stopping down the aperture during partial phases, it's not really possible with a fixed-aperture mirror lens. --Geoff

From : Geoff <gsims@iprimus.com.au>

Hey all, Just wondering.. I know they say the Baader film can produce a "whiteish/blueish sun".. but in a few photographs I just got back it is VERY purple. Not "purpleish".. like.. VERY VERY purple!!

Just wondering if thats normal? And if so.. what colour filter would be needed to change it to a more pleasing (orangeish) colour? The photos look awesome but really unrealistic. I'll scan and upload to my website so you can see for yourself. I'll let everyone know when its done.

Also a few comments about my Tamron 500mm Mirror Lens-- the sun spots look much more awesome with a 2x converter (1000mm effective), so maybe it would be an idea to photograph partial phases with a teleconverter, then take the teleconverter off before Totality.. though it does cause more panic! --Geoff

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

Geoff:

1: Do not use that teleconverter! Use a fine-grained high-contrast film instead, e.g. Velvia (test first). The last thing you need is workload--and you will definitely make work for yourself when you try these stunts you mentioned. You will panic. The teleconverter degrades the image.

2: You can use a color gel filter or combinations thereof, obtained from a theater supplier. But, think about it--the sun is a yellow star, not an orange (we'd freeze to death). I'd do what I can to neutralize the purple to white: maybe combine green and yellow. Or shoot high definition black and white film for partials. cheers/Robert B Slobins

From : "Mark" <rainbowsymphony@rainbowsymphony.com>

Try a Thousand Oaks Optical Solar Filter. The image is a light orange color! We carry T.O.O. 1 mil solar film...very light blue/white image. Mark

From : Hal Couzens <hal@dneg.com>

Geoff, Have you considered the possibility that the purple result could have come during the developing or more likely the printing process.

I have had varying 'offerings' from my printers with respect to the colouring on my partial and indeed total shots. And naturally you can reprint the shots pulling some of the purple out.

It really is a good idea to shoot a frame up front of some kind of colour scale as a guide. Of course I did not do this. Glen Schneider (I think) recommended this a long time ago but alas I did not heed the advice.

From : JohnLX200@aol.com

I've heard of that before, but not experienced it myself. It's difficult to diagnose if your results aren't consistent. If color prints from negatives, I'd first tend to totally blame the printing job. If on slides, then it's more of a mystery and probably due to the very complex spectral response of the filter interacting with the particular type of film in an unpredictable way.

I wouldn't advise abandoning the Baader in favor of false-orange filters, for two reasons. First their colors are bogus by design, rather than by accident. Being a purist, I hate that! Second, the optical quality of the Baader is superior to all

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the other commercially available options out there, short of super-expensive custom filters based upon optical flats.

Maybe I'd better qualify that second point. At 500mm focal length on 35mm film, whether the filter has a Strehl ratio of 24% or 54% or 94% doesn't matter very much. However, if you go to a truly long focal length or put the filter onto a telescope then it really does matter and the Baader will win.

Personally, I like to see the sun as a pure or platinum white (as in Aruba'98 visually) or yellowish (as in Zambia '01 visually). I also like to avoid overdoing any color filtering, as it tends to destroy information in order to accomplish only a subset of the manipulations possible on the computer afterscanning the negative or slide.

But I will say that if you are getting false purple due to the Baader/film combination, then using a warming filter to cancel that as much as possible and get back to near realism on the film, still falls within the realm of what a good purist would do.

A good way to subtract purple without winding up with another bizarre color problem is to use an 81 series (weak warming) or 85 series (stronger warming) filter. They appear as various shades of orange/brown.

In order of increasing density: 81A, 81B, 81C, 81EF, 85, 85A, 85B.

For anyone preferring a slightly orange sun, any of the 85 series will probably do. (It will also come in handy later, in 2045, when you take a side trip from the solar eclipse to see the Weeki Wachee mermaid show, where one or two stacked 85 series filters will help take the blue out of underwater photos taken there.) John Hopper

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

John Hopper wrote, "At 500mm focal length on 35mm film, whether the filter has a Strehl ratio of 24% or 54% or 94% doesn't matter very much. However, if you go to a truly long focal length or put the filter onto a telescope then it really does matter and the Baader will win." What's a "Strehl ratio"? Jim Huddle

SCIENTISTS SEE PREDICTION OF SOLAR STORMS IN FUTURE

Much like tornado watchers look to the skies for clues that a twister is forming, NASA and university scientists are watching the Sun in an effort to better predict space weather - blasts of particles from the Sun that impact the magnetosphere, the magnetic bubble around the Earth.

<http://spaceflightnow.com/news/n0205/19spacewx/>

Picture

Artist's concept of a birth of a coronal mass ejection. On the Sun, coronal mass ejections occur when solar magnetic field lines snake around each other, forming the letter "S". Usually, they go past each other. But if they connect, it's like a short circuit. The mid-section breaks loose and drives out a coronal mass ejection. Credit: NASA Marshall



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Scattering blue

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de> To : Finsternisliste <solareclipses@aula.com> Date : Mon, 27 May 2002 22:35:38 +0200

Dear friends, I'm sorry to bother the whole list with this query; of course I've thoroughly searched my local computer and the web before: Some months ago we had a discussion about eclipse-related music, and someone posted a link to a band or project named "The Scattering Blue". If someone still has this link, would you please send it to me via private mail? Thanks a lot! Marc

Scattering blue

From : Marc Weihrauch <marc.weihrauch@student.uni-halle.de> To : Finsternisliste <solareclipses@aula.com> Date : Mon, 27 May 2002 22:35:38 +0200

Dear friends, I'm sorry to bother the whole list with this query; of course I've thoroughly searched my local computer and the web before: Some months ago we had a discussion about eclipse-related music, and someone posted a link to a band or project named "The Scattering Blue". If someone still has this link, would you please send it to me via private mail? Thanks a lot! Marc

Central line

From : Jean Meeus <JMeeus@compuserve.com>

Why are so many people nowadays speaking of the "centerline" of a solar eclipse?

The British-American "Astronomical Ephemeris", which appeared from 1960 to 1980, used the term "central line", and so did the "Astronomical Almanac" for 1984 (the last one I have). Jean Meeus

From : Kidinvs@aol.com

....and if Centerline only applies to the "center" of the Central Line, then how wide is the "Centerline" ?

Eric Brown www.eclipsesafaris.com

From: Bill Kramer <bill@autocode.com>

Perhaps it is a sign of the accuracy attainable. Or just a term of art taken from engineering and architectural drafting then being applied to map making and the plotting of eclipse details.

Central implies "in the general area" where as centerline is a more precise value. The centerline of a highway is an example. A highway extends from both sides of the centerline.

So does Central Line apply to the entire width of the totality path? Then would Centerline only applies to the "center" of the central line?

Hmmm, I need to review a few of my web pages and perhaps make some more corrections... English can be such a foul language (or is it fowl?!). -Bill Kramer

From : "Cliff Turk" <cliffturk@yebo.co.za>

Hi, The change from Central Line to Centerline is perhaps even worse because the latter would be spelled as "centreline" in UK or South Africa and several other places - proving that George Bernard Shaw was right when he described Britain and America as two countries totally separated by the same language!

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Perhaps we should go back to Central Line to save any further confusion. Cliff

From : Jean Meeus <JMeeus@compuserve.com>

In order to avoid any misunderstanding, let me tell that the central line of a solar eclipse is NOT the line halfway between the northern and southern limits of the path of total (or annular) eclipse.

Instead, it is the line on which the center of the lunar disk is seen passing exactly over the center of the solar disk. Therefore, it could better be called the "curve of central eclipse" (whence "central line" for short).

The central line is not exactly, but *almost* exactly, halfway between the northern and the southern limits of the path. The difference between the central line and the "halfway" line is greater when the width of the path is larger, AND when the least distance of the axis of the lunar shadow to the center of the Earth (the so-called value Gamma) is larger.

In the northern hemisphere, when $\Gamma > 0$, the central line is a little closer to the southern limit of the path than to its northern limit.

And of course, when the axis of the shadow misses the Earth completely (this is the case at non-central total or annular eclipses), there is no central line. Jean Meeus

What's the LENGTH of Moon shadow track

From : "F.Podmore" <podmore@science.uz.ac.zw> To : SOLARECLIPSES@AULA.COM Date : Fri, 24 May 2002

I was phoned yesterday with a question I couldn't (immediately) answer -

What is the total length of the eclipse track across the globe on 4 Dec 2002 (in kilometres)? Is there a straightforward way to work it out for any particular eclipse?

I could transfer the lat and long of the start and endpoints from one of fred's maps to my globe and wrap a piece of string between them (or do some spherical trigonometry) but there must be a more accurate method. Help please. Thanks. Francis

From : Jean Meeus <JMeeus@compuserve.com>

Francis Podmore asked the length of the track of the total solar eclipse of 2002 December 4. I have a program that calculates the length of the central line of any central solar eclipse. (No, sorry, that program is not for sale...!).

For the eclipse of 2002 December 4, my program gives a length of 14893 kilometers. (As a comparison, for the eclipse of 2001 June 21 the length was 12014 km). Jean Meeus

From : Jean Marc Larivière <jeanmarc.lariviere@sympatico.ca>

Jean Meeus' response to Francis Podmore's question about the length of the central line for the Dec. 4th eclipse raises the natural question : what is the longest (theoretical) central line ?

From : Jean Meeus <JMeeus@compuserve.com>

This is an interesting question. At this moment, I know no answer. Surely the longest path length is reached at an eclipse that is nearly central (Γ close to zero) and for a total eclipse of long duration (because then the lunar shadow moves more rapidly over the Earth's globe). The "big" eclipse of 1991 July 11 might be a good candidate. This should be investigated further. Jean Meeus

SETalk

From : Jean Meeus <JMeeus@compuserve.com>

I calculated that the length of the central line of the famous total solar eclipse of 1991 July 11 was 14982 kilometers.

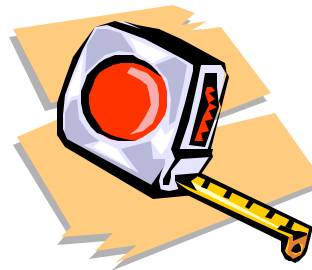
However, the central lines of the next two eclipses in the same Saros series will have still longer lengths :

2009 July 22 15144 km
2027 August 2 15217 km

The latter is the longest central line of all solar eclipses during the period 1970-2030.

Here are the lengths of the central lines of some other eclipses:

1986 Oct. 3 1851 km
1999 Aug. 11 13681 km
2002 June 10 14682 km
2002 Dec. 4 14893



The eclipse of 1986 October 3 occurred at high northern latitude, near Iceland. At that eclipse, the axis of the Moon's shadow nearly missed the Earth. Jean Meeus

Vic Winters down

From : KCStarguy@aol.com To : SOLARECLIPSES@AULA.com Date : Mon, 20 May 2002 11:48:47 -0400

Vic winters has a heart attack last week and we were all taken by surprise. I will keep the group posted. My other name was attacked by a huge spam attack. Use my other name for inquiries . Dr.Eric Flescher for now (orionman1@aol.com)

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

- Off-topic: Vic Winter is back home now after undergoing quadruple bypass surgery last Wednesday and is recovering very well.

- On-topic: It doesn't look like it'd be possible to sneak down and see everyone in Puerto Vallarta. - We will have to see what Klipsi can do with a web cam. I haven't asked him about his plans. I know he's currently in the midwest tornado chasing around the Texas area this week. Perhaps there will be better weather for this annular than the last. Clear Skies, Jen Winter - Owner

New Moons

From : Rybrks1@cs.com To : SOLARECLIPSES@AULA.COM Date : Thu, 30 May 2002 10:11:56 EDT

Last night I accidentally entered a wrong date into my copy of EclipseComplete (Zephyr Services, written by Charles Kluepfel) and up popped the saros for the new moon.

So my "discovery" way-back-when that a non-solar-eclipse new moon either was, or will be, in a saros that intercepts Earth, was really discovered by others long before the light bulb went off in my head.

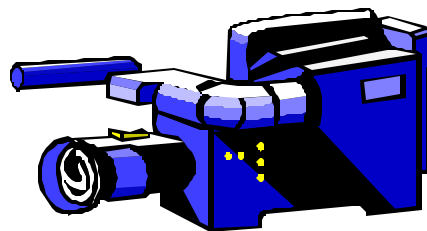
EclipseComplete will correctly list the saros for past or future saros families for any typical new moon. It is much simpler and faster than the spreadsheet I designed for myself.

I still intend to list the pedigree of the +New Moon of the Month+ on the SEML just for fun. Ray Brooks

SETalk



Some contributions of SEML subscribers from the internet or found in publicity. Thank you Geert Vandebulcke (Belgium) for the Eclipse biscuits. PP found the Pink Floyd Eclipse website or had Eclipse shirts.



The Saros for June 10, 2002

From : Rybrks1@cs.com To : SOLARECLIPSES@AULA.COM Date : Wed, 1 May 2002 11:26:43 EDT

Next Month's Eclipse Saros 137 is a curious series. It is the saros that covers the annular eclipse this June in Puerto Vallarta and the hybrid eclipse that followed the engaging story of the Titanic disaster a few days later. It is curious because it does not transition from Totals to Annulars as most saroses do simply through a series of hybrids, (T-H-A). It changes through a double series (T-H-A-H-A) of 6 hybrids then into 4 annulars then reverts to 3 hybrids again before finally returning and staying annular. Why?

First a general rule about solar eclipses: The primary reason any solar eclipse is annular is due to the Moon's distance not the Sun's. No matter how small the Sun appears in the sky, if the Moon is near apogee it seems even smaller and the eclipse can only be annular. It is not true to say (the converse) a perigee moon will definitely make a solar eclipse total, since some perigee moons in early January are too small and distant to cover the large perihelion sun. Apogees are always distant but perigee moons vary quite a bit.

That general rule is why this saros (and any saros) can change. If a saros is centered around apogee then it remains annular. Almost all saroses have annular eclipses because the Moon resides near apogee for a relatively longer time, that is, it travels through apogee slowly. Many saroses are all annular.

It is difficult to find a saros that is all totals. I randomly looked at 64 saroses before I found one that is all totals. Saros 127 is all totals, the one with last year's Africa June 21, 2001 solstice eclipse. A string of all totals is difficult to attain because, per the general rule, not all perigee moons are large enough and because the Moon does not linger around perigee as long as it does around apogee.

Saros 137 When the centrals begin in this saros they are total because eclipse day is only about one day before perigee. They move away from perigee and roughly midway through the saros the eclipses are midway between perigee and apogee. They continue to move toward apogee as the saros ages to end as annulars right at apogee. (To say "move away from perigee" is the same as saying "move toward apogee"). The last annular eclipse (at the south polar region) occurs almost simultaneously with apogee (only 2 km closer than apogee and an hour and a half different).

Why a double dip? Saros 137 first changes from totals to hybrids in December for two reasons, the Sun is getting larger as we approach Jan 4 perihelion and the Moon is getting successively farther and farther away. By February the Moon is so far away that the eclipses are now pure annular. But by April the eclipses again become hybrid because the Earth is receding so fast from the Sun that the rate of shrinking sun is faster than the rate of shrinking moon. Smaller sun makes for a bit of totality near greatest eclipse. (The second entry into hybrids was the Titanic eclipse.)

The Earth reaches peak recessional speed from the Sun, almost 1150 MPH, around Mar 30 of the year. If the Earth's orbit were circular, a New Moon would always be approximately half a million miles closer to the Sun than a Full Moon. But in reality, the retreating effect from the Sun in late March is so strong that the new moons can be almost as far from the Sun as the full moon was two weeks earlier !! (within about 60,000 miles).

By May in Saros 137, the ever farther moon and slower retreat of Earth allow for pure annulars again. The eclipses remain annular a saros-year later in April despite another peak retreat from the Sun because the Moon is now simply too far away to be offset by a shrinking sun (moon is basically at apogee). Clear skies to all (well, at least clear horizons for the next few eclipses) Raymond Brooks

From : Jean Meeus <JMeeus@compuserve.com>

Raymond Brooks wrote: "It is true to say a perigee Moon will definitely make a solar eclipse total, since some perigee moons in January are too small and distant to cover the large perihelion Sun."

I am not convinced. It is true that some perigee Moons have a smaller angular diameter than the Sun in early January.

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It is true that, for instance, when the Moon reached perigee on 2001 December 6, its apparent diameter was only 32'17", which is smaller than the Sun's diameter of 32'32" in early January.

However, at that perigee the Moon was approximately at Last Quarter, so the major axis of the lunar orbit was nearly at right angles to the direction of the Sun. In such a case, the eccentricity of the lunar orbit is a minimum -- see, for instance, Chapter 2 of my "Mathematical Astronomy Morsels" (Willmann-Bell, 1997).

When the Moon is at perigee and when this happens at a solar eclipse, then the major axis of the lunar orbit is aligned with the Earth-Sun line; in such a case, the eccentricity of the lunar orbit is a maximum, making the Moon's perigee distance smaller than normal.

I didn't investigate this subject further, but I think that, when the Moon is at the perigee at a solar eclipse, its disk is always larger than the Sun's. Jean Meeus

From : Michael Gill <eclipsechaser@yahoo.com>

Hi Ray, Last year, after Derryl Barr brought the Saros 137 peculiarity to my attention, I looked into the composition and evolution of 250 Saros families.

I found just 14 Saros families (5.6%) that had just partial and total eclipses (i.e. P – T – P).

They were Saros numbers 11,14,17,69,72,75,127,130,179,182,185,234,237 and 240.

I found it interesting how a 3-integer separation between Saros families with this composition popped up so often. 58-integer separations between families also appear.

In the whole survey, 3-integer and 6-integer separations between Saros families with similar composition popped up very frequently. Michael Gill

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

For those interested in details about the individual eclipses comprising Saros 137, I have a table listing the entire series at:

<http://sunearth.gsfc.nasa.gov/eclipse/SEsaros/SEsaros137.html>

- Fred Espenak

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

For a concise summary of solar eclipse Saros series 1 through 175, see:

<http://sunearth.gsfc.nasa.gov/eclipse/SEsaros/SEsaros1-175.html>

- Fred Espenak

From : Rybrks1@cs.com

Thank you, Jean Meeus. That is the second time I fell into the perigee trap.

I reviewed the next century of lunar circumstances in Dance of the Planets and it supports your view. Considering a 60 day period centered on Jan 4 (perihelion) any perigee moon near the Sun (less than 50 degrees separation from the Sun) is larger than 32.5 minutes in size. So they are all as large or larger than the perihelion Sun and would result in a total solar eclipse. Although a century is a small sample, if 50 degrees separation can lock it in, it is likely that any perigee moon right at a solar eclipse (meaning zero separation) would result in a total eclipse.

Had I unwrapped your "Mathematical Morsels" books which arrived last week, perhaps I would have avoided my mental trap. Wonderful books, thanks again. Your plot of the solar system barycenter is delightful. I had plotted that myself a number of years ago but only out to year 2020.

Best of luck to all for nice skies. Actually some of the nicer photos from the 1992 annular sunset in California were accented with colorful clouds nearby. Raymond Brooks

From : Rybrks1@cs.com

The new moon this month was in Saros 99 and left Earth July 11, 1515 (old calendar) to the south as a partial. That is why it passes beneath the Sun this month. When it left Earth it was near perigee, perigee occurring over 2 days later. Now it is nearer apogee (May 10, 2002), new moon being less than 5 days after apogee.

Saros 99 started as annulars then changed to totals. After leaving Earth it changed again to annular (in Earth's vertical fundamental plane) 1641 Oct 4. If viewed from Earth's vertical fundamental plane this month it would still be an annular eclipse due to nearness to apogee.

Ray Brooks



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Hotelito Desconocido, Puerto Vallarta (Cont.)

From : Alcovedbase@aol.com To : solareclipses@aula.com Date : Wed, 1 May 2002 21:57:35 EDT

Hi, I have seen an ad of Holiday Inn (Puerto Vallarta) on the April 2002 issue of Astronomy magazine (page 96). The rate advertised was \$52 (believe it or not, fifty-two USD !!!) per night (double occupancy). I can't be sure if they still have rooms available though. Nevertheless, I would be trying there if I had not decided to go to Hawaii with my wife for the AAVSO meeting (<http://www.aavso.org/meetings/spring02.stm>). It's worth checking out that hotel. Good luck and have fun in Mexico! Haldun I. Menali

From : Rybrks1@cs.com

Jay.M.Pasachoff@williams.edu wrote " I gather that it may be difficult to get back from the band of annularity after sunset on June 10 to Puerto Vallarta..."

I am interested in why the difficulty? Poor road conditions or the chance of highway robbery?

Likely to be discussed at the Hard Rock Cafe the previous night? Ray Brooks

From : Jay.M.Pasachoff@williams.edu

There was a discussion about very, very poor road conditions.

From : Scott Bowers <hdemann@yahoo.com>

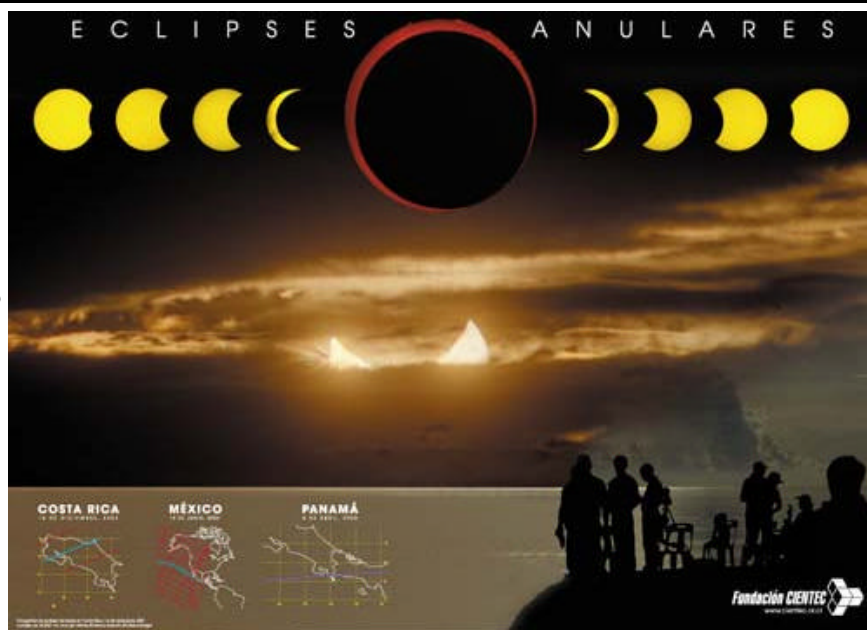
I think that it is highly unlikely that anyone will rob or kill you in this area. And the main road south of PV is in good condition. From, Scott



New Annular Eclipse Poster

From : Alejandra León-Castellá <leonale@racsa.co.cr> To : SOLARECLIPSES@AULA.COM Date : Mon, 06 May 2002

Dear eclipse followers, In preparation for the next Annular Eclipses in the region - Mexico, 2002 and Panama, 2005- and as a follow up to our Educational Campaign in Costa Rica, CIENTEC has produced a new poster with magnificent photographs taken in Costa Rica - last December by Vic & Jen Winter (Baily's Beads and setting sun) and Marco Tulio Saborio (phase sequence). Olivier Staiger also contributed with his wonderful picture of the watching crowd, taken in an earlier event. We want to thank them all for their support to this project that we hope will help Costa Ricans look back at the weather-frustrated-event in a more positive light and prepare for the future one in our neighborhood.



You can view an image of the Annular Eclipse Poster on our web site. <http://cientec.or.cr/astronomia/eclipse/index.html>

I hope to visit Puerto Vallarta and the Rock Cafe on the June 9th. I look forward to clear skies for this one. All my best to all of you, Alejandra



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Annular Eclipse, 2002 - Puerto Vallarta Convention

From : FAMA FAMA <famaastro@yahoo.com> To : SOLARECLIPSES@AULA.com Date : Sun, 19 May 2002

Annular Eclipse, 2002 - P.Vallarta Convention

Held from June 7th to 11th in Meliá Vallarta Hotel. Speakers include: Jay Passachoff, Harvard Observatorium Alejandra Leon-Castella, Fundación CIENTEC, Costa Rica

Jesús Galindo, Universidad Nacional Autónoma de México, UNAM Luz Ma. Calderón, Físicos Astrónomos Mexicanos y Asociados.

Cruise observation of the Eclipse.

Contact for information or help in your travel in Mexico: Susana Samohano susana@viajesnosana.com.mx

Clear Skies, Rafael Barbabosa, General Cordialator, FAMA

From : Jay.M.Pasachoff@williams.edu

Thanks. Please note: my name is spelled "Pasachoff," with 1 "s." My organization is Harvard-Smithsonian Center for Astrophysics

Would you like me to list the tour you are running on a mailing list of people interested in eclipses? Are spaces still available? What is the price? is there a Web site that lists the agenda? Jay Pasachoff

Lunar Limb Profiles

From : Egan Mark <astrophoto@yahoo.com> To : SOLARECLIPSES@AULA.COM Date : Thu, 16 May 2002

Does anyone know what the lunar limb profile will be for the June 10 eclipse?

Or for that matter, does anyone know if there is a way to obtain the lunar limb profile for any given date? Thanks a bunch!

Saturn on june 11-10

From : "wasy1 moszowski" <wasil@belgacom.net> To : <solareclipses@aula.com> Date : Fri, 24 May 2002 22:21:46 +0200

Hi, anybody knows where to imagine Saturn at the moment of central eclips? I'll be watching at the other side of the big ocean, probably on Talaud island. rgds, Wasy1, Brussels



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Path of Antumbral Shadow in Mexico (10Jun2002)

From : Jay Friedland <jay@cinemagic.com> To : "SOLARECLIPSES@AULA.COM" Date : Fri, 24 May 2002 08:27:14 -0700

Hello all, Has anyone calculated the path of the Antumbral Shadow for Mexico down to the second (or 5 seconds)? I just obtained a 1:50,000 topo map of the region and wanted to plot the data. I'll be glad to share (post to a website) if someone can provide the data or a pointer to a website with the data. Any data on the lunar limb profile would be a wonderful bonus. See you in Mexico! - Jay - Jay Friedland, Likes Shadows... Totals: 1991 Baja, 1994 Bolivia, 1995 Thailand, 1998 Galapagos, 1999 Austria Annulars: 1992 Catalina Island (clouded out), 1994 Erie, PA, 2002 Puerto Vallarta (fingers crossed!)

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

Jay - Here's a short table of coordinates at 15' steps in longitude. Just be aware that these coordinates do not include refraction which will be significant at such low solar altitudes. See my map of the eclipse path in Mexico posted at:

<http://sunearth.gsfc.nasa.gov/eclipse/ASE2002/ASE2002gif/PuertoVallarta3a.jpg>

The map includes my rough estimate of the path shift due to refraction. I don't have a table of refracted coordinates, but I generated the refracted path based on the unrefracted path, the Sun's altitude and azimuth. - Fred Espenak

Annular Solar Eclipse of 2002 Jun 10 Delta T = 64.4 s
Elev. = 0.0 m



Mapping Coordinates for the Path of Annularity on 2002 Jun 10

Longitude	Latitude of:		Circumstances on Center Line					
	Northern Limit	Southern Limit	Center Line	Universal Time	Sun Alt	Sun Az.	Path Width	Central Durat.
			h m s	° °	° °	km		
110°00.0'W	22°22.82'N	21°43.08'N	22°02.98'N	01:33:31	5.4	293	67	01m04.3s
109°45.0'W	22°16.42'N	21°36.50'N	21°56.49'N	01:33:34	5.2	293	67	01m04.4s
109°30.0'W	22°10.01'N	21°29.93'N	21°50.00'N	01:33:37	4.9	293	67	01m04.6s
109°15.0'W	22°03.61'N	21°23.35'N	21°43.51'N	01:33:40	4.6	293	67	01m04.7s
109°00.0'W	21°57.20'N	21°16.76'N	21°37.02'N	01:33:42	4.4	293	68	01m04.9s
108°45.0'W	21°50.78'N	21°10.18'N	21°30.52'N	01:33:44	4.1	293	68	01m05.0s
108°30.0'W	21°44.37'N	21°03.60'N	21°24.02'N	01:33:47	3.8	293	68	01m05.1s
108°15.0'W	21°37.96'N	20°57.01'N	21°17.52'N	01:33:49	3.6	293	69	01m05.3s
108°00.0'W	21°31.54'N	20°50.43'N	21°11.02'N	01:33:51	3.3	293	69	01m05.4s
107°45.0'W	21°25.12'N	20°43.84'N	21°04.51'N	01:33:52	3.1	294	69	01m05.6s
107°30.0'W	21°18.70'N	20°37.25'N	20°58.01'N	01:33:54	2.8	294	69	01m05.7s
107°15.0'W	21°12.28'N	20°30.66'N	20°51.51'N	01:33:55	2.5	294	70	01m05.9s
107°00.0'W	21°05.86'N	20°24.07'N	20°45.00'N	01:33:57	2.3	294	70	01m06.0s
106°45.0'W	20°59.44'N	20°17.48'N	20°38.50'N	01:33:58	2.0	294	70	01m06.1s
106°30.0'W	20°53.02'N	20°10.89'N	20°31.99'N	01:33:59	1.7	294	71	01m06.3s
106°15.0'W	20°46.60'N	20°04.31'N	20°25.49'N	01:34:00	1.5	294	71	01m06.4s
106°00.0'W	20°40.17'N	19°57.72'N	20°18.98'N	01:34:00	1.2	294	71	01m06.5s
105°45.0'W	20°33.75'N	19°51.13'N	20°12.48'N	01:34:01	1.0	294	71	01m06.7s
105°30.0'W	20°27.33'N	19°44.54'N	20°05.97'N	01:34:02	0.7	294	72	01m06.8s
105°15.0'W	20°20.91'N	19°37.96'N	19°59.47'N	01:34:02	0.4	294	72	01m07.0s
105°00.0'W	20°14.49'N	19°52.97'N	01:34:02	0.2	295	72	01m07.1s	

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June 10 Timeline

From : Rybrks1@cs.com To : SOLARECLIPSES@AULA.COM Date : Wed, 29 May 2002 11:51:12 EDT

Dear All; Just for grins, to make the anticipation time leading up to the local events more fun, here is a timeline. Print a copy and bring it to PV, it makes the day more fun.

Best I can tell PV goes to Daylight Savings. If not, please adjust times.

PUNTA La IGLESIA

TIMELINE

Times are local Puerta Vallarta, CDT (UT minus 5 hours) Local Events are where Northern Limit makes landfall west-south-west of Puerta Vallarta at Latitude: 20 Deg 29 Min North, Longitude: 105 Deg 35 Min West

June 8, 2002 16:34 CDT Earth and Sun at Moon's ascending node. Since eclipse occurs 2 days later when Sun is about 2 degrees left of the node, the path will have a positive gamma, + 0.1992.

JUNE 10, 2002

TIME Event

HH:MM:SS



01:09	Uranus rises Azimuth 103 degrees. Magnitude +5.8
01:18	Antares in Scorpio transits
01:19	Solar viewpoint: Moon lower limb aligned with Earth lower limb, climbing 5 degree slope, Moon center 4.6 Earth diameters left of Earth center
02:01:39.7 46.5	Precisely local midnight (at listed coordinates) Sun due north, altitude minus
06:21	Mercury rises, Azimuth 72 degrees, magnitude +2.0
07:02:10	Moonrise (not visible, sky too bright) Azimuth 67 degrees
07:21:10	Sunrise, Azimuth 65 degrees, Moon 5 deg to upper right
07:21:20	Saturn rises 2 degrees to right of the Sun (not visible)

Approach Phase

With the length of the umbra cone elongating about 2.3 mile every hour and the antumbra diameter shrinking 1 mile in diameter per hour (measured at Earth center distance), the penumbra and antumbra approach their contact points on the leading limb of Earth, P1 and U1.

The umbra cone is increasing in length because Moon is receding from the Sun at 560 mph (Earth/Moon system is receding from the Sun at 460 mph and the Moon is approaching Earth at 100 mph.) The apex of the umbral cone will come closest to Earth at maximum magnitude (see below), 904 miles above Earth.

08:19	Penumbra edge 16,000 miles from limb of Earth (point P1) ~2 Earth diameters away
12:05	Penumbra edge 8,000 miles from limb of Earth (P1) ~1 Earth diameter away
12:52	Moon (76 alt) locally directly above Sun (74 alt), same azimuth 78
13:08	Antumbra edge 8,000 miles from limb of Earth (point U1)
14:01:45.7	Local noon, Sun due north, altitude 87.4 degrees
15:01	Antumbra edge 4,000 miles from limb of Earth (U1), 1 Earth radius



(Continued on page 50)

(Continued from page 49)

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P1 15:51:50 60 miles inland from the north shore of New Guinea in the lowland forests on the Mamberamo River. First opportunity on Earth to see partially eclipsed sun - moon bites top of sun at local sunrise. This can actually be seen almost a degree west (about 61 miles west-southwest) of the site indicated (for a standard atmosphere) due to refraction. For the site indicated, the sun would simply be about 1.8 diameters above the horizon. If we included non-forecastable atmospheric conditions that can create the green flash effect then the very farthest location to the west that could witness initial first contact would be as much as another 4 miles west and a bit sooner. But basically everyone along a line from the site to that max west point would see contact at nearly the same time - the farthest point west perhaps witnessing contact up to 4 seconds sooner, depending on specific refraction effects.

16:01 First contact in Guam
16:03:30 Most easterly location to see first contact at sunrise in the Gulf of Carpentaria (North Australia) near Wellesley Islands

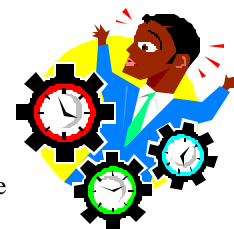
16:18 Moon locally is 1.5 degrees directly below Sun in west, azim 281
16:37 Venus transits local meridian, due north, 87 degrees altitude, magnitude -4.0, hopefully no clouds thus visible naked eye
16:42 First contact in Tokyo

16:53:50 U1, first part of Antumbra contacts Earth, first chance on Earth to see annularity begin
16:55:10 U2, All of antumbra on Earth, last part of antumbra lands on Earth,

17:09 Maximum magnitude in Guam, 0.98
17:10 First contact in Peking, (Peking is over 1000 miles west of Tokyo so one would think Peking would experience first contact before Tokyo. Because the Earth is tilted so much toward the Sun June 10, as the penumbra expands northward it initially advances to the west reaching Peking later.
17:39 Maximum magnitude in Peking, 0.12
17:41 Maximum magnitude in Tokyo, 0.46

17:47:45 Most westerly location to see last contact at sunrise, in Tebetan Plateau about 400 miles NE of Mt Everest
17:59 P2, Last opportunity at sunrise to witness last contact, C4. On the west shore of Burma across the gulf from Rangoon.

18:04 First contact in Hawaii
18:09 Last contact in Peking
18:29 Last contact in Guam, First contact in Pensacola, Fla
18:35 First contact in Anchorage
18:45 Last contact in Tokyo



The following 4 events with *asterisks occur in Pacific Ocean 500 miles north of the Midway Islands. Time is P. Vallarta, UT-5

G0* 18:44:18 Latitude 34.55 North, Longitude 178.6 West Instant of greatest eclipse, antumbra footprint is least elliptical, closest to Earth's center.

If the Earth were clear glass, a person could view the annular eclipse at the instant of greatest eclipse on the opposite side of Earth from a glass-bottom boat 400 miles off the Angola shore by looking almost straight down (alt -78.5, azim 12). Annular duration would go up to 1:31 because of the much smaller moon even though the relative velocity increases to 3133 mph due to the reverse motion of the observer.

noon* 18:48:16.5 Mid eclipse at local noon Lat. 34.92 North, Longitude 177.19 West,

D* & M* 18:49:31.2 Shortest duration and greatest magnitude Moon assumes largest size ratio relative to sun Latitude 35.03 North, Longitude 176.74 West Duration 0.083 seconds shorter than G0 Usually, the inflection point of duration and greatest

(Continued on page 51)

magnitude are at different sites and times but for this eclipse three effects essentially offset each other at this location, site vs. antumbra differential speed, Earth curvature and approaching Moon.

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18:48	Maximum magnitude in Pensacola, 0.27, sets before eclipse ends
18:51	First contact in Whitehorse, Yukon
19:06	First contact in San Francisco
19:21	First contact in Denver
19:28	Maximum magnitude in Anchorage, 0.28 First contact in Chicago
19:29	P3, First opportunity at sunset to witness first contact, C1, occurs near Georgia/Florida stateline east of Valdosta, GA
19:31	First contact in Buffalo, NY
19:31:12	First contact locally, lower right, 196 degrees CCWfV
19:32	First contact in Calgary
19:39	Maximum magnitude in Whitehorse, 0.25
19:42	Maximum magnitude in Hawaii, 0.52
19:45:07	Most easterly location to see C1 at sunset, Quebec, Canada
19:50	Maximum magnitude in Buffalo, 0.17, sets before eclipse ends
20:01	Maximum magnitude in Calgary, 0.34
20:10	Maximum magnitude in Chicago, 0.31
20:16	Maximum magnitude in Denver, 0.50 & Frisco 0.72
20:19	Last contact in Anchorage
20:22	Last contact in Chicago
20:26	Last contact in Whitehorse
20:49	Last contact in Calgary
20:33:26	U3, First part of Antumbra departs Earth
20:34:40	U4, Last chance on Earth to witness end of annularity
20:33:42	Max eclipse locally
20:41:30	Sunset locally
21:06	Last contact in Hawaii
21:08	Last contact in Denver
21:19	Last contact in San Francisco
21:26:30	Most westerly location to see C4 at sunset, 1200 miles off Baja coast
21:36	P4, Very last opportunity on Earth for anyone to witness last contact, C4 occurs 750 miles offshore from Baja, Mexico



All times calculated by Raymond Brooks, StarEngineering Rounded to nearest full second or minute.

From : Evan Zucker <ez@AbacusTotality.com>

What an impressive piece of work! I've never seen anything like this for any eclipse. The amount of detail is amazing, and you included eclipse tidbits that I've never before seen discussed, at least not to that degree. My only quibble is a parochial one. According to my calculations, the highest magnitude eclipse anywhere in the U.S. is in San Diego. It would have been nice to have mentioned that and included San Diego among your listing of cities, such as Denver and San Francisco, both of which are smaller than San Diego. But that's okay -- we San Diegans are used to being overshadowed by flashier cities <g>.

From : "Patrick Poitevin" <patrick_poitevin@hotmail.com>

Ray did the same for last years 2001 June Eclipse. His work was published in the April 2001 part B of the Solar Eclipse Newsletter. See <http://sunearth.gsfc.nasa.gov/eclipse/SENL/SENL0104B.pdf> It was also including info about the Saros. See pages 64 to 71 for the whole contribution of Ray. PP

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2**Tour to Total Solar Eclipse 2002 Ceduna or Lyndhurst**

From : "Amanda Forbes McKinnon" <charters@waywardbus.com.au> To : <eclipse@hydra.carleton.ca> Date : Fri, 17 May 2002

I am the charter coordinator for a south australian based tour operator. We specialise in small group touring in mini coaches but can access larger vehicles for the eclipse.

We have 2 tours to Ceduna at \$1490 per person (depart and return to Adelaide - 7 day - fully inclusive) - see our website www.waywardbus.com.au/eclipse.html

I have some group options in the Flinders Ranges at Angorichina Village - approx 1.5 hrs drive from Lyndhurst, based on 3 night minimum & includes all meals - cooked breakfasts, morning tea, lunch, afternoon tea, dinner, supper, \$350 per person (also includes transfers, guided walks and hikes to Blinman Pools, Wilpena Pound hiking with options for St Marys Peak, trip to Chambers Gorge to view aboriginal art, mountain bike riding, 'feral' bbq including kangaroo & emu, visit to winery at Mintaro and optional visit to Martindale Hall, the 'school' for Peter Weir's film, Picnic at Hanging Rock) - can take up to 100 pax, approx. 40 in cabins (these would be based on up to 5 pax per cabin sharing \$440 pp), 20 in bunkhouse (\$390pp) and up to 40 in the campground (\$350pp), David & Caroline are the hosts and have a website www.angorichinavillage.com.au/accommodation.htm - view the area but please contact Wayward Bus for details.

Our regular 8 day tours from Alice Springs to Adelaide or Adelaide to Alice Springs have been adjusted to take in the Eclipse at Lyndhurst (where there is also a Eclipse Music Festival) and our new 10 day tour that includes a swim in the waters of Dalhousie Hot Springs (the water is thought to be several million years old!) in the Witjira National Park is also passing Lyndhurst around this time! If you would like to know more please contact me at amanda@waywardbus.com.au Thanks, amanda McKinnon

TSE2002 simulation

From : "F.Podmore" <podmore@science.uz.ac.zw> To : solareclipses@aula.com Date : Sat, 25 May 2002

Now another query about TSE2002 - which website has a simulation of what the eclipse will look like from various places (e.g. Harare)? [Klipsi - I thought you would have one - have you??]

Treating the solar disc as a clockface, with 12 at the top (furthest from the horizon) where will first and fourth contacts be? [Sorry Fred, I'm still confused by the values in your bulletin to be sure which ones give this information - I think your bulletins should include a diagram and a bit more explanation of eclipse terms and geometry] Thanks, Francis --

From : timo.karhula@se.abb.com

Hi Francis, The parameter you are searching for is called the Vertex angle. 0 degrees means up towards the zenith, 90 due left, 180 down and 270 means due to the right. If I use Chris O'Byrne's Javascript Eclipse Calculator (<http://www.chris.obyrne.com/Eclipses/calculator.html>) and enter the coordinates of Harare (latitude 17d50' S, longitude 31d03' E and altitude 1500 m), it gives the Vertex angle of 30 degrees for the 1st contact. V=30 means up towards the left ("11 o'clock"). Fourth contact happens at V=213 ("5 o'clock"). There is no total eclipse in Harare, however. /Timo Karhula

Weblog by Jay Pasachoff

From : "Patrick Poitevin" <patrick_poitevin@hotmail.com> To : SOLARECLIPSES@AULA.COM Date : Thu, 23 May

Weblog by Jay Pasachoff, jay.m.pasachoff@williams.edu

I went to Ceduna in May 2002 to check on the eclipse arrangements. Here is my Weblog plus various references. See www.eclipses.info for our site of the International Astronomical Union Program Group on Public Education at the Times of Eclipses, with a link to the site for the IAU's Working Group on Eclipses, both of which I chair. I took various photographs on print film, which I will have delivered and scanned on my return to the US. At that time, I will post them on a suitable Web site. There will be at least a link at www.eclipses.info and at www.williams.edu/astronomy/eclipse. If anybody wants me to bring back anything special, such as local maps, please let me know right away (@US\$10 ppd). We will be in Australia through Friday morning.

Friday, May 10

(Continued on page 53)

Naomi and I flew from Boston to California. This schedule gave us a night to sleep in a real bed before boarding the over-night flight to Australia.

Saturday, May 11

We flew Qantas 108 on its American codeshare out of LAX at 11:45 pm. The Qantas staff was very friendly throughout. The 14h40m flight is so long that we were able to sleep 7 hours; having an empty seat between us helped. Leg room was OK, though not fabulous. The seating is 3-4-3 on the Boeing 747. We brought sandwiches with us, which we were glad to have in the middle of the night, though there was a dinner and a breakfast served, both of which were fine, as well as a snack just before landing, which we found both tiny and unappetizing. Through a contact on Patrick Poitevin's Solar Eclipse Mailing List, Dale Ireland has supplied me with four rolls of film to test the cumulative effects various x-ray machines. I have one roll in a lead bag in my carry-ons (which I am allowing to be x-rayed), one roll in my carry-on camera case outside the lead bag, and one roll in my check-in suitcase. The fourth roll, a control, is on my table at home in the U.S.

Sunday, May 12

We had no May 12 because of the International Date Line, unless you are keeping track of changing time zones on board.

Monday, May 13

We arrived in Sydney slightly early, ahead of our 7:25 a.m. scheduled arrival time. There was a half-hour wait for passport control. We had "electronic visas" issued through the airline; they were in our computer file at Australian customs, so we didn't even need the printouts we had showing them. The time change from LAX was 17 hours, and from Boston was 14 hours. That is, the time zone in Sydney is 14 hours later than the time zone in Boston or New York. That change is for May, in which Boston is on Daylight Saving Time and Sydney isn't. During the eclipse time of December, that situation should be reversed, and the time difference from the US East Coast will be 12 hours. South Australia is 1/2 hour different (earlier), so there is now a 13.5 hour time change. In December, assuming that South Australia has Daylight Saving Time, it should be 11.5 hours later than Boston time. (I love these 1/2 hour time zones, which exist rarely. I am especially fond of the 45-min time zone for Nepal, and of the fact that giant China is all in a single time zone. I discuss such things in my textbook on astronomy, so follow the latest time-zone changes.) The taxi rank at the airport at that hour had no waiting and lots of cabs. The trip to Sydney took only 25 minutes and cost A\$38; we tipped 10% making it A\$42. We understand that tipping is really optional here. The exchange rate is now about US\$1=A\$1.80, so the taxi fare was about US\$23 including tip. We are staying at the Park Hyatt Sydney and have an upgrade to a very nice room with a fantastic view overlooking the Opera House. We are in a district called The Rocks, which has been reclaimed over the past decades to become trendy. Five minutes away is Circular Quay, from which ferries leave for all kinds of destinations in the Harbor. Other hotels are also close by. The weather today is about 70 degrees and completely sunny. My first business in Australia is to get a cell phone, which we did at the Telstra office. Telstra is the main Australian telephone company, and has the

widest coverage, which includes Ceduna and the area around it. I was able to get a phone for only A\$129, which included A\$50 of free calls. So I wound up paying only about A\$80=US\$45 for the phone itself. The number, valid through eclipse time and beyond, is 0409 220 873; from the US, one dials 011 61 409 220 873. I tried to use my two Zambian GSM cell phones, but they were "network locked" and though we went to the repair place they sent us to, the phones couldn't be unlocked at the moment, and the A\$35 charge apiece for unlocking them made using these phones not a big saving over buying a new one. Incidentally, it is undoubtedly cheaper just to buy a phone in each country you are in for some time (I already have a British cell phone, for example) than to use a GSM provider like the US's VoiceStream and have calls forwarded around the world--the standard US cell phone systems don't work in Australia (or Europe or most other places in the world). With the Telstra phone, there is no charge for incoming calls. And the rate to call the US is, they say, only 33 Australian cents per minute, about US\$0.20. I verified that later on with a call to the US. (I also have a callback arrangement with a US company for about that rate; see www.debitalk.com to get a pre-paid account that will call you back at any location worldwide with a US dialtone that you can use to make calls at a good rate, a much better rate than ATTDirect or any other direct dialing from ground phones.) We went to HalfTix, the half-priced theatre ticket organization. See citysearch.com.au. They are at 201 Sussex Street, Sydney NSW 2000, telephone +612 9286 3310, fax +612 9286 3334, shows@halftix.com.au. There is lots of theatre on, but it is Monday, when few shows play. None of the ones we wanted to see was available at HalfTix. HalfTix is near the entrance to Darling Harbor, about a half hour walk uphill from The Rocks. This Harbor is lined with restaurants as part of modern malls, plus the National Maritime Museum (which we hear is excellent) and the Aquarium. After lunch, we went to the IMAX to see the Shackleton movie about his Antarctic epic voyage of 1915-6. It was a fascinating and unbelievable story. The IMAX gave a good perspective about what the Antarctic is like, good preparation for the 2003 eclipse expedition. We could have taken a water taxi back to the Opera House or Central Quay though we decided to walk the half hour, largely downhill. We decided to see Copenhagen, the play by Michael Frayn about the 1941 encounter between Niels Bohr and Werner Heisenberg. It was one of several plays being presented by the Sydney Theatre Company. Copenhagen was playing at the Wharf Theatre on the Rocks. The STC also had a play by the Australian playwright David Williamson at their venue

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in the Sydney Opera House; Williamson has three plays currently on the boards, so is indeed prolific and popular. (Madonna just opened in London's West End, to mostly bad reviews, in the starring role of yet another play by Williamson.) With our sleep on board, and a one-hour nap in the morning, we aren't feeling too much jet lag, though I did nap on and off during the first act. I revived for a light dinner at the hotel after the theatre, which--fortunately--had an early curtain: 6:30 pm.

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Tuesday, May 14

I talk to an official at Australian customs about duty free and tax free importation of goods. The most straightforward way to import goods is with a Carnet, available in the US, in which you list the goods you are bringing in and are given forms to carry with you to have stamped at various customs places. We typically have 3000 pounds (1500 kg) of telescopes and electronic equipment, so need careful customs exemptions. The Carnet costs some hundreds of dollars, depending on the value of the goods, so I prefer to work with a customs broker, when possible. But ordinary eclipse watchers, with much smaller amounts of equipment, should just do fine with ordinary luggage, or should look into the Carnet. I will have to check the URL; www.carnet.com is a possibility, or look up "Carnet" on Google. The customs official says that customs would accept a Letter of Understanding arranged in advance, for which I would need a customs broker. I would rather pay the broker than pay for the Carnet, but those with lesser equipment would probably not. Any reader involved in large amounts of equipment for temporary eclipse importation can contact me for more details. The weather has turned to gray and drizzly, as winter approaches. We walked over to the State Library of New South Wales and saw an interesting exhibition of press photos. We walked further through a park to the Art Gallery of New South Wales, which has an outstanding collection of Australian art and a few European masterpieces (a Picasso, two Braques, a Van Gogh, etc.). We took a tour there and heard the beginning of a noon demonstration of aboriginal music. We returned to our hotel to talk with Stewart Campbell of Adventure Associates (www.adventureassociates.com) about the Russian icebreaker going to the 2003 eclipse in Antarctica. Vic and Jen Winter (www.icstars.com) are also booking berths for this month-long trip. We now know much more about Antarctic travel than we did. The trip should be long and difficult though fabulous. Fred Espenak and John Parkinson of the UK are the two astronomical experts scheduled so far; I am hoping that I will also be invited to lecture; this would be my 24th total solar eclipse and my 36th solar eclipse of all types. We then met Mark Sood, my travel agent, with whom I have arranged tours to India in 1980, India in 1995, Mongolia in 1996, Aruba in 1998, Romania in 1999, and Zambia in 2001. See www.solareclipssetours.com for the itinerary we have worked out for the 2002 eclipse in Ceduna. He also has space allotted with Adventure Associates for the 2003 Antarctic icebreaker expedition. Mark was with his local travel agency connection, a lively and competent woman from Canberra named Lisa Mehonoshen. Meeting her gave us confidence that the local Australian arrangements would be well handled. Since we hear that they may have 35,000 people in the vicinity of Ceduna, a town of 3,500 inhabitants, having good arrangements in advance seems very wise. We had dinner with David and Philippa Malin. David is the noted photographer who took the fantastic color images with the Anglo-Australian Telescope. He has now reprocessed them all digitally. You can see them at his site; you can link through it via my own textbook's site at www.solarcorona.com, and then clicking on Update by Chapter and using the link in the Telescopes and Observatories chapters. David has just completed a 33-minute film to accompany the Australian composer's Ross Edwards's Fourth Symphony, entitled "Star Chant." The film played along with a symphony orchestra, and the event opened in Adelaide, and will be used for the Opening Ceremony of the International Astronomical Union in Sydney in July 2003. Malin morphed his own astronomical images along with images from Hubble and elsewhere, using software to scan around within the images on a slow basis.

Wed, May 15

The Sydney Biennale 2000 art exhibition opened today in several venues around town, and we saw the assortment of mostly weird artworks at the Museum of Contemporary Art in the morning and at the Art Gallery of New South Wales in the afternoon. At lunch, we consulted with two colleagues from T.A.F.E., the local branch of the Training and Further Education system in Australia about physics modules they are making for teaching purposes, providing lab experiences on computers. The weather was rainy off and on all day. We had considered going to a play or ballet at the Opera House at 8 pm but at 5 pm I lay down in the room and was soon out cold. My wife also fell asleep and we woke up only at about 2 am. So I guess we hadn't handled the time change as well as we had thought.

Thursday, May 16

We left at 5:45 am for the airport and were there in a taxi by 6:00 am, for the same A\$28 (A\$32 with tip, which we gather is really optional in Australia). We had no problem getting all our bags on Qantas, but I am worried about the small plane (19 seater, we hear) on Kendell Airlines from Adelaide to Ceduna, so have arranged to be met at ADL by a driver from Citicar, who will take two of our bags to the hotel in Adelaide to which we will go in three days. Interestingly, Adelaide and Ceduna are in a time zone that is 1/2-hour earlier than that of Sydney, making it 13.5 hours later than NYC. All those arrangements

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worked fine. The trip to ADL was smooth. The driver met us and took the bags. We went to the Kendell counter, which is still under a big sign with the defunct Ansett name. (When I asked if Kendell gave airline miles, the man said that they were under receivership [from bankruptcy] and that such niceties may be restored when someone takes over the airline.) We hear that we are allowed 15 kg each checked luggage, and kept ourselves to one 30 kg suitcase + a big camera bag + a computer case + a briefcase + (for my wife) a large purse and a tote bag. The check-in person at Kendell preferred to check most things in and weighed everything, though he didn't charge any overweight. I think for the small plane they just have to know the real weight. We are boarding carrying only (for me) the computer case + a single camera I extracted from my camera case and (for Naomi) her purse and her tote. We waited in the Qantas Club, showing up at the gate 5 minutes before the boarding time we were given by Kendell, only to find that everybody else was already on board and that they were awaiting us. But the other people had only just gotten on board and the luggage was just arriving at the snazzy small plane, which seats about 19, one person on each side of the aisle. So there was no harm done. There was no room at all on the plane overhead for luggage, so I see why everything had to go in the hold. Indeed, they took half of the bags we still had and put them in the hold. I kept out only a single camera and a book and newspaper. The 90-minute trip from ADL to CED went over some water and then a peninsula. Then we flew over clouds, and when we could see through the clouds we saw only barren fields--everything brown but divided into rectangles. Eventually we came in for a smooth landing down a runway that pointed at a town beyond, nicely visible through the cockpit front window. At the airport, there are two competing rent-a-car company, and we rented a small always-on four-wheel-drive cute red vehicle. Bevin, whose company this is, is apparently the largest local rental car person and has 60 vehicles. Last year, he supplied all the cars for the episodes of Survivor that were filmed not far from here. (T. Bevin, Ceduna Rent-a-Car, phone +61 8 8625 2085, fax +61 8 8625 2820, mobile +61 407 603 223, cedrent@tpg.com.au, PO Box 571, Ceduna SA 5690) There is also a Budget Rent-a-Car office, tel 08 8625 2742, fax 08 8625 3201. We were met by the people whose house we have rented for the eclipse period. I will cover our very nice interactions with them in a private Weblog for my own group. It is about 5 km to town from the airport. It is a charming town, with a cross of streets that has stores for about a block in each direction. A set of distance signs in the middle of the main intersection has notations like "Port Lincoln 414," "Port Augusta 470," "Adelaide 781" and "Perth 1964" (km). It is about a 7 hour drive from Adelaide. A look at the map shows that there are wide stretches of national parks and other restricted areas to the north of route A1, which goes from Adelaide to Perth. So there are literally no north-south roads. It would not be possible, once you are out on the road near Ceduna to drive north-south; only the east-west distance is available for eclipse chasing, so I think for this eclipse you have to pick a spot and be resigned to whatever weather you find. Town has two supermarkets, a bakery with sit-down tables, two banks (I opened an account at ANZ to help with my eclipse expenses), a dry-cleaners, a laundromat, a hardware store, at least two appliance stores, and a clothing store. There are a few informal restaurants for take-out and sit-down, including a Chinese restaurant where we wound up having dinner. But all these facilities will be very overloaded during the eclipse. The Town Council has appointed a coordinator, Rob Curkpatrick, an Adelaide man who is experienced in arranging large events. They think there might be 20,000 or even 35,000 (I heard once) in this town of 3,500, so they are trying to make sure that food, sanitary facilities, and other arrangements are in place. I know little about the tent cities that are to be set up. Naomi and I meet with Rob in Adelaide on Monday, at which time I will learn more. There is no internet cafe. I will ask Rob about arrangements for e-mail during eclipse time. I myself will use at least the dial-up of the people with whom we are staying. They are looking into the possibilities of installing a higher speed line. My Telstra Australian cell phone works fine, though there is also the possibility (likelihood?) of the circuits being overloaded at the eclipse period. I will suggest to Rob that he work with Telstra to temporarily beef up their wireless capabilities. One block down from that main town intersection is the sea. There is a lovely park along the beach extending several blocks to either side, with a wharf extending straight out, due west (since Ceduna is on the east side of a bay). Everybody refers me to Rob to find out just what parts of this park will be restricted and what parts will be open to the public on eclipse day. Beyond the park are roads to the north and the south, so there is a lot of space along the roads where people can stop to see the eclipse. Note that it may be 40 degrees C (104 degrees F) or even more, so that it may be quite tough during eclipse day, and that I don't know yet what sanitary facilities will be available. (We later saw that the record high temperature in December is 47 degrees C = 117 degrees F. But it could also be 25 degrees C = 77 degrees F for a daily high, which would be nice weather.) The Thevenard neighborhood perhaps a kilometer to the south of downtown has a turnaround and a wood platform looking over the sea, and will also be wonderful for eclipse watching--though unable to handle all the people. I have heard that there may be tents near here--inland, off the shore. The view away from the shore is of a huge grain silo complex, which is also visible on the horizon from the shore near town. We visited the Ceduna Tourist Center and met Margie Stott there (pronounced with a hard "g"), who is in charge. She handles housing, including home stays, and some small amount of that is still available. (telephone 1 800 639413 or +61 8 8625 2780, fax +61 8 8625 3294, travelce@tpg.com.au, PO Box 57, Ceduna SA 5690) The eclipse watching details have been handed off to Rob. Some eclipse tee-shirts are already available in the center, which includes a travel agency, and local souvenirs like stuffed koalas are on sale. I forgot to inquire about internet facilities there (there is a sign on the window that indicates they are available),

but plan to do so tomorrow. We slept at the Highway One motel, on the outskirts of town, which makes it about 1/2 mile from the center of town. There is also a Best Western in town + one other motel. All, of course, are booked for the eclipse time.

Friday, May 17

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We had breakfast at the Bakery downtown--muffins, pastries, bacon and eggs, etc. We met Phil Taylor by appointment; he is setting up a tent city for about 250 people at Thevenard Oval, that is, the football field out near Thevenard Point. He has a viewing area, which we visited, at Thevenard Point, a couple of kilometers east of the city along the coast. The people would walk or take a shuttle bus for about 5 blocks or so between the Oval and the viewing area. Phil's e-mail is pjtaylor@cedunatours.com, mobile 0419 833 199. We did some e-mail at the Visitor's Center. They have only one computer there, so there will be total overload at eclipse week. I will mention that point to Rob, as well as suggest that he try to get Telstra, the telephone company, to bring more capacity for the cellular network. I asked Phil whether it was true that the area around was so barren that there would be nothing to see if we drove for an hour or so in each direction. He disagreed, and suggested some trips. About an hour west is Cactus Beach, a surfing beach. Two or three hours away are some aboriginal rock drawings. While I was finishing my hour of e-mail, he had a business emergency, and Naomi and I drove up to Cactus Beach in our own 4wd. It was 70 km to Penong, the next town on the map, which turns out to be a crossroads with an old-style hotel that wasn't serving any food, a BP gas station that had some cheap sandwiches, and a general store at which we wound up buying some cheese. It would have been nice if we had brought along utensils. We took the cheese and some toast we had down to the beach at Sinclair Point, another 20 km. For the last 5 km, we saw gypsum sand dunes and some low pools, both of which were pretty. At the beach turnoff, there is a small parking area and a modern wood set of beach boardwalk stairs. We could see a half dozen surfers in the water, and watched them occasionally catch a wave. The drive took us across the beginning of the Nullarbor Plain, so named because there are literally no trees. Even in the first part of the drive, there were a few trees alongside the road, but basically none across the plains on all sides. For eclipse watching, though, there were broad shoulders on the two-lane road, and we could imagine people stopping their cars along the road. But it is hard to imagine how hard the conditions would be if it is 100 degrees Fahrenheit or even 90. People could die of dehydration. I myself would not go to the area unless I had accommodation with food and shelter reserved. After the excursion, I concluded that I had been right at first--there is nothing to see on a drive an hour or so away from Ceduna. Later in the afternoon, Mark Sood, my travel agent from Los Angeles, came into town with his local travel agent. Our tourist expedition, which is separate from my student/staff research trip, is listed at www.solareclipsetours.com. We have run tours together to India in 1980, India in 1995, Mongolia in 1997, Romania in 1999, and Zambia in 2001. We went together to see the site he has worked out for the group with Phil Taylor, an absolutely gorgeous site at the Shelley Beach campgrounds, which has 1 km of private coastline. The viewing will be from an area on top of dunes, with a pretty view over the sea one bay east of Ceduna. The tents they are setting up are just below. It would be nice if I could put my scientific equipment here, because of the unimpeded view, but it would be too hard, we think, to get sufficient electricity, shelter, etc., for the whole week prior to the

eclipse that we need for setting up and aligning equipment. We are trying to make do at the house we have rented, but are checking to make sure that the sun is high enough at eclipse time to clear the trees that are between the house and the sea. A weather front is coming in with rain, and we succeeded in changing our Kendell reservations from Sunday to tonight. Since we have seen everyone we wanted to see here, and have seen all the sights we wanted to see, we may as well have the rainy weekend in Adelaide. It wasn't easy to change the Kendell tickets, which had to be done on the long-distance telephone. Even at the airport there was nobody with authority to change the tickets, since boarding at the tiny terminal is handled by the local travel agent at the Tourist Office. Kendell's Australia telephone number from anywhere in Australia is 131300. Here is the current Kendell schedule, but it is subject to change, and nothing is planned more than 3 months ahead because of the receivership:

Adelaide to Ceduna

KD 372 7:10am-8:40 am Tues, Friday

KD 372 10:35 am-12:10 pm Wed, Thurs

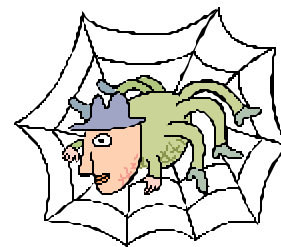
KD 374 6:10 pm-7:45 pm Sun, Mon, Tues, Fri [there is no flight on Saturday]

Ceduna to Adelaide

KD 373 8:55 am-10:15am Tues, Fri

KD 373 12:25 pm-1:45 pm Wed, Thurs

KD 375 8:00pm-9:20pm Sun, Mon, Tues, Fri



One just has to be at the airport a half hour before the flight, and nobody is there before then. The plane is a 19-seater Saab pro-

(Continued on page 57)

pellor plane: 8 rows with one seat at each side of the aisle and a back row three across. The ceiling is so low that one can't even stand up in the plane while boarding.

The trip from the airport to the Hilton in town was literally 10 minutes in a taxi.

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Saturday, May 18

Adelaide is a planned city, set out in a grid in the mid-19th century. The square grid is surrounded by parkland on all sides, so the center city is quite compact and very walkable. The population listed in the guidebook is 1.7 million, but that obviously includes surrounding areas. Hotels are relatively cheap compared with Sydney or Melbourne. Our hotel is on Victoria Square, a large area dead center in the planned grid. It is bounded by handsome 19th-century buildings. We walked up the broad King William Street to the north. Four blocks up to the right is a long shopping street, now a pedestrian mall, called Rundle Mall. Of it are all kinds of stores, and even two cinemas and an IMAX. We saw the new Star Wars, Episode 2, on a huge screen with stadium seating and a top-quality sound system. Before and after the movie, we went one block farther north and saw the aboriginal artefact collection (the Australians and the British write "artefact" for what Americans write "artifact") at the South Australian Museum. It is a fine collection, with thousands of spears, ornaments, masks, etc. The museum has recently been modernized, and the Australian aboriginal display has been nicely and carefully updated and mounted. The Pacific Island artefact collection, by contrast, is in a rather more old-fashioned set of museum surroundings. The Mundrabilla meteorite, 2500 kg (out of the original 5000 kg), collected in the Nullarbor Plain, is at the museum's entrance, and other meteorites are upstairs. Tomorrow we plan to go to the South Australian Art Gallery. We stopped into the adjacent South Australian Library, and briefly looked at the only exhibition there--one about the famous cricketer Don Bradman. For those in cricket countries, he is more famous than Babe Ruth is in the U.S.A., I am told. We tried hard to get an International Herald Tribune, but it is just not available anywhere in Adelaide. But in Adelaide--and, indeed, in Ceduna--there is lots of Kodak film of all types. (The price at the Ceduna tourist office for Kodak Elite Chrome is A\$10.50 for 24 exposures and is A\$8.40 for a roll of Gold 100 24-exposure and A\$13.20 for a pack of two rolls; there were no 36-exposure rolls there, though the Adelaide airport had had them.) So part of the solution to the debate we have been having on line on the Solar Eclipse Mailing List of how to safeguard your film when passing through airports may be simply to purchase the film in Australia, saving at least half the exposures.

Sunday, May 19

Early on, we went for a long walk around this planned city, up to and including the lush botanical gardens. We covered much of our ground during intervals in the rain, which recurred at intervals. We moved our hotel from the Hilton to the Hyatt. At noon, we went for a drive in the Barossa Valley wine country with Mark and Lisa, including a wine tasting and ploughman's lunch at the Peter Lehmann establishment. Later, we had coffee/tea/chocolate at the old German town of Hahndorf--very touristy town but nice. Back home, we enjoyed the buffet dinner at the Hyatt. At the Hilton, I could use the business center at A\$10/hour for their dial-up line. At the Hyatt, I have a high-speed Ethernet link in my room for A\$30/day maximum (A\$1.65 per three minutes). The line started up fine but crashed after 20 min. After the hotel personnel fixed it once, apparently by restarting the program, it went dead more definitively. Finally, someone on the phone from Singapore (!) monitored the line and saw it go off and on quickly. He figured out that the Ethernet plug may not be tightly into the wall socket; that's the end of the wire that I didn't touch. He was right, and the connection has worked reliably since then on my Macintosh G4 titanium PowerBook.

Monday, May 20

At 9 a.m., after a walk along the riverbank, we met, by arrangement, Rob Curkpatrick for breakfast at the Hyatt. He is a professional event coordinator, and has been hired by Ceduna to arrange various eclipse-related events, including the allotment of space in Ceduna. We were joined by three members of the Astronomical Society of South Australia, an active amateur group: Fraser Farrell, Michael Mattiazzo, and Tony Beresford. Rob hadn't realized that an 88% partial eclipse, which they will have in Adelaide, is like nothing compared with a total eclipse, a fact reinforced by the agreement by the ASSA trio with my evaluation. So that alone made our meeting worthwhile, since he will be coordinating publicity in Adelaide. Also, I gave him a corrected version the writeup, distributed in the Tourist Office at Ceduna, about how to watch the eclipse, with dire and sometimes incorrect eye-protection discussions, and he accepted it gracefully and said he would incorporate the changes. Rob was very pleased that the advice we offer from the Working Group on Eclipses of the International Astronomical Union comes free of charge; he is more used to working with, say, professional motoring organizations, which charge for everything. He thinks he can set aside a patch of seafront opposite the Wade house for our professional group to carry out our experiments, and to get an electric line from a nearby house in the old-age development. He thinks we may need a generator to stand by. We already plan to use UPS's,

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something that Fraser is looking into; he is in the computer consulting business. We were joined by Stuart Innes, a journalist from The Advertiser, one of the Adelaide newspapers inness@adv.newsltd.com.au), and a photographer. There may be something about the eclipse in tomorrow's edition. Our meeting lasted 2.5 hours and we covered lots of ground. Rob will look at various information pieces on our www.eclipses.info Web site, including Ralph Chou's information about safe filters. They are planning some festival at Ceduna on eclipse day. At present, the loud music will stop two hours prior to totality, though I asked for longer quiet time. After totality they will have various activities leading up to fireworks. They may play the symphony Star Chant mentioned above at some time during the day. Fraser took us about an hour south on the Fleurieu peninsula, where we took a walk in the bush. We then had lunch in his home town of McLaren Vale at a modern restaurant attached to a local hotel. We declined a wine tasting in an adjacent winery but we did drive through scenic wine country to a chocolate factory. The roads also gave us beautiful views over the ocean. Fraser took us to meet Michael O'Leary, a former Navy navigator, who teaches navigation and a bit of astronomy at the University's planetarium. The members of the Astronomical Society of South Australia will be a valuable resource for the local people in the months leading up to the eclipse. We had dinner at our hotel after a long day.

Tuesday, May 21

We began the day by visiting Ayers House, the major house in town (on North Terrace, opposite the museums) of Sir Henry Ayres, of Ayres Rock fame. He made a fortune in the 1850s-70s in mining. The house is worth the tour. We visited the Art Gallery of South Australia, which has major collections of European art and of Australian art. It should be on everyone's activity. We visited Prof. Roger Clay, head of the Department of Physics of the University of Adelaide, a cosmic-ray high-energy astrophysicist. They have no particular plans to observe the eclipse, other than personally travelling to see it. The University of Adelaide was the site of Prof. A.W. H. Bragg's first teaching, and there is a laboratory named after him. We saw some of the early physics equipment on display. At 5 pm, we flew to Melbourne on Qantas.

Wednesday and Thursday in Melbourne

Wednesday, May 22

We spent the day walking around Melbourne, a lively city filled with shops and people. We are really back in the Big City. We had been looking forward to seeing the major art collection at the Art Gallery of Victoria, but their main building on the south bank of the river is closed for two years for major renovation, and the remnants of the collection on display in a building on Russell Street in town are disappointing. We also saw beautiful watercolors of the genus Banksia, plants, on display at the National Library. Melbourne is a city filled with skyscrapers, and one walks among them. We were exhausted by mid-afternoon, and sat quietly for 3 hours watching "The Fellowship of the Ring." At least there was THX sound, but the movie itself was much worse than we had expected, especially the second half.

Friday aloft to fly home: MEL-LAX-BOS.

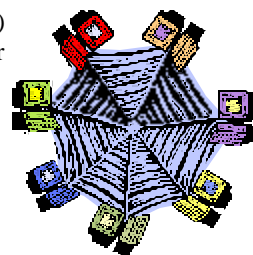
From : timo.karhula@se.abb.com

> The time change from LAX was 17 hours, and from Boston was 14 hours. That is, the time zone in Sydney is 14 hours later than the time zone in Boston or New York. That change is for May, in which Boston is on Daylight Saving Time and Sydney isn't. During the eclipse time of December, that situation should be reversed, and the time difference from the US East Coast will be 12 hours. South Australia is 1/2 hour different (earlier), so there is now a 13.5 hour time change. In December, assuming that South Australia has Daylight Saving Time, it should be 11.5 hours later than Boston time. (I love these 1/2 hour time zones, which exist rarely. I am especially fond of the 45-min time zone for Nepal, and of the fact that giant China is all in a single time zone. I discuss such things in my textbook on astronomy, so follow the latest time-zone changes.)

I believe you made a mistake here. South Australia should have 15.5 hour later time (not 11.5 hours) than Boston and New York in December. S.A. indeed uses Daylight Saving Time during 27 October 2002 to 30 March 2003.

An example:

	New York	South Australia	difference
May	UT-5h+1h DST	UT+9.5h	13.5h
December	UT-5h	UT+9.5h+1h DST	15.5h



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There is good information about Australian time zones at <http://www.dstc.qut.edu.au/DST/marg/daylight.html>

Thanks for your Australian report! /Timo Karhula

From : Fraser Farrell <fraser@trilobytes.com.au>

timo.karhula@se.abb.com wrote: I believe you made a mistake here. South Australia should have 15.5 hour later time (not 11.5 hours) than Boston and New York in December. S.A. indeed uses Daylight Saving Time during 27 October 2002 to 30 March 2003.

Ahem.... South Australia would, in fact, be 15.5 hours ahead of US East Coast time during December. Something I needed to be mindful of in the pre-email era when I telephoned the AAVSO headquarters with alerts. Also recall watching live TV coverage of the New York time ball about to do its Millennium thing; while we lunched on the leftovers (and nursed the occasional hangover) from our own celebrations the previous night!

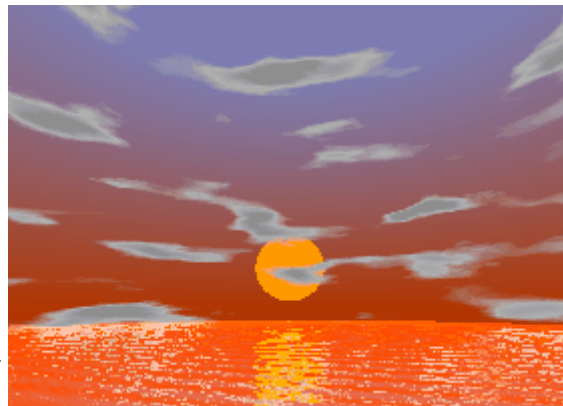
Daylight Saving in South Australia always begins at 2am on the last Sunday in October, and ends at 2am on the last Sunday in March. During Daylight Saving we are UT+10h30m.

The city of Broken Hill, just over the border in New South Wales, also runs with South Australian times. And there is indeed a semi-official timezone of UT+8h45m in Australia, which is used by some of the tiny settlements on the Nullarbor Plain. I'm not sure what they do during summer nowadays, because Western Australia does not use Daylight Saving anymore and remains on UT+8h00m all year.

If you want to know why South Australia has such a silly time zone - whose "prime meridian" is entirely outside its territory - contact me privately. It's a long story of political stupidity vs nature, right up there with the Indiana proposal of 1897 that tried to legislate $\pi=3.0000$

cheers, Fraser Farrell (writing this footnote in South Aus at 15 minutes past midnight on Saturday 25 May....)

From : Fraser Farrell <fraser@trilobytes.com.au>



Daylight Saving Times Australia sunset-vsml

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A few comments on Jay's weblog:

> of cabs. The trip to Sydney took only 25 minutes and cost A\$38; we tipped 10% making it A\$42. We understand that tipping is really optional here.

Tipping is considered unusual here. Conversely, Australians travelling abroad are often surprised (and sometimes irritated) by the culture of tipping that exists in some places.

> David has just completed a 33-minute film to accompany the Australian composer's Ross Edwards's Fourth Symphony, entitled "Star Chant."

And a lovely film & symphony it is too; according to the reports I've heard of its world premiere at the recent Adelaide Festival of Arts.

> The check-in person at Kendell preferred to check most things in and weighed everything, though he didn't charge any overweight. I think for the small plane they just have to know the real weight.

They also prefer to distribute the weight evenly within those smaller planes. I've been on a couple of regional flights where the plane was well under half full; but our luggage was still weighed & distributed between both cargo holds, and we were asked to spread ourselves throughout the cabin. Pilot friends of mine tell me that "trim flaps" aren't always sufficient to overcome a major

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weight imbalance during flight, and they impose a drag penalty.

> The 90-minute trip from ADL to CED went over some water and then a peninsula.

These would be the St Vincent Gulf immediately west of Adelaide, followed by the Yorke Peninsula. If it had been clear thereafter you would have seen Spencers Gulf, and then the farmlands of the Eyre Peninsula all the way to Ceduna.

> stores, and a clothing store. There are a few informal restaurants for take-out and sit-down, including a Chinese restaurant where we wound up having dinner. But all these facilities will be very overloaded during the eclipse.

Nevertheless do try to buy some stuff while you're "onsite"; even if it's just a few rolls of film or a souvenir t-shirt. This earns some good karma for you among the locals, which can be a real asset if you ever hit trouble during your stay. Besides, you're tourists, so you're expected to spend money... ;-)

> One block down from that main town intersection is the sea. There is a lovely park along the beach extending several blocks to either side, with a wharf extending straight out, due west (since Ceduna is on the east side of a bay).

The wharf pilings are encrusted with marine life and attract some interesting fish. Ditto for some of the rocky bits of coastline near Ceduna. Well worth bringing a facemask & snorkel.

Fishing is best avoided. A lot of the waters near Ceduna are reserved for aquaculture, the regulations on minimum fish sizes are complex; and you will not be able to take your fish home.

You can always relax on the beach though. But a reminder that the Ozone Hole problem is quite bad over southern Australia, particularly during late spring when ozone-deficient air masses sometimes drift up from Antarctica.

Protective lotions and creams are readily available in Australia and you should use them on all exposed skin while outdoors! Also wear a broad-brimmed hat, and a shirt that covers your shoulders. Failure to follow these precautions is likely to result in sunburn within a few minutes. With prolonged exposure, or if you're fair-skinned, you risk the real possibility of painful second-degree burns with blisters if you don't protect your skin.

> Adelaide is a planned city, set out in a grid in the mid-19th century.

By military surveyors, who were also foresighted enough to lay out really wide streets for future growth.

> The square grid is surrounded by parkland on all sides, so the center city is quite compact and very walkable. The population listed in the guidebook is 1.7 million, but that obviously includes surrounding areas.

Must be a misprint. The population of the whole state of South Australia was about 1.5 million at the 2001 Census. Adelaide contains about 3/4 of the state's population....1.07 million sounds right.

> adjacent South Australian Library, and briefly looked at the only exhibition there--one about the famous cricketer Don Bradman. For those in cricket countries, he is more famous than Babe Ruth is in the U.S.A., I am told.

"The Don" died last year. One of Adelaide's main roads was renamed after him as a memorial. You would have travelled down it from the airport to the city.

He was held in such high regard by later cricketers that they would deliberately avoid beating his records. For example a few years ago the captain of the Australian team equalled Bradman's record for the highest individual score against England - and then retired from the match, so that he wouldn't offend the old man by breaking his record. Which by then had stood unchallenged for about 50 years....

Yes he's so famous that even a non-cricket person like me knows about him!

> They are planning some festival at Ceduna on eclipse day.

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I understand that Andamooka is definitely having a huge outdoor barbecue party a few km south of the town, just inside the northern path limit. Leigh Creek are also rumoured to be planning celebrations of some kind.

> The University of Adelaide was the site of > Prof. AW. H. Bragg's first teaching, and there is a laboratory named > after him. We saw some of the early physics equipment on display.

He got a Nobel Prize, for discovering Bragg's Law - the basis of of X-ray diffraction physics. I think Howard Florey, who got a Nobel for his work on penicillin, also spent some of his career there? cheers, Fraser Farrell

From : "Cliff Turk" <cliffturk@yebo.co.za>

Hi Fraser and everyone, Quite right! Australia is always far ahead (not behind) the USA. In fact you are so clever that your email sent at 00h15 on 25 May was read by me at 18h45 on 24 May in South Africa - and New York would have seen it some 7 hours earlier than I did!

Confusing? Maybe we should all stick to UT on the SEML? Cliff

Ceduna webpage [Ceduna_eclipse99k_w150xh201](#)



ASE 2003

2003 annular

From : Sheridan Williams <sheridan@clock-tower.com> To : SOLARECLIPSES@AULA.COM Date : Sat, 25 May 2002

With just over one year to go until the 31 May 2003 annular eclipse I have been getting many questions about it.

Therefore I have just put together a web site and will be travelling to Scotland shortly to check out viewing locations and accommodation.

I'll keep it updated as and when I get feedback.

www.clock-tower.com/eclipse2003 Sheridan Williams



Joanne & Patrick

The sole Newsletter dedicated to Solar Eclipses



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Part of speech at Jo's and PP's wedding by best man Fred Espenak

Eclipses and women

by

Fred Espanak

(on Jo's and PP's wedding speec)

A man walking along a beach was deep in thought. All of a sudden, he said out loud, Lord grant me one wish."

Suddenly the sky clouded above his head and in a booming voice the Lord said, "Because you have ALWAYS been a good and kind man, I will grant you one wish."

The man said, "You created a world in which total eclipses occur only once every year or two. I wish there was a total eclipse every month!"

The Lord said, "Your request is very materialistic. Think of the

enormous challenges for that kind of undertaking. I would need to push the Moon into a different orbit! The enormous energy and effort it would take are unimaginable! Furthermore, it would have a drastic effect on your fellow man. The Moon controls the tides so the world's tides would be completely screwed up. There would be great loss of life due to flooding from new tides. Fishing based economies would be devastated since ocean migration and spawning patterns would be adversely disrupted.

I can change the Moon's orbit to produce more eclipses, but it is hard for me to justify your desire for such a selfish thing. Take a little more time and think of another wish, a wish which will honor and glorify me."

The man thought about it for a long time. Finally he said, "Lord, I wish that I could understand women. I

want to know how they feel inside, what they are thinking when they give me the silent treatment, why they cry, what they mean when they say 'nothing', and how I can make a woman truly happy."

The Lord replied, "You want one or two eclipses each month?"

Jo and her dad, Derek Edmonds

