

## GENERAL TOPICS

thing disappearing, because I know exactly what to look for and where. From personal experience I know that my response time to an appearing body is more delayed than that to a disappearing body. Other observers may have different experiences.

But the real problem that Chauvenet - to my surprise - neglects to mention is that for the two inner satellites, which he favours for the higher frequency of observable phenomena, the eclipses and occultations normally overlap when Jupiter is in or near opposition with the Sun. In other words, before opposition only the immersion of the satellite into Jupiter's shadow can be observed (to the west of the planet), whereas after opposition, only the emersion (to the east of it). Therefore, the Nautical Almanac and Astronomical Ephemeris would typically tabulate no phenomena at all for over a month when Jupiter is too close to the sun, subsequently for satellites 1 and 2 the immersions only for about half a year, followed by the emersions only for another half a year. Merely for satellites 3 and 4 the immersions as well as the emersions would be tabulated throughout the interval where Jupiter is sufficiently distant from the sun.

Clearly, one needs sufficient separation between the Sun and Jupiter to observe the latter's satellites at all. A rule of thumb is: Jupiter should be 8 deg above the horizon and the sun as much below. If one then checks the chances how often satellite eclipses can be observed at all \_at a given location\_, one might easily find that there is no suitable event within an interval of 3 or 4 months (around conjunction). How much more restrictive would it be to insist on having both ends of an eclipse within the given limits!

Coming back to George's question about Cook's time. Even at the beginning of the 19th century, finding longitude by Jupiter was not as simple as comparing an individual observation timed in local apparent time against a well established tabulated ephemeris. The ephemeris was rather a planning tool for the observation; It told the observer when to get ready to look, hardly more. Ideally, an individual observation expressly taken for longitude would be directly compared against a simultaneous observation from a place of known longitude. Short of that, each observation would serve to improve and refine the theory as much as it would serve to establish the longitude of the place of observation. The whole process was a slow interaction between theory and observation parameters, leading to a steady improvement of both over many decades. Of course, longitude determination through other means were also fed into this process. It should also be noted that even in the above case of direct comparison of two observations, the results would be available only after as much

time as was necessary then to communicate them to a common place. The observer did not necessarily have the benefit from his own observation, and certainly not immediately so.

By the time Chauvenet wrote his book (1863), the theory and reliability of the ephemeris may well have improved to an extent where satellite phenomena may indeed have become "celestial signals" the absolute timing of which was known with sufficient accuracy to be used for immediate determination of longitude. But for Cook this was out of question. Best regards, Herbert Prinz (from 1368950/-4603950/4182550 ECEF)

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

Hi Herbert, Thank you for elaborating on the various important omissions in Chauvenet's treatment of the method of Jupiter moons for determining terrestrial longitudes.

I think that when Chauvenet wrote his Manual of Spherical and Practical Astronomy, this method was rarely used anymore and that Chauvenet added a brief summary of it for completeness sake.

Although I know of several longitude determinations by this method in the 18th century, I only know a few from the 19th century. Ali Bey (Domènec Badía i Leblíc) still used this method (together with lunars) during his travels through North Africa and the Near East in the early 19th century. A cursory examination of several famous travel books of the 19th century (Speke, Burton, Livingstone, Stanley, etc.) failed to uncover any mention of this method but perhaps I skipped too quickly through these often rather voluminous works. Best wishes,

From: George Huxtable <george@HUXTABLE.U-NET.COM>

Thanks to all those that replied. Those replies were most useful to me.

Catherine Hohenkerk of the UK Nautical Almanac office has kindly brought to my attention a source of precise information on phenomena concerning the satellites of Jupiter. This is - "Satellites Galileans de Jupiter", a supplement to the "Connaissance du Temps", published by the Bureau des Longitudes, Observatoire du Paris, each year.

A website is given of <http://www.bdl.fr> and an anonymous ftp site at <ftp://ftp.bdl.fr>, neither of which I have visited.

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This publication provides precise timings to the second of all phenomena involving the four bright satellites of Jupiter, distinguishing carefully between the various stages of immersion into umbra and penumbra, and occultation. It gives precise calculated values for the current year and algorithms for calculating less precise predictions for the succeeding year.

The text is given in both French and English.

It was exactly what I needed.

> Herbert Prinz said-Coming back to George's question about Cook's time. Even at the beginning of the ...

This comment worries me, considerably, and (in the nicest possible way) I ask Herbert Prinz to defend it and to quote some references. The period I am dealing with is around the start of the Nautical Almanac (1767) and the first voyage of Cook. I am a participant in a team trying to replicate Cook's navigational methods, and Herbert's comment, if true, would put something of a spanner in the works.

As I understand it, Herbert is saying that in Cook's time the Jupiter satellite observations would give only a tentative figure for time (and therefore longitude) which would have to be readjusted after return, by comparison with timings of the same events which had been recorded at an observatory. Useful for mapmakers, but not for the immediate purposes of the voyager.

It's true that such an approach would have allowed the use of the Jupiter satellites method even in the absence of any theory for precise prediction of the events.

Let me put some arguments against Herbert's view, as applied to the Cook period.

1. My information comes from the article on "Longitude and the satellites of Jupiter" by Albert van Helden, in "The Quest for Longitude" symposium, ed W.H. Andrewes, 1996. I haven't followed up his references. He quotes the *Connaissance des Temps*, for 1773 (pub. 1771) as stating a caveat that the observer was not to expect adequate precision from the calculated eclipse times, except in the case of the first satellite. The eclipses of the three other satellites could not, even in the 1770's, be predicted with a precision of one minute of time.

With an error of one minute of time, longitude could be obtained to 15 minutes, which is twice as good as a lunar distance could do. Presumably, restricting observations to the first satellite would improve matters further. So even at that date it was the most accurate method available for determining longitude.

2. Maskelyne tabulated those satellite positions to the second. Whether they were good to that precision, I rather doubt. But if they were only intended to guide the observer when to apply his eye to the telescope, any such precision would have been absurd. Maskelyne intended his predictions to be used by mariners on the spot when reaching land.

3. From memory, without scanning the 4-volume Beaglehole edition of Cook's journals once again, at no point does he refer to the Jupiter observations as preliminary or unreliable or requiring readjustment after return from the Greenwich records. (I allow that in completing those journals after his return, he could have used some hindsight.) Neither does Wales, when describing the observations of the first voyage, much later in 1788. Instead, Jupiter measurements were used by Cook at the time (supplemented by the lunar measurements) for immediate purposes such as establishing the errors of the clock (in the second voyage), and establishing the longitude of his rendezvous points such as at Queen Charlotte Sound.

4. (This is a crucial argument). When in longitudes opposite to that of Greenwich, satellite events which were observable by Cook at night occurred in the daytime at Greenwich, so could never be compared with a Greenwich observation. If that comparison with Greenwich records was necessary, satellite measurements would have been of no use to Cook at all, in the South seas.

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I think that Herbert Prinz was describing a situation that existed well before, but not at, the time of Cook's voyages. I look forward to a response from him. George Huxtable.

From: George Huxtable <george@HUXTABLE.U-NET.COM>

In mid-July I asked some questions about the historical use of eclipses of the Jupiter satellites to obtain time and therefore longitude from on land, and received some interesting replies. This previous correspondence is copied below. A rejoinder from Herbert Prinz is promised but has been somewhat delayed.

More recently, I have had access to Maskelyne's "Explanation and use of the articles contained in the Astronomical and Nautical Ephemeris", which was appended to the first Nautical Almanac in 1767. It supports, to some extent, both sides of the friendly argument between Herbert and me, on how those satellite timings could be used. Perhaps more him than me... But I think it might be of interest to others if I quote the relevant parts of what Maskelyne has to say, so I will. Also, I enjoy Maskelyne's clear prose, and I hope others do too.

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Relevant parts of Maskelyne's article, appended to the 1767 almanac, follow. My own comments are in square brackets.

"The eclipses of Jupiter's satellites are well known to afford the readiest, and for general purposes the best method of settling the longitude of places on land; and it is by their means that geography has been so much reformed within a century past, and the positions of the most distant places determined to equal accuracy with the nearest." [there's a section, omitted here, about the impossibility of using suitable telescopes at sea, etc.] .

"The eclipses of Jupiter's satellites are achieved by astronomers at land, as well in order to provide materials for improving the theories and tables of their motions, as for the sake of comparison with the corresponding observations which might be made by persons in different parts of the globe, whereby the longitude of such places will be accurately ascertained... The eclipses carefully calculated and set down in the ephemeris, will serve to advertise them and observers in general of the times when they should attend to these observations. The person who may be under any meridian different from Greenwich, must turn his difference of longitude into time; see table, page 6, 7, and 8, and add it to or subtract it from the time of the eclipse set down in the ephemeris; accounting as he is to the East or West of Greenwich, to find the apparent time at which the eclipse will happen at his meridian, nearly. He must also take care to regulate his watch or clock by apparent time...[here follows a section on determining apparent time]."

"The observer being in a place whose longitude is well known, should be settled at his telescope three minutes before the expected time of an immersion of the first satellite, six or eight minutes before that of the second and third satellites. and a quarter of an hour or more before that of the fourth satellite; chiefly on account of the uncertainty of the theories; but if the longitude of the place is very uncertain,, he must begin to look out for the eclipse proportionately sooner: thus if the longitude of the place is uncertain to 30 degrees, answering to 12 minutes of time [here I think Maskelyne must have meant 3 degrees; perhaps the printer confused the little "o" symbol for degrees with a zero], he ought to fix himself to his telescope 12 minutes sooner than is mentioned above. Nevertheless when he has observed one eclipse of any satellite. and therefore found the error of the tables, he may allow the same correction to the calculations of the ephemeris for several months, which will advertise him very nearly of the time of expecting the eclipses of the same satellite, and dispense with his attending so long.

The immersions signify the instant of the disappearance of the satellite by entering into the shadow of Jupiter; and the emersions signify the first instance of its appearance coming out of the same..."

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That's the end of my quotation from Maskelyne, though there is a lot more interesting stuff to be found in that reference.

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Maskelyne's instructions allow us to draw some conclusions about the predictions for 1767.

1. Predictions of times for satellite 2 and 3 were indeed much worse than for satellite 1 (Io) by something like 3 to 5 minutes, so an observer such as Cook or Green would be wise to confine his observations (if possible) to Io.

2. The expected errors in times for Io must have been significantly less than 3 minutes. Maskelyne advises an observer "in a place whose longitude is well known" to settle himself at the telescope three minutes before the predicted time. How much extra time -allowance is he giving for the total of- Any residual error in longitude, even when it is "well known". Any error when determining apparent time Any error in the watch, since that moment. Time for the observer to home in on Jupiter and allow his eye to adjust. Time for watching the fading of the satellite. Presumably, Maskelyne would not expect an observer to put his eye to the lens just at the moment of the last flicker. We can only guess how much time Maskelyne thought should be allowed for the above purposes. He says that the time allowance was "chiefly on account of the uncertainty in the theories", and in the case of Io. perhaps that might mean two of the allowed three minutes for error in the theories, 1 minute in total for the other factors listed above. A two-minute uncertainty in an immersion time for Io would result in an error of 30 minutes of longitude: still as good as anyone could expect from a lunar. So I would maintain that an immersion/emersion timing of Io would give useful longitude information in its own right.

3. Maskelyne tells us that having made one timing of a satellite at a known longitude, and determined its error, one can use that error to correct other observations of that same satellite "for several months". This tells us that the time-error in the predictions is an amount that accumulates steadily, not an amount that fluctuates randomly between events for that satellite. Perhaps the revolution periods of the satellites had not been determined with enough accuracy; perhaps it derived from uncertainty in slow changes in the orbit parameters, such as precession..

This has some interesting implications- It quickly disposes of my argument (which at the time I claimed to be "crucial") that satellite observations made in the South Seas could not have been improved by retrospectively checking against the Greenwich records, on the grounds that an event that was visible at one end of the Earth could never be seen at the other. Now I can see that, if the time errors are gradually progressive, it isn't necessary to observe the same event in Greenwich that Cook did in the Pacific. Another eclipse of the same satellite at a near date, one that WAS visible from Greenwich, would do just as well to set the records straight after the event.

Another implication is this: As Cook travelled from island to island, harbour to harbour, errors in his absolute longitudes with respect to Greenwich, based on Jupiter events, might build up and need to be recalibrated after his return. But relative longitudes of places that were visited and measured within the same season would be rather more accurately established. George Huxtable.

From: George Huxtable <george@HUXTABLE.U-NET.COM>

This is a postscript to my posting of yesterday.

As that posting reiterated the previous correspondence, I will not repeat any of it again here.

The point at issue was this -

During Cook's first voyage (1768-1771), observations were made of eclipses of Jupiter's satellites for the purpose of determining Greenwich time, by comparing with predictions from the almanac. Were those predictions good enough for Greenwich time (and hence longitude) to be deduced on the spot, or did the predictions have to be compared with observatory measurements after return to Greenwich?

Since I wrote, I have received a copy of Maskelyne's "British Mariner's Guide", published 1763. Here's what Maskelyne had to say then on the topic in the Appendix, page 90.

"The first and second satellites are most useful for finding the longitudes of places, the tables of the first never erring more than 1m. of time, and those of the 2d not more than 4m. ... But if a corresponding observation can be obtained, made in any

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place whose longitude is known, the longitude will be found independently of any error of the tables."

If I had been aware of that statement when sending my mailing yesterday, I would certainly have included it.

An error of 1 minute of time (for eclipses of Jupiter's first satellite, Io) corresponds to an error in longitude of 15 minutes of arc, which is significantly more accurate than a lunar distance could provide. So it's clear (or at least, it was Maskelyne's view) that back in 1763, predictions for timings of Io's eclipses were already good enough to obtain directly usable longitudes which were more accurate than those obtainable by other methods. George Huxtable.

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

Hi George, I think that there is ample evidence that astronomers already trusted the tables of Jupiter's satellites and the accuracy of the derived terrestrial longitudes some time before that.

Around 1720, the German astronomer Johann Gabriel Doppelmayr completed a map entitled BASIS GEOGRAPHIÆ RECENTIORIS ASTRONOMICA in which he listed the astronomically determined longitudes and latitudes of 143 cities around the globe. Many of these longitudes (especially outside of Europe) were determined by Jupiter satellite observations alone. It would make a nice exercise to compare some of these longitudes with their modern values and see how well they agree.

This map is the 15th in Doppelmayr's *\_Atlas Coelestis\_* (1742) and can be viewed in detail on the Gallica web site (<http://gallica.bnf.fr>) of the Bibliothèque National de France. Regards,

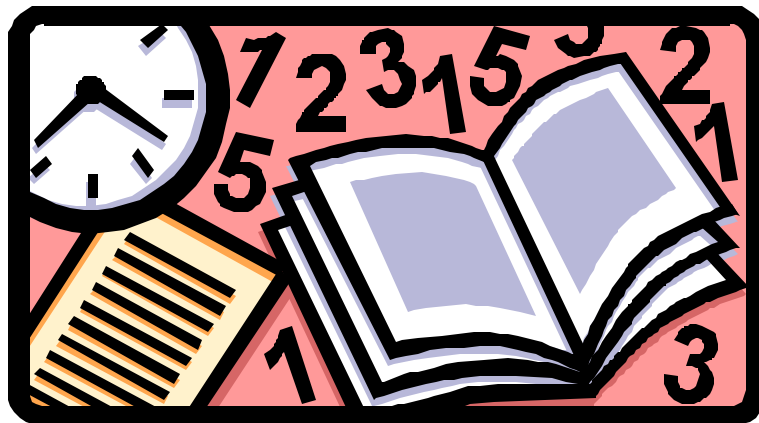
From: George Huxtable <george@HUXTABLE.U-NET.COM>

My reply -

Yes, it's accepted that mapmakers could obtain longitudes to high accuracy based on Jupiter satellite observations. Even if the predictions of the times of satellite events were inaccurate, a mapmaker could compare his measured times, retrospectively, with times of corresponding events measured at the observatory which he used as his longitude reference. The precision of such a procedure would not depend at all on any uncertainties in the predictions.

However, if a traveller needed to use Jupiter satellite measurements to obtain on-the-spot longitudes for immediate use, prior to his return to a base observatory, then he would be completely dependent on the precision of the predictions.

Maskelyne claimed that the errors in the predictions for the first satellite (Io) were better than 1 minute of time. I wonder when that accuracy in the predictions for Io was achieved? George Huxtable





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From: Hal Couzens <hal@dneg.com> To: <SOLARECLIPSES@AULA.COM> Sent: Wednesday, July 18, 2001 3:43 PM Subject: [SE] **Its early days...**

...but I cannot stop myself thinking about the prospect we have of seeing transits of Mercury AND Venus.

I am still basking in the afterglow of that fine eclipse in Africa and panicking (haha) already about 4 Dec 2002's weather patterns. Yet I cannot keep my mind away for too long from the prospect of these events: Mercury 7th May 2003 and Venus 8th June 2004. I feel a burning need to know where on the round of this planet will they be visible from. These things need planning and especially with a thing like a transit of Venus, 121.5 years since the last one. That's pretty special. Perhaps with the right kind of preparation and support one could recreate historic voyages associated with this event (such as Cook's trip to Tahiti). Any thoughts on these? Hal

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

Innovations in Travel is planning to offer a Nile Cruise for the Venus Transit in 2004. The 9 day itinerary includes Cairo, the Pyramids, Sakkara, Aswan, Abu Simbel, Luxor and the Valley of the Kings. On transit day, the boat will dock so we can set up cameras and telescopes on land by the Nile River. Note that NO ONE ALIVE has seen a transit of Venus. The Nile Valley has clear daytime skies, and is well placed to observe the transit: Ingress exterior contact is at 08:19:43 Egypt Daylight Time, and egress exterior contact is at 14:23:34.0 on 8 June 2004. For more info, contact Renate Martin, innovationsintravel@msn.com. Best Regards, Jim Huddle

Yohkoh 1999

From: Mike Simmons <msimm@ucla.edu>

I am planning a trip to Iran for the Venus transit of 8 June 2004. Between the wonders of ancient Persia and the contradictions of the modern-day Islamic Republic, I find the area to be the most complex and interesting I have ever visited. Iran will be centrally located for the transit, which is more important than for a Mercury transit because it lasts so long -- over six hours. It's important to be located centrally for a reasonable solar altitude for both ingress and egress. At mid transit, the Sun's altitude will be 76 degrees at Tehran (one half hour before local solar noon) but we will be farther south and east where the Sun will be slightly higher and even closer to the meridian at mid-transit. The Sun will be above 45 degrees altitude for BOTH first and last contact. There are currently plans to establish observatories with telescopes for amateur use in the next few years and these should be available to all -- before and after the transit in a dark location as well as during the event (the Moon is waning gibbous on 8 June 2004). The weather conditions in Iran in June are about as good as one can expect. The observing

location will have some altitude to avoid undue desert heat (the first planned observatory site's location is above 2000 meters), but Iran is not all desert as most people think. And for westerners wondering about travel in Iran, not only are the people wonderful and anxious for contact with westerners -- Americans in particular -- things are improving and the tourism industry is recovering. The trip is being planned through Nojum (Astronomy) Magazine in Iran and the coun-

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try's best travel agency.

I will be returning to Iran in Spring 2002 with a small, select group of amateur astronomers on a goodwill tour -- seeing the sites, meeting the people in general and amateur astronomers in particular, giving star parties for the public and enjoying dark sky sites in historic locations. Write to me if you're interested.

See my web site at <http://webpages.charter.net/msimm/Iran> for more information on Iran and my friends and travel there. There is a report on my eclipse trip in 1999 and a PDF of my April 2001 Sky and Telescope article on astronomy in Iran. Also a bit of information on activities there but I am hopelessly behind on updating the site with news, including the visit of a group of Iranian astronomers to the US this past Spring.

The occultation of Venus yesterday just whetted my appetite. I've been waiting for this Venus transit since I read about it as a child! For further information, see Eli Maor, "June 8, 2004: Venus in Transit", with tables of local circumstances produced by Fred Espenak and global maps showing the position of the Earth at contact times so you can get an idea of the circumstances of different locations. Mike Simmons

From: Olivier "Klipsi" Staiger <[olivier.staiger@span.ch](mailto:olivier.staiger@span.ch)>

Hal, I don't know where the best place is to see the 2003 Mercury transit and the 2004 Venus transit, but I know that both are visible from my hometown Geneva Switzerland. I have a few info on <http://eclipse.span.ch/transit.htm> . If you download [www.cybersky.com](http://www.cybersky.com) you can do an animation from any city on the dates of the transit and then see if it is visible from that city. Klipsi

From: Peter Tiedt

An in-depth article on the 1882 transit can be found at ..

There is also a link to the 2004 transit.

<http://canopus.sao.ac.za/~wpk/tov1882/tovwell.html>

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

Here are a few links:

<http://www.users.zetnet.co.uk/pete/Venustransit.htm>

[http://canopus.sao.ac.za/~wpk/tov1882/tovdata\\_e.html](http://canopus.sao.ac.za/~wpk/tov1882/tovdata_e.html)

[http://perso.cybercable.fr/eclipses/transit\\_venus.htm](http://perso.cybercable.fr/eclipses/transit_venus.htm)

Evan H. Zucker



From: <[Jay.M.Pasachoff@williams.edu](mailto:Jay.M.Pasachoff@williams.edu)> To: <[solareclipses@aula.com](mailto:solareclipses@aula.com)> Sent: Thursday, July 19, 2001 1:22 PM Subject: [SE] **eclipses from space, shadow bands**

I am glad to see Evan cite the 1970 National Geographic article that Donald Menzel and I wrote, in which we were glad to include a photo from space of the umbra on the Earth. Tomorrow, I visit National Geographic where the Photographic Division has many rolls of my telephoto eclipse slides; the Committee for Research and Exploration of NG supported some of my scientific observations and on the side the magazine and photographic division often support their grantees.

I have read various correspondence asking about shadow bands from space. Of course, there wouldn't be any, because shadow bands are a phenomenon in the Earth's atmosphere (and thus of little interest to me, as someone interested in the Sun's atmosphere). But for those who want experimental verification, they should realize that the mismatch between the speed of the umbra through space and a location in the zone of totality on Earth is much less than the mismatch between that umbral speed and the speed of an orbiting spacecraft. Spacecraft, even if they should go through totality, would do so

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in seconds even when there would be minutes of totality on the ground. On the ground, the Earth's rotation helps keep up with the speed of the shadow (which is why the longest eclipses occur near the equator). So eclipse phenomena would go vanishingly quickly, and I doubt that there would be time to see shadow bands even if there were still an atmosphere above to cause them. Jay Pasachoff

From: Bill Kramer <bill@autocode.com>

> So eclipse phenomena would go vanishingly quickly (in space)

In '73 I had the pleasure of being on board the Canberra with several astronauts. After the eclipse I asked them if they had ever held their thumb up and caused an eclipse while in space. And if so, how did it look. One remarked that he had and he didn't think it was nearly as interesting as what we had seen off the coast of Africa.

The atmosphere adds a lot to the eclipse experience: Shadow bands, shimmering light, lovely colors of the sky and horizon, and of course, something to breath. Bill Kramer

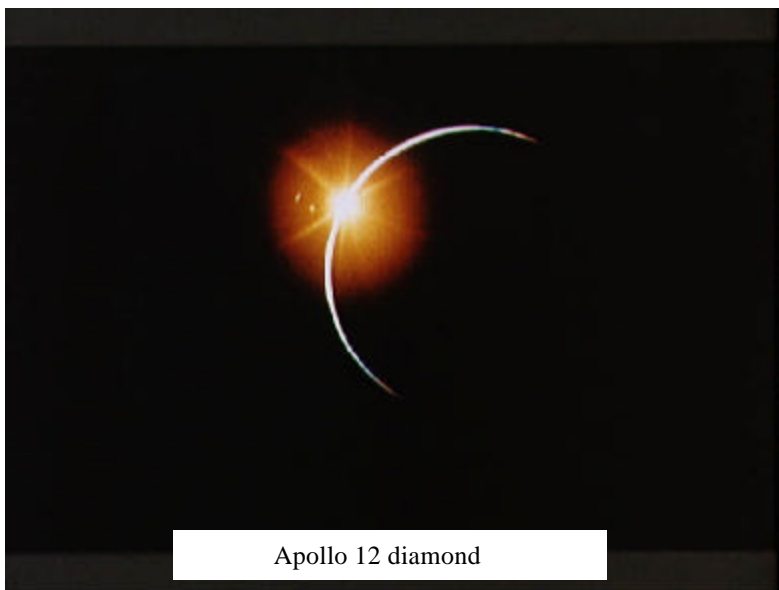
From: Starman <4starman@home.com>

The photo can be found at the following site: <http://antwrp.gsfc.nasa.gov/apod/ap990830.html>

It was shot by the French cosmonaut Jean-Pierre Haignere from aboard the Mir Space Station, as the moon's dark umbral shadow passed over the southern tip of England on its way eastward. For added "romance", his poignant comments follow:

"I cannot better describe this strange feeling than by saying that this spotseemed incongruous. Its lack of estheticism was so far away from our usual view of Earth. Incongruous, like the trace a finger, filthy with dirty grease, would have left on a beautiful woman's gown." Dennis

From: Evan Zucker <ez@AbacusTotality.com>



But what DID it look like? Reading in between the lines, I'm assuming that the astronauts meant or said that they were able to see the corona by this method. Did they elaborate? Evan H. Zucker

From: Bill Kramer <bill@autocode.com>

The filters on the window and mask prevented him from seeing much detail. It was described as being a bright glare and not the pearly white as seen in the sea of light blue during a TSE.

Do note that those observations were made in the 1960's, the technology of spacecraft has improved a bit since then, including the windows - I wonder if a shuttle astronaut has tried the same trick? If it works, there could be a whole new market for the eclipse chasing tourism business selling shuttle and space station tickets for "long duration artificial eclipses". -Bill

From: Evan Zucker <ez@AbacusTotality.com>

I recall there being a fairly extensive discussion on this subject on this e-mail list a year or two ago. The main issue in contention was whether the "thumb eclipse" method would be effective when done inside a pressurized space craft as compared with doing it in the vacuum of space, as during a space walk. Some people thought that inside the space craft the sun's light would

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be scattered by the air, thereby preventing the astronaut from seeing the corona.

It would be great to have a shuttle or space station astronaut try the two methods. It would literally only take seconds to do and so would hardly interfere with their mission. Evan H. Zucker

From: Gerard M Foley <gfoley@columbus.rr.com>

I pity the poor astronaut who has to do without air in his spacesuit so he can see the corona. That's brutal! Gerry K8EF

From: Didier Van Hellemont <didier.van.hellemont@pi.be>

It's indeed a good idea if someone could try this in space.

I asked Frank De Winne, who is due to be the second Belgian astronaut somewhere in 2003, if he could check this out from up there (which actually means the International Space Station). He agreed to try it out, but I doubt Frank will do a spacewalk the first time he flies.

By the way, Frank was one of the members of a Urania trip to Zimbabwe last June. As it was his second eclipse, he knows what to look for. Didier Van Hellemont

From: Leonard Krylov <cl4lkryl@CLING.GU.SE> To: <HASTRO-L@WVNM.WVNET.EDU> Sent: Monday, July 23, 2001 9:43 AM Subject: **short Q. on medieval eclipses**

This may be a stupid question, but it has troubled my mind lately and I haven't found any information whatsoever on the praised net.

Shouldn't those medieval eclipses that were written down with day of month precision be offset from their astronomical calculation by approximately 510 days, because of the Gregorian reform? Or is this correction done in software (highly unlikely)? Or did I completely overlook something?

From: Thomas Schmidt <schmidt@HOKI.IBP.FHG.DE>

This correction is usually done by the software. If you enter a date up to October 4 1582, it is understood to be in the Julian calendar; October 15 1582 and later dates are interpreted as Gregorian. Some programs provide the option to override this automatic switchover. Well-documented software should tell you exactly how it handles this problem to rule out any doubt.

An offset may occur in those cases where the report originates from a region where the transition was made later than the above dates. The historian has then to look carefully whether the given date is 'old style' or 'new style'. Regards, Thomas

From: Leonard Krylov <cl4lkryl@CLING.GU.SE>

Thanks for the prompt answer! But I'm not content...

Is this some standard? Pretty confusing then if I'm interested in precise dates outside the Julian/Gregorian realm. Sorry, I think that is strange indeed :)

Still, I don't understand this: why is a \_medieval\_ account of an eclipse written down in Gregorian style? Was the clergy living in the new calendar already? Is the reform a fraud?? Questions, questions from a dilettante!

From: Leonard Krylov <cl4lkryl@CLING.GU.SE>

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Ok, sorry, I think I got it sorted out now. That in-software "correction" got me mixed up.

From: Thomas Schmidt <schmidt@HOKI.IBP.FHG.DE>

> Ok, sorry, I think I got it sorted out now. That in-software "correction" got me mixed up.

Okay, but just to make sure:

> This correction is usually done by the software. If you enter a date ...

All I wanted to say is that medieval dates which are given in the Julian calendar usually are simply entered into the software as they are - the software automatically recognizes them as Julian as long as they are earlier than October 4 1582. At least that's the way many programs do it. You might want to check the documentation of your particular program to avoid possible surprises.

If your date is given in a different calendar (say 'ab urbe condita' or 'anno Diocletiani'), you have to convert it to the Julian calendar first, unless you have a specialised program which is able to deal with those calendars.

> An offset may occur in those cases where the report originates from ...

No, no, I just had mentioned October 1582 as the switchover date, and I only wanted to elaborate on the fact that there are regions where the switchover was made later, so that in reality things are a bit more complicated than the astronomical programs usually assume. If you are only interested in strictly medieval dates this needn't concern you. Regards, Thomas

From: Ron Sutcliffe <rawn@NETTAXI.COM>

> Thomas Schmidt wrote; This correction is usually done by the software. If you enter a date up to October 4 1582, it is understood to be in the Julian calendar; October 15 1582 and later dates are interpreted as Gregorian.

Dare I ask? but I am having trouble locating astronomy software that calculates back to 3000 BC with any reliability. Is this just wishful thinking or is there some software available with precision enough to calculate back that far? I don't really want this to turn into a product endorsement opportunity, but I have asked quite a few astronomers about this without much luck. Please drop me a private email with your recommendations if this is inappropriate for general listserver discussion.

I am concerned with time's effects upon horizon line astronomy as most likely practiced by the ancients. I am not trying to figure out the 'path of totality' of ancient eclipses. But I am interested in properly accounting for precession, change in tilt angle between meridian and ecliptic, galactic orbits, etc.. All things that pertain to the study of ancient astronomy. many thanks, Ron Sutcliffe

From: Keith Pickering <keithp@MINN.NET>

Hi Ron, I use SkyMap Pro, which is free in the demo version. (Demo version includes all objects visible to the naked eye.) I have checked its handling of precession and proper motion, and been very impressed. Keith Pickering

From: Thomas Schmidt <schmidt@HOKI.IBP.FHG.DE>

The most ambitious commercial programs in this regard which I am aware of are SkyMap <http://www.skymap.com/> and Guide <http://www.projectpluto.com/>, there may be others.

Assessing the accuracy of such a program is not a trivial task, especially if you are aiming at such an extended time span. There are many different computational elements involved in such a calculation (orbital elements, coordinate transforms, precession, time scales, ...) all of which derive from different sources and have their own peculiarities and long-term (in)accuracies. With respect to ancient comet apparitions and solar eclipses, some of these have recently been discussed on this list. The Guide website offers a detailed discussion of accuracy questions: <http://www.projectpluto.com/accuracy.htm>

*(Continued on page 31)*



## GENERAL TOPICS

If you are only concerned with horizon phenomena, things should be more relaxed; if I'm not mistaken, you should need only an accurate formula for the obliquity of the ecliptic and some spherical trigonometry in order to find the extremal points of sunrise and sunset. The Moon is already much more complicated.

Ideally, you would analyse the computational elements entering your specific calculation (e.g. the ELP-2000 theory for the Moon, Lieske's precession model etc.), determine their accuracies by checking the relevant literature and assess their combined effect on the results.

On the other hand, you may simply trust people who probably know what they are doing and get your ephemerides directly from JPL's HORIZONS system <http://ssd.jpl.nasa.gov/horizons.html> which is probably the best and most reliable ephemeris existing to date. They promise ephemerides back to 3000 BC, so this should be adequate for your purposes, and if you are in doubt, they are presumably among the most knowledgeable people to ask about accuracy.

If you prefer the fancier user interfaces of the commercial programs, you can still check their output against the HORIZONS results and you should get a reasonable impression of what can be done and what not.

Jean Meeus' "Astronomical Algorithms" (Willmann-Bell) is a very accessible source that could give you some background on the attainable accuracy of some models and theories. Regards, Thomas

From: R.H. van Gent <r.h.vangent@PHYS.UU.NL> To: <HASTRO-L@WVNVM.WVNET.EDU> Sent: Monday, July 30, 2001 10:32 PM Subject: **Epigram on Hi and Ho**

Hi all, In 1894 the *\_Observatory\_* (vol. 17, p. 346) printed the following witty epigram on the legendary Chinese astronomers Hi and Ho of botched eclipse-prediction fame:

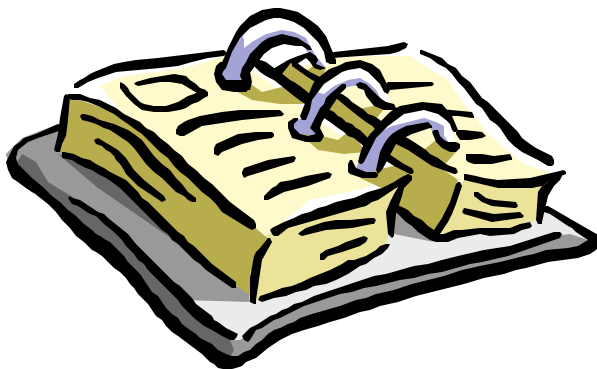
Here rest the bones of Ho and Hi,  
Whose fate was sad, yet risible,  
Being hang'd because they did not spy  
Th' eclipse that was invisible.

Heigh ho! 'tis said a love of drink  
Occasion'd all their trouble;  
But this is hardly true, I think,  
For drunken folks see double.



The editor (H.H. Turner) had extracted it from a London newspaper which stated that this 'old epigram' was a fitting comment on the recent misfortunes of a certain Li Hung Chang who of late had apparently failed to give the Chinese authorities warning of a similar event.

Does anyone on the list know the story of this unfortunate Li Hung Chang or when this epigram first appeared and who the author was? Regards,



## GENERAL TOPICS

From: FRED ESPENAK <u32fe@lepvax.gsfc.nasa.gov> To: <SOLARECLIPSES@AULA.COM>; <eclipse@hydra.carleton.ca> Sent: Wednesday, July 25, 2001 5:45 PM Subject: [SE] **Solar and Lunar Eclipses: 2021 - 2050**

Thanks to the help of my National Space Club summer intern Bailey McCreery, I have been able to make some major additions to the NASA Eclipse Home Page (<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>).

In the past, this web site has featured tables and maps for every solar and lunar eclipse for the 30 year period from 1991 through 2020. I'm pleased to announce that this coverage has now DOUBLED to include the years 2021 through 2050.

The new data is arranged and accessed through 10 year (decade) tables for solar and lunar eclipses, respectively. These tables include a brief summary of each eclipse including the date, eclipse type, saros series, magnitude, duration and geographic region of visibility.

The explicit URL addresses for the Solar Eclipse decade tables are:

Solar Eclipses:

1991-2000 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1991.html>  
2001-2010 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2001.html>  
2011-2020 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2011.html>  
2021-2030 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2021.html>  
2031-2040 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2031.html>  
2041-2050 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2041.html>

The explicit URL addresses for the Lunar Eclipse decade tables are:

Lunar Eclipses:

1991-2000 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1991.html>  
2001-2010 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2001.html>  
2011-2020 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2011.html>  
2021-2030 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2021.html>  
2031-2040 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2031.html>  
2041-2050 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2041.html>

Links to all tables may be found on the top page of the NASA Eclipse Home Page: <http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

The goal of this web site has always been to provide accurate, detailed information and predictions for both solar and lunar eclipses to the international astronomical community (both professional and amateur). I hope everyone on this mailing list will find that the new additions are both useful and informative.

A work of this magnitude will invariably include a few typos (hopefully not many). Please let me know if you find any errors or broken links. Thanks! - Fred Espenak

From: Dale Ireland <direland@drdale.com>

This gives me new incentive to make it to my 99th birthday. Today I am going to start increasing my fiber intake. Dale

From: Pierre Arpin

That will help me to reach 60 minutes of viewed totalities even if nurses have to carry me on wheelchair to eclipses sites.. :-)

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



## General Topics

Several weeks ago, the NASA Eclipse Home Page (<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>) was expanded with the addition of new eclipse maps and tables for EVERY solar and lunar eclipse from 2021 through 2050. This was accomplished in large part thanks to Bailey McCreery who is working with me as a summer intern at Goddard through the National Space Club Program (open to students from the Washington DC area high schools).

Bailey has just finished his internship with me, but before he left Goddard, he completed another major addition to the NASA Eclipse Home Page. Thanks to Bailey's hard work, I can tell you that the NASA Eclipse Home Page now features maps, tables and descriptions of EVERY solar AND lunar eclipse over the 100 year period 1951 through 2050.

The new data is arranged and accessed through 10 year (decade) tables for solar and lunar eclipses, respectively. These tables include a brief summary of each eclipse including the date, eclipse type, saros series, magnitude, duration and geographic region of visibility.

The explicit URL addresses for the Solar Eclipse decade tables are:

1951-1960 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1951.html>  
1961-1970 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1961.html>  
1971-1980 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1971.html>  
1981-1990 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1981.html>  
1991-2000 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade1991.html>  
2001-2010 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2001.html>  
2011-2020 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2011.html>  
2021-2030 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2021.html>  
2031-2040 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2031.html>  
2041-2050 - <http://sunearth.gsfc.nasa.gov/eclipse/SEcat/SEdecade2041.html>

The explicit URL addresses for the Lunar Eclipse decade tables are:

1951-1960 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1951.html>  
1961-1970 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1961.html>  
1971-1980 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1971.html>  
1981-1990 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1981.html>  
1991-2000 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade1991.html>  
2001-2010 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2001.html>  
2011-2020 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2011.html>  
2021-2030 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2021.html>  
2031-2040 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2031.html>  
2041-2050 - <http://sunearth.gsfc.nasa.gov/eclipse/LEcat/LEdecade2041.html>

Links to all tables may be found on the top page of the NASA Eclipse Home Page: <http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

The new addition (1951-1990) will allow you to look up eclipse details from events that you or other family members may have observed over the past half century.

The goal of this web site has always been to provide accurate, detailed information and predictions for both solar and lunar eclipses to the international astronomical community (both professional and amateur). I hope everyone on this mailing list will find that the new additions are both useful and informative.

A work of this magnitude will invariably include a few typos (hopefully not many). Please let me know if you find any errors or broken links. Thanks! - Fred Espenak

From: FRED ESPENAK <[u32fe@lepvax.gsfc.nasa.gov](mailto:u32fe@lepvax.gsfc.nasa.gov)>





## General Topics

>One question: How precise (in seconds or kilometers) are eclipse path predictions 50 years into the future? There are some interesting "extreme" cases in that interval, where minor errors (of LOD, not by you :-)) might become important.

The change in LOD and delta T over the next 50 years are unlikely to have any significant effect on the type/nature of even an "extreme" eclipse (i.e. - non-central near the poles, or perhaps a hybrid eclipse).

For example, an error of 10 seconds in delta T corresponds to an east-west shift of an eclipse path of about 2.5 minutes in longitude or 4.6 km at the equator. The effect shrinks to zero at the poles. Shifts due to uncertainties in the Moon's declination in 50 years would be on the order of one arc-second, which is smaller than the effects of the lunar limb profile.

Such shifts could be seen in the path tables listed on my eclipse web site, but they would be invisible on the global and world maps. - Fred Espenak

From: Daniel Fischer <dfischer@astro.uni-bonn.de> To: <SOLARECLIPSES@AULA.COM> Sent: Tuesday, July 31, 2001 11:13 AM Subject: [SE] **Suppressing the coronal brightness gradient with a rotating shutter**

A member of my Zambian expedition had come up, all by himself, with an - in principle - ingenious way of suppressing the brightness gradient of the solar corona: Andy Sischka built a rotating shutter that blocked out most of the inner corona while letting thru most of the outer corona. A very detailed website discussing the approach (in German) is growing at <http://homepages.compuserve.de/andysischka/sofible.html> (showing the artefact-rich result at the very bottom).

Now, several people (including myself) vaguely remember to have read about similar experiments some time ago, probably in magazines like Sky & Telescope, but none of us has been able to track down a reference so far. Does someone on this list remember? And is there perhaps either a review article somewhere in the recent literature (or perhaps even a website) that discusses all the approaches for suppressing the coronal brightness gradient other than the classical Newkirk radial gradient filter? The classic books on eclipses or the corona (such as the Zirker and the Pasachoff-Golub) don't, to my surprise. Thanks a lot! Daniel

From: Richard Bareford <bareford@yahoo.com>

Even if you can't read German this is amazing! A lot of "sturm und drang" for apparently small result. But I take it this was a first attempt and the technique will be refined.

One can't help but wonder, however, about the enormous effort put into this mechanical approach to the problem. When a few minutes at the computer can produce such spectacular results as obtained by Carlos, Espenak and others, Sischka's concept does seem a might obsessive.

On the other hand, I stubbornly cling to a mechanical polar alignment technique and festoon my scope with home-made accessories. I even bought a marine sextant to go along with my GPS (and at 4 times the price). There's a satisfaction here that goes beyond mere results. Richard Bareford

From: <Jay.M.Pasachoff@williams.edu>

Using a rotating shutter to suppress the inner corona is an old technique, and it is nice to see it reinvented. There are advantages, such as reduced scattering, in cutting out brightness further out in the optical system rather than merely compositing in the darkroom (though John MacKenty, Kevin Reardon, and I were among the pioneers of such compositing with our early image processing of the 1984 eclipse observations from Papua New Guinea, reported in the journal Solar Physics, before the invention of Adobe Photoshop made the technique widely accessible).

Pierre Guillermier and Sege Koutchmy, in "Total Eclipses" (Springer, 1999), report

p. 105: The problem of overexposure remained critical, and it was during [the 1930s] that the first attempts were made to incorporate radial-gradient neutral-density filters of the mechanical type, later reintroduced by M. Laffineur for the 1961 eclipse. A similar device had been tried out by Professor Burckhalter of the Chabot Observatory in 1900, and then by Professor R. W. Marriott of

## General Topics

Swarthmore College in the USA, for the eclipse of 14 January 1926, with excellent results....

A wide-ranging article on the eclipses of 1936 and 1937, by Irvine C. Gardner of the National Bureau of Standards in Washington, appeared in the special eclipse number of the National Geographic, No. 1, 1939, and describes the various instruments used, including a 'rotating sector disc', successfully used at the eclipse of 8 June 1937. At this time, the system was employed at the focus of a camera of 5 m focal length, together with an eclipse coelostat. This was a similar array to the multiple instruments used by Soviet teams, who had brought back memorial results from the preceding eclipse of 19 June 1936. A large American expedition, led by well-known astrophysicist D. H. Menzel, travelled to the USSR for the 1936 eclipse....

On p. 118, a photograph taken by Laffineur, Bloch, and Bretz "at the Haute-Provence Observatory during the eclipse of 15 February 1961. The equipment included a 15-cm camera...and a rotating diaphragm producing radial attenuation of brightness from the limb out to 1.5 solar radii. The photograph has played an important part in the evolution of our ideas about the plasma corona, as it shows structures very clearly, due to the compensation technique for the radial gradient."

p. 119: "The same method had been employed in 1937 by an American team, who placed near the focus a rotating device with two small heart-shaped wings, which avoided overexposure of the internal parts of the corona...."

"Not long afterwards [from the 1961 eclipse], during the eclipse of 1962, K. Saito of Japan took up the idea again; this time the rotating device had wings reminiscent of a dragon. The best example of the use of this method was that of G. Newkirk...." Jay Pasachoff

From: Mel Bartels <mbartels@efn.org>

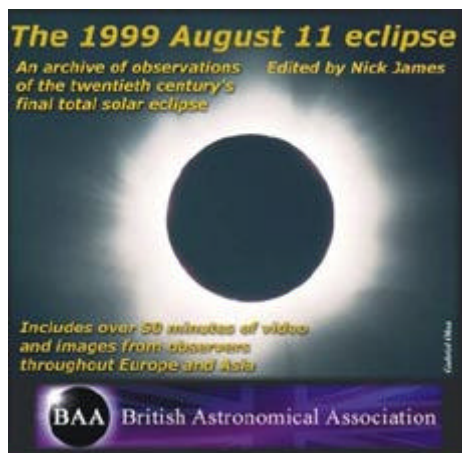
A spinning mask to vary the degree of exposure is described in Strong's Experimental Procedures in Physics from the 1950's. In Strong's case, it is used to vary the depth of an aluminized coating to automatically parabolize a spherical mirror.

Spinning masks have also been used in amateur blink comparators. But I have never heard of one being used for an eclipse. Mel Bartels

From Dietmar Staps

Van Biesbroecks article about Coronal photography in Kuiper's popular book The Sun (1953) may have inspired Laffineur to re-invent the rotating sector.

Other german amateurs have used such devices at the 73 and 99 eclipse. in 1973 by wedel of the wilhelm-foerster sternwarte berlin photographs are published in wfs publications and german journals unfortunately wedel died too early and many of his projects come to an end. one of the two devices for the the 1999 eclipse by another group of german amateurs, was on sale for about 1500 dollars at the astronomy fair essen 2001. greetings dietmar staps



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From: Hole in the Sky Tours <eclipse98@earthlink.net> To: <eclipse@hydra.carleton.ca> Sent: Tuesday, July 17, 2001 4:41 PM Subject: [eclipse] Re: **2001 Eclipse Trips Page**

Eric, thank you for your fine continuing work. We will have at least one, and perhaps 3 offerings for 2002. We also have plans to see the annular eclipse in Costa Rica this December. Clear Skies, Jerry, Hole in the Sky Tours [www.holeinthesky.com](http://www.holeinthesky.com)

> From: Eric Pauer <pauer@sanders.com> I have compiled a list of tours, trips, expeditions, and cruises which have been organized to view the next total solar eclipse on June 21, 2001. Currently there are 33 different groups listed, and several groups have more than one trip planned. The URL for the list is: <http://www.bit-net.com/~pauer/eclipse99/elinks/elinks.htm> I've been looking for the right trip for me (I have still not decided), and I thought I would share what I have found out there. If you are leading an eclipse trip or know of one that is not listed, please email me privately and I'll add it to the list. Eric Pauer

From: Daniel Fischer <dfischer@astro.uni-bonn.de> To: <SOLARECLIPSES@AULA.COM> Sent: Tuesday, July 31, 2001 2:28 PM Subject: [SE] **High-resolution video clips of 2nd & 3rd contact ...**

... as seen from Zambia with an XL-1 camera can be seen as animated GIFs at <http://www.geocities.com/georgdittie/eclipse/zambia2001.htm> (click on the thumbnails for larger versions). Apart from the most beautiful prominence being outside the extremely narrow field of view (at 800 mm focal length) and extreme blooming these are the best video clips of contacts I've encountered from \*any\* eclipse. Or are there even more stunning ones out there ...? Daniel

From: Massimiliano Lattanzi <m.lattanzi@unesco.org>

Hi Daniel, I don't know whether they are "more stunning", but please do have a look at <http://www.geocities.com/mlattanzi/tse-2001> Enjoy, Max

From: Patrick Poitevin <patrick\_poitevin@hotmail.com> To: SE Mailing List <SOLARECLIPSES@AULA.COM> Sent: Thursday, July 12, 2001 10:04 PM Subject: [SE] **Exchange eclipse stamps?**

Dear All, Anybody want to exchange eclipse stamps? We have spare eclipse stamps of Zambia and Zimbabwe. Exchange for Madagascar eclipse stamps (or other countries, years)? Just send me a personal mail. Best regards, Patrick



Eclipse stamps in the Post Office of Lusaka, Zambia



## ANNULAR 2001

From: Michael Gill <eclipsechaser@yahoo.com> Sent: Saturday, May 19, 2001 7:43 PM Subject: **Annular Eclipse Images Wanted For Eclipse Publication**

Dear All, Alejandra León Castellá in Costa Rica is preparing a publication for the December 14th 2001 annular solar eclipse that will be observable from Central America (including Costa Rica).

This will be along the same lines of the publication produced for the July 11th 1991 total solar eclipse (Eclipse Total De Sol. Costa Rica, 11 De Julio, 1991).

I've targeted you all initially, as I know you have photographed annular eclipses. If further images are needed I may widen the appeal via Patrick Poitevin's eclipse listserv.

If you have any images, primarily of annular eclipses, that are suitable for publication then Alejandra would be delighted to hear from you at: leonale@racsaco.cr

Images will be returned after use, and any images used will be credited to you in the publication. Unfortunately, no funds are available for payment so this will be for personal satisfaction only.

If you are able to provide images, then can you please include any technical information (film speed, exposure time, focal length of instrument used, type of filter) that is applicable to your photograph. Could you also state which annular eclipse you photographed (year) and from where (country, state, city).

Images can be got to Alejandra in the following ways:

An Express mail service (in Miami) can be used to send images to via snail-mail. Or, they can be sent electronically.

Due to file sizes and disc constraints, please do not send digital images without prior consultation with Alejandra. Many thanks for any assistance you can provide. Michael Gill.

## TSE 2003

From: Prestige Rent-a-Car <mail@prc.ch> To: <icstars@icstars.com> Cc: <Jay.M.Pasachof@williams.edu>; <espenak@gsfc.nasa.gov>; <patrick\_poitevin@hotmail.com> Sent: Monday, July 16, 2001 7:37 AM Subject: **Tr: Eclipse in Antarctica 2003 November 23-24**

Dear friends, here is message I received today you will probably love to read. Looking real good... :-)) best regards, Olivier

De : Stewart Campbell, Adventure Associates <Stewart\_Campbell@adventureassociates.com> À : Olivier "Klipsi" Staiger <olivier.staiger@span.ch> Date : lundi, 16. juillet 2001 07:36 Objet : Eclipse in Antarctica 2003 November 23-24

Dear Olivier, Greetings! We corresponded a while back regarding the possibility of us taking an ice-breaker to Antarctica in 2003 in order to hopefully see the solar eclipse on November 23. I just wanted to touch base again with some further details for you, as we are indeed still planning to operate such a voyage.

The exact dates and pricing is still to be confirmed, however at this stage we expect that details will be as follows:

Tentative Dates: 12 November to 3 December 2003 - 21 nights Ports: Fremantle, Western Australia to Hobart, Tasmania Price: from approx US\$15,000 pp twin share Eclipse Viewing morning of 24 November: from near Mirny Station - on land or fast ice or the vessel. Additional Voyage features - Emperor penguin colony visits, Casey, Mirny and Davis Stations, Adelie penguin colonies, helicopter scenic flights.

We hope if possible to be on "solid" land or fast ice to enable a more stable viewing/photography platform than a ship. I also understand that the eclipse is longer and higher in the sky near the coast than from offshore at 60 degrees S, where the eclipse would also be visible. Being on or near the coast is likely to also improve the chances of experiencing clear skies.

Can you confirm if you would still be interested in participating in such an expedition? How many other people do you know of that are likely to have the interest and money to join in?

Within the next couple of months we hope to finalise more definite plans for the voyage. In the meantime, I

(Continued on page 38)



16.02.99 by  
Olivier Staiger

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*(Continued from page 37)*

look forward to hearing from you. Kind regards, STEWART

A message from Stewart Campbell Operations Manager ADVENTURE ASSOCIATES: 197 Oxford Street Mall, Bondi Junction, Sydney, NSW 2022, Australia (PO Box 612, BONDI JUNCTION NSW 1355) Ph: 61 2 9389 7466 Fax: 61 2 9369 1853 www.adventureassociates.com

From: <Jay.M.Pasachoff@williams.edu>

I have an indication of an icebreaker cruise to observe the 23/24 November 2003 total solar eclipse from on or near the Antarctic coast. The fare (Australia to Australia, including eclipse + penguins, etc.) is in the vicinity of \$15,000. I know that is very expensive. Could anybody interested in a preliminary fashion please contact me at jay.m.pasachoff@williams.edu? Jay Pasachoff

From: Katherine LOW <katherine.low@worldonline.be>

Hello, I have received the following message from an operator that is planning an eclipse expedition to Antarctica to observe the 23 Nov eclipse. I suggest that if you are seriously interested (and well enough funded) you reply directly to the e-mail of Mr. Stewart Campbell from Adventure Associates. Best regards, Kris Delcourte

From: David Makepeace <imoon@interlog.com>

In addition to the cruises for 23 November 2003 already mentioned here, I have recently been asked by an American company to be the eclipse specialist on another voyage leaving from Cape Town for the event.

Anyone who would like information about this trip should contact me directly. Best to all, David Makepeace

From: Vic & Jen Winter, ICSTARS Inc. <icstars@icstars.com>

Hello all, I understand that Adventure Associates is offering Cruise space to Antarctica for the eclipse. I received a copy of this same offer listed below.

I am sure that Adventure Associates are quite a reputable company. They have a great deal of experience contracting cruises to the Antarctic Peninsula and they are well established.

I would, however, like to insert a note of caution. This company is not the actual line who owns the ships and subsequently sets the terms of the program. The ships and programs advertised by Adventure Associates are actually owned by Quark Expeditions.

My last communication with Quark for our agency indicated that while a ship is scheduled to sail to this event, firm plans have not been solidified and were still subject to a great deal of modification. While my agency is in negotiation with Quark, and will contract for space, we are not posting advertisements of the like yet, as those estimates and offers offered now are premature. I have heard 14 days from Hobart - not 21, I have not heard that a land site was selected, and that the team was examining weather reports and eclipse path as recently as a few days ago to determine the best location. I have also seen some VERY different prices thrown around for the program.

Travelers looking to book a costly program such as this should carefully examine the carrier they contract with. For maximum safety, your booking agency should be 'ARC bonded'. This protects your investment on the part of your local company. Also, your INBOUND OPERATOR who is contracting hotels, owns your equipment, cruise ship or aircraft should also be bonded. There are several alliances including ASTA, USTOA, NTA, or ATME. These associations indicate the operator carries significant protection against big liabilities such as injury, or default. This type of trip gives an extra cause for caution in these aspects.

Also, when one considers booking a program, be sure what the exact terms are for deposits, cancellation or



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policies for increase in trip costs. I hope everyone has a happy, safe experience booking an eclipse trip.... whatever company is ultimately chosen. Clear Skies, Jen Winter - Owner

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

Reisebüro in der Südstadt GmbH also has something planned for 2003

<http://www.eclipse-reisen.de/>

The direct link is: <http://www.eclipse-reisen.de/SoFi23112003.htm> . - Peter Tiedt

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

about the 2003 Antarctica TSE: We will have more options and programs in a few weeks and months.

Back in 1997 I contacted various Antarctica tour operators to inform them about the eclipse and invite them to make their tours and cruises coincide with the event, which would simply bring them more clients. So Adventure Associates, Quark Expeditions, Adventure Network International and others have been preparing their tours. They have not yet published their programs because they now mostly work on their 2001-2002 and 2002-2003 seasons. But the 2003-2004 programs will soon be published and several tours to see the eclipse will be offered. There will actually be a choice of several cruises and flights - who would have guessed !

As for me I will be with Astronomical Tours [www.astronomicaltours.net](http://www.astronomicaltours.net) , we'll soon have info available on our expedition to see how Emperor penguins react during totality :- ) Klipsi

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From: Abebe Kebede <gutaye@ncat.edu> To: <SOLARECLIPSES@AULA.COM> Sent: Wednesday, June 27, 2001 5:15 PM Subject: [SE] **Info Request**

Colleagues, I just hosted the 2001 Solar Eclipse in collaboration with NASA/Exploratorium (<http://www.exploratorium.edu>). During the next eclipse (December 2002), a group us decided to send students and their mentors to the path of the eclipse in Africa. Please inform me of any student groups who are traveling to a site in Africa for the purpose of 1) doing experiments based on the eclipse, 2) studying social and linguistical structure of the host locality 3) collaborating with students of the host country or group of countries. I am also looking for potential collaborators from schools where the site is located. and international organizations dedicated to education Regards

thank you in advance. Abebe Kebede, Associate Professor of Physics, NC A&T State University

From: <KCStarguy@aol.com> To: <undisclosed-recipients:;> Sent: Tuesday, July 17, 2001 6:22 PM Subject: [eclipse] **a great aussie 2002 eclipse trip**

Eric Another fine tour to add to your listings at <http://www.bit-net.com/~pauer/eclipse99/elinks/elinks.htm> >>

is Mimi Leavitt's tour to Australia through the winco travel agency. The link is <http://www.wincoeclipsestours.com/> Mimi is a great tour operator and has seen many eclipses. Contact her for further information. I recommend her and her trips highly. She can also be contacted at [info@wincoeclipsestours.com](mailto:info@wincoeclipsestours.com)

From: Glenn Schneider <gschneider@mac.com> To: <SOLARECLIPSES@AULA.COM>; <dan@mcglaun.com> Sent: Tuesday, July 03, 2001 5:29 PM Subject: [SE] **UMBGRAPHILE 2002 (... the count-down begins)**

As 21 June 2001 is now behind us (sad, but true) we all start (or have started) looking toward 04 December 2002. With respect to that, I have now put a downloadable UMBGRAPHILE data file for that eclipse on my server (a bold thing to do before I have gotten my pictures back from the recent eclipse ;- ) .

<http://balder.prohosting.com/stouch/UMBGRAPHILE.html>

UMBGRAPHILE users may want to pick it up and start testing - it's never too early. Suggestions for changes/improvements to the program itself are always welcome - though I likely will not get to them for several months. Cheers, Glenn Schneider



From: FRED ESPENAK <u32fe@lepvax.gsfc.nasa.gov> To: <SOLARECLIPSES@AULA.COM>; <eclipse@hydra.carleton.ca> Sent: Wednesday, July 11, 2001 11:12 PM Subject: [SE] **NASA 2002 TSE bulletin**

With the big 2001 Jun 21 total solar eclipse behind us, I am now resuming work on the NASA Technical Publication for the 2002 Dec 04 TSE. I hope to finish the manuscript in August and would then expect publication and distribution in September. I also hope to get some of the material from the 2002 eclipse bulletin onto my web site sometime in early August: <http://sunearth.gsfc.nasa.gov/eclipse/TSE2002/TSE2002.html> Thanks to all for your patience. - Fred Espenak

From: FRED ESPENAK

Two solar and three lunar eclipses occur in 2002 as follows:

2002 May 26: Penumbral Lunar Eclipse  
 2002 Jun 10: Annular Solar Eclipse  
 2002 Jun 24: Penumbral Lunar Eclipse  
 2002 Nov 20: Penumbral Lunar Eclipse  
 2002 Dec 04: Total Solar Eclipse



I have recently completed my annual contribution on eclipses "Eclipses During 2001" for the Observer's Handbook 2002 of the Royal Astronomical Society of Canada. The article covers predictions for all eclipses which are summarized in a series of diagrams. World maps show the regions of visibility for each eclipse. The lunar eclipse diagrams also include the path of the Moon through Earth's shadows. Contact times for each principal phase are tabulated along with the magnitudes and geocentric coordinates of the Sun and Moon at greatest eclipse.

Of special note are detailed maps of the Guam/Saipan region and Pacific coast of Mexico showing the path of the annular eclipse on 2002 Jun 10.

Although the article will not be published until fall 2001, it is now available from my NASA eclipse web site. The URL is:

<http://sunearth.gsfc.nasa.gov/eclipse/OH/OH2002.html>

Please let me know if you find any errors or broken links.- Fred Espenak

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

Fred, Good morning to you ! I hope you had a great trip to Africa by the way.

Thanks for the info today, although I have noticed a few broken links for all three penumbral lunar eclipses (gosh, that is sad) in 2002 and the 2 lunar eclipses in 2003.

<http://sunearth.gsfc.nasa.gov/eclipse/LEplot/LEplot2001/LE2002Nov20N.gif> <<http://sunearth.gsfc.nasa.gov/eclipse/LEplot/LEplot2001/LE2002Nov20N.gif>>

should be :- <http://sunearth.gsfc.nasa.gov/eclipse/LEplot/LE2002Nov20N.gif> <<http://sunearth.gsfc.nasa.gov/eclipse/LEplot/LE2002Nov20N.gif>>

and similarly for the other 2 and the associated 'figure' hyperlinks. Also similar hassles with the 2003 Lunar Eclipses links. Once again, keep up the good work and thanks for all your info. Kind regards, Stephen McCann

From: FRED ESPENAK

Sorry about the broken links! I've done some major restructuring of directories and apparently not all the changes made it from my desk-top to the web server. All links should be working now (except for the one to: "[sunearth.gsfc.nasa.gov/eclipse/ASE2002/ASE2002.html](http://sunearth.gsfc.nasa.gov/eclipse/ASE2002/ASE2002.html)". That one will have to wait until I can get to it).

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I'm still checking into some problems with the solar eclipse local circumstance times in tables 2 and 4. Apparently some times are local while others are in UT. I'll get it sorted out and will let everyone know when they are fixed.

Thanks again to all who pointed out bad links and problems. - Fred Espenak

From: FRED ESPENAK

I've now corrected and expanded the two "local circumstances" tables (all in UT) for the 2002 Jun 10 and 2002 Dec 04 solar eclipses. All other links should now be operational. Please let me know if you find any more problems. Thanks, Fred Espenak

From: <JohnLX200@aol.com> To: <SOLARECLIPSES@aula.com> Sent: Thursday, July 05, 2001 7:45 PM Subject: Re: [SE] **2002 Sunset eclipse in Australia**

> Mmmm, I can just feel coming up the proposal for a relaxed cruise in the Indian Ocean... ;-)> There already is. See: <http://www.nauticom.net/www/planet/files/jun21ROC.html> Joel M. Moskowitz, M.D 7 (total) eclipses and counting >>

Joel, Are you on it? Perhaps we'll finally meet. The cruise will be a good opportunity for me to see some of the same eclipse-cruise folks who were on the Canberra in 1973, my first TSE.

As for the 2002 cruise:

1. I was the first person to have a deposit accepted by Royal Olympic to book a room on the 2002 cruise, via may-hugh.com
2. Ted Pedas really ought to have not reused the 2001-named page for the 2002 cruise.
3. Beware: the cabin numbers on the new Olympic Explorer are not identical to those on the (existing sister ship) Olympic Voyager, so be sure to use the right cabin number map, if you can find a readable copy at all. Back when I picked mine, the Royal Olympic website's map was unreadable, so I used ones at icruise.com
4. Similarly, be careful of how many people are allowed in different cabins, there seem to be some quirks which almost require someone visiting the ship itself, to resolve.
5. I'm not 100% sure that the cruise is where I'll wind up, but I suspect it will be a better option than on land in Africa, considering that 2002 is going to be at a lot hotter/wetter/buggier time of year than 2001 was in Southern Africa.
6. Mobility on the ground in Southern Africa isn't the advantage it is normally expected to be in many places. With park fees, checkpoints, game scouts, fixed campsites, life-threatening animals, and so forth, it's not easy to just head somewhere totally different the night before the eclipse, and the 2002 eclipse is in the morning in Africa. I'm not so sure I'd have been able to camp 100km away or run even 10km during the partial phase this year if there had been clouds. Heck, until the sun rose on eclipse day, I didn't even dare go the 25 meters to the toilet tent, as a leopard was panting at me in the dark from quite nearby while I relieved myself 2 meters outside my tent door and quickly dove back in. The ship has no shortage of safe bathroom facilities and cruises at 50 km/hour in a straight line toward good weather.
7. Typical intra-African flight and safari weight restrictions make it difficult to bring heavy equatorial tracking mounts anyway. This year, I chose flights where this wasn't a problem, but still wound up alt-az. My light setup did very well despite having to give up super-long, tracked coronal exposures. The corona still filled my frame in some cases. John Hopper







Joanne & Patrick

*Solar Eclipse Mailing List*



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**Goodbye Africa, see you in 2002?**

