

# SOLAR ECLIPSE NEWSLETTER

## INDEX

## The sole Newsletter dedicated to Solar Eclipses

2	SECalendar May
8	SECalendar - 3 items
8	SECalendar May - Annular 1994
9	SECalendar May - Mouradian
9	Picture SECalendar May - Mouradian
10	Invitation lecture
11	SENL April 2004 Index
11	Understanding Eclipses by Guy Ottewell
14	Delta T
14	Antarctic Eclipse Short Film
15	NASA employee spotlight
15	Picture NASA logo
15	Auroras and Eclipses
16	Astronomy & Esperanto
17	The mathematics of solar eclipses
18	Timing of contacts during eclipses or transit
18	Venus eclipsed by the Moon...look for software
19	THE OUTBACK ECLIPSE STORY
19	Eclipse from United States, Pittsburgh, Pennsylvania
19	A comet visible during total eclipse - right now !
19	Picture SOHO and comet
20	GPS accuracy
22	Total Lunar Eclipse 04/05/2004 - Live webcam from Gran Canaria
22	First filming of solar eclipses
23	Eclipse travel planning - recommended PC atlas
24	Picture Observation Frans Van Loo and son Mercury Transit 2003
25	European Web site on Venus Transit VT -2004
25	I wonder...about this concerning the Venus Transit
25	Ancient Venus-Transits ?
26	New Transit of Venus window at Much Hoole
27	Transit of Venus medal
29	Shades of Venus: 4/17/04 - Science News Article
32	Picture Transit of Venus from SOHO
33	Scientific American article on the historical Transit of Venus
34	Jeremiah Horrocks
36	Venus history in Iraq and Afghanistan
38	List protocol
38	Ancient views on Venus
41	Mounts and tracking
42	Eclipses During 2004
42	Nome Alaska 13 october
42	Umbra Oct 14
42	Any Webcam is South africa to look at the Partial eclipse?
43	Solar eclipse report from Cape Town
43	19-Apr-2004 PSE Report - Tswaing Meteorite Crater
44	PSE report from Madagascar
44	Images of last week's eclipse
44	Picture Images of last week's eclipse

Dear All,

We hope you are all well. The partial solar eclipse in Southern Africa was a success for those whom went. Congratulations. Though the Lunar Eclipse had mixed observations. More in next issue.

Waiting for the Transit of Venus. As you will notice in this issue, lots of messages at various mailing lists. We hope you enjoy.

Next after the Transit is the partial solar eclipse of 14 October 2004. We hope to receive your contributions on the Solar Eclipse Mailing List or in this Newsletter. And there after we have (again) a Lunar Eclipse.

Though, we will meet first in August for the international Solar Eclipse Conference (SEC2004) in the Open University of Milton Keynes (UK). We feel the registrations for SEC2004 come in slowly but we still hope to have the same amount of registrations of 2000. We'll keep you posted.

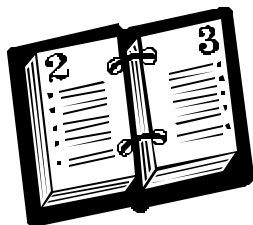
If you have any comments, contributions, remarks or complaints, please drop us a message at [solareclipsewebpages@btopenworld.com](mailto:solareclipsewebpages@btopenworld.com)

Best regards,

Joanne & Patrick

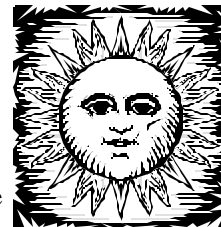
45	Picture Archive Frans Van Loo
46	Picture SEC2004 Poster

## SECalendar



Dear All,

Please find herewith the solar eclipse calendar (SECalendar) for May. If you have any additional information, queries or remarks, please drop us a mail.



### May 2004

For the whole Solar Eclipse Calendar, see our Solar Eclipse WebPages at

<http://solareclipsewebpages.users.btopenworld.com>

May 01, 0664 "In this year the Sun was eclipsed on the 5th of the Nones of May; and Earcenbryht, the King of the Kentish people died and Ecgbryht his son succeeded to the Kingdom." Refers to the total solar eclipse of 1 May AD 664. From: The Anglo Saxon Chronicles. Ref SW Solar Eclipses from Year 1.

May 01, 1185 "On the first day of the month of May, on the day of the Saint Prophet Jeremiah, on Wednesday, during the evening service, there was a sign in the Sun. It became very dark, even the stars could be seen; it seemed to men as if everything were green, and the Sun became like a crescent of the Moon, from the horns of which a glow similar to that of red-hot charcoals was emanating. It was terrible to see this sign of the Lord." From: Lavrentievskaya Letopis. "On the first day of the month of May, during the ringing of the bells for the evening service, there was a sign in the Sun. It became very dark for an hour or longer and the stars were visible and to men everything seemed as if it were green. The Sun became like a crescent of the new Moon and from its horns a glow like a roaring fire was coming forth and it was terrible to see the sign of the Lord. Then the Sun cleared and we were happy again." From: Novgorodskaya II Letopis Both of these quotations refer to a total solar eclipse in Novgorod, Russia, of 1 May 1185. Ref. FRS 1997, page 395.

May 01, 1952 Minor planet (3428) Roberts 1952 JH. Discovered 1952 May 1 at the Goethe Link Observatory at Brooklyn, Indiana. Named in memory of Walter Orr Roberts (1915-1990), from 1960 to 1970 the founding director of the National Center for Atmospheric Research. In the early 1940s he established the Harvard College Observatory's Fremont Pass Station (which later became the University of Colorado's High Altitude Observatory), where he made solar observations with the first coronagraph in the western hemisphere. His interests soon broadened from solar physics to climatic research in general, and he served as president (and later president emeritus) of the University Corporation for Atmospheric Research. His final major activity was the Greenhouse Glassnost project between scientists in the U.S. and the U.S.S.R. (M 16885) Name proposed by F. K. Edmondson. Obituaries published in Bill. Am. Astron. Soc., Vol. 24, No. 4, p. 1331-1332 (1992); Q.J.R. Astron. Soc., Vol. 33, No. 1, p. 35-37 (1992). Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

May 03, -1374 (1375 BC) Syria: A clay tablet found at that site notes that "the day of the New Moon in the month of (Apr-May) was put to shame. The sun went down with Mars in attendance. This means the overlord will be attacked by his vassals." Ulysses 3/97" But: "was put to shame" was also translated as "on the sixth" (day) and again differently by others. "went down" is the same word as that used for "to set". Ref. ENB013. This is no solar eclipse, although mentioned by several references. (Reprinted, from Chasing the Shadow, copyright 1994 by Joel K Harris and Richard L Talcott, by permission of Kalmbach Publishing Co. Also appears in Total Eclipses of the Sun by Zirker. In Guide to the Sun, Phillips says that this might refer to the eclipse of 1223 BC.) Ref. SENL July 1999, FE 01/01.

May 03, 1715 "A few seconds before the sun was all hid, there discovered itself round the moon a luminous ring about a digit, or perhaps a tenth part of the moon's diameter, in breadth. It was of a pale whiteness, or rather pearl-colour, seeming to me a little tinged with the colors of the iris, and to be concentric with the moon." Refers to a total solar eclipse of 3 May 1715. From: Edmund Halley. Ref. Popular Astronomy by Newcomb, and in UK Solar Eclipses from Year 1 by Williams.

May 03, 1715 Edmond Halley (1656-1742 or 1743) England, during an eclipse in England, is the first to report the phenomenon later known as Baily's Beads; also notes bright red prominences and the east-west asymmetry in the corona, which he attributes to an atmosphere on the Moon or Sun. Halley observed from London (John Flamsteed (1646-1719) observed from Greenwich).

(Continued on page 3)

## SECalendar

May 03, 1715 Probably the first map of a path of totality, drawn by the English astronomer Edmond Halley (1656-1742 or 1743). On a copper plate he engraved the totally paths of the total solar eclipses of 3 May 1715 and 11 May 1724. On top of the map, the date 22 April 1705 (i.o. 3 May) is mentioned, but that is because the Gregorian Calendar in England was introduced in 1752.

May 03, 1769 "It will be Eclipse first, the rest nowhere." Dennis O'Kelly (at Epsom, 3 May 1769) (Quoted in The Penguin Dictionary of Quotations by Cohen and Cohen. In UK Solar Eclipses from Year 1, Sheridan Williams says: "One of the world's most successful racehorses was born around the time of this [annular eclipse of 1 April 1764] and was named Eclipse. The Eclipse Stakes, named after that horse, are still run today, and the horse of the year awards in the U.S. are called Eclipse Awards after him.")

May 03, 1880 Death of Jonathan H. Lane, American physics and astronomer. Studied temperature and physics of the Sun and density of Sungas.

May 03, 1981 Hess 2844 (1981 JP): Minor planet discovered May 03, 1981 by Edward L.G. Bowell at Anderson Mesa. Named in honor of Frederick Hess, Prof. of natural sciences at the State Univ. of NY at Fort Schuyler and long time lecturer at the Hayden Planetarium-American Museum in NYC. Hess has directed a number of Solar Eclipse expedition and has accumulated more than 30 min in the shadow of the Moon. MPC 9215. Name proposed by the discoverer. Ref. VK6/97

May 04, 0292 Last total solar eclipse visible in Madeira. The next total solar eclipse in Madeira will be only in 18 September 2620. On 15 May 291 there was a total solar eclipse though, only a year before. A nearly miss with magnitude 0.99 was on 20 June 540 and a total solar eclipse before sunrise, (altitude -1) on 17 October 1781. Ref. More Mathematical Astronomical Morsels by Jean Meeus; Willmann-Bell, 2002.

May 05, 0840 "In the third year of the Indiction, the Sun was hidden from this world and stars appeared in the sky as if it were midnight, on the third day before the Nones of May (May 5) during the Litanies of Our Lord. There was great distress, and while the people beheld it, many thought that this age would last no longer. But while they were contemplating these simple things, the Sun shone again and trembling as it were began to escape from its former shade." Refers to a total solar eclipse of 5 May AD 840. From: Andreas Bergomatis Chronicon. Ref. FRS 1997, page 387.

May 05, 1361 " Chih-cheng reign period, 21st year, 4th month, day hsin-szu, the first day of the month. As the Sun was about to sink (i.e. set) suddenly it lost its light. It took the shape of a plantain leaf. The sky was as dark as night and the stars were shining brightly. For a short time (literally: for the duration of a meal), the sky became bright again. Then in a short time (the light) disappeared once more." Refers to a total solar eclipse of 5 May 1361. From: Sung-chiang Fu-chih (History of the town of Sung-chiang, south-west of Shanghai). Ref. FRS 1997, page 259.

May 06, 1883 Carolina 235: Minor planet discovered 1883 November 28 by Johann Palisa at Vienna. Named for an atoll of the Line Islands, 450 miles northwest of Papeete, Tahiti, where the discoverer observed the Total Solar Eclipse of May 6, 1883. Palisa observed the solar neighborhood in order to find an intra-Mercurian planet. BAJ CIR 218. Ref. VK 6/97

May 06, 1883 Oceana 224: Minor planet discovered 1882 March 30 by Johann Palisa at Vienna. Named for the Pacific Ocean. The discoverer communicated from Honolulu on return from the solar eclipse expedition of May 6, 1883 that Governor von Dessarts of Tahiti has named this planet. BAJ CIR 210 (1883). Ref. VK 6/97

May 07, 1819 Birth of Otto Wilhelm von Struve (1819-1905) in Dorpat, Russian astronomer. Discovered 547 double stars, studied rings of Saturn and parallax of the Sun.

May 09, 1988 Minor planet (4899) Candace 1988 JU. Discovered 1988 May 9 by C. S. Shoemaker and E. M. Shoemaker at Palomar. Named for Candace P. Kohl, American chemist and a leading investigator of ancient solar activity through analysis of solar cosmic-ray-produced nuclides in lunar samples. She has also contributed importantly in the development of techniques for dating surface exposure of materials on the earth from cosmic-ray-produced nuclides. Through her popular lectures on meteorites, the moon and the solar system, Kohl has reached a wide audience ranging from primary-school children to high-school students and the lay community. (M 25443) Citation provided by K. Nishiizumi at the request of the discoverers. Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

*(Continued on page 4)*

## SECalendar

*(Continued from page 3)*

May 11, 1904 Minor Planet (536) Merapi Discovered 1904 May 11 by G. H. Peters at Washington. Named after a mountain in west central Sumatra, site of the U.S. Naval Observatory and other expeditions to the total solar eclipse of May 17, 1901. It gives off smoke more or less continuously and the name means "with fire". It should not be confused with the nearby active volcano of the same name in central Java. The discoverer was a member of the eclipse expedition. (H 57) Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

May 11, 1916 Death of Karl Schwarzschild, German astronomer. Explained the difference in light intensity of the edge of the Sun in 1906.

May 11, 1924 Birth of Antony Hewish, British physicist and astronomer. Studied Solarwind. Got Nobelprice of physics in 1974.

May 11, 1956 Death of Walter S. Adams, American astronomer. Studied spectra of Sunspots and stars.

May 12, 1706 An English ship captain named Stannyan, on vacation in Switzerland, reports a reddish streak (chromosphere? prominence?) along the rim of the Sun as the eclipse becomes total.

May 12, 1706 If Duillier's account is to be trusted, the Moon's shadow was first seen in its swift approach. (ref. Total E of the S, Todd, 1894). "This was also the occasion when, if DUILLIER'S account is to be trusted, the Moon's shadow was first seen in its swift approach." (p 110)

May 13, 1733 As per (Sir) Patrick Moore, Guinness Book of Astronomy (1983), the shadow bands have been reported for the first time by H. Goldschmidt in 1820. The description is also mentioned in the book of Mabel Todd, Total Eclipses of the Sun, 1894. But during the total solar eclipse of 13 May 1733 (2 May 1733 Julian date), observations have been coordinated and collected by Celsius. The eclipse was visible in the north of Europe. In Forsheim, Sweden, the duration was a little more then 3 minutes. The Transactions of the Royal Society of Sweden do have the most physical nature observations of a solar eclipse of that time and before. Edmond Halley (1656-1742 or 1743) was the only whom noted a physical observation during the eclipse of 1715. Rydhenius, pastor of Forshem noted following: when the sun was about to lose his light, and also when he was about to recover it, he emitted rays that undulated like the aurora borealis, and were of a fiery red color. At the same eclipse, the pastor of Flo noted: towards the total obscuration stars were visible, and also a singular fluctuation in the air. (ref. History of Physical Astronomy)

May 13, 1733 Birger Wassenius (Sweden), observing an eclipse near Göteborg, is the first to report prominences visible to the unaided eye; he attributes them to the Moon.

May 13, 1733 The first person who makes mention of earthshine during totality is Bigerus Vassenius the Swedish astronomer. In the account of that eclipse which he transmitted to the royal Society, he asserts that with the telescope of 21 feet focal length, he perceived several of the principal spots on the moon during the total obscuration. Ferrer also states, that during the total eclipse of 1806, the irregulations of the moon's surface were plainly discernible. (ref. History of Physical Astronomy).

May 13, 2608 November 15, 1999 last transit of Mercury which was partial for a region though complete in parts of Australia and New Zealand (Patrick Poitevin observed from Invercargill in New Zealand). Line between the area of complete transit and that of partial transit crossed Australia and New Zealand. The next transit of Mercury which was partial for a region was on 13 May 2608. This transit is partial in area's and in other area's no transit at all. Ref. More Mathematical Astronomical Morsels by Jean Meeus.

May 14, 1230 "On the 14th May, which was the Tuesday in Rogation Week, the unusual eclipse of the Sun took place very early in the morning, immediately after sunrise; and it became so dark that the labourers, who had commenced their morning's work, were obliged to leave it, and returned again to their beds to sleep; but in about an hour's time, to the astonishment of many, the Sun regained its usual brightness." Refers to the total solar eclipse of 14 May 1230. From: Rogerus de Wendover, Flores Historiarum, vol. ii. p.235. Ref. FRS 1997, 425.

May 14, 1973 Launch of Skylab, American spaceship. Got 3 times visitors of each time 3 astronauts. Research of the sun.

May 14, 1991 Minor Planet (5381) Sekhmet 1991 JY. Discovered 1991 May 14 by C. S. Shoemaker at Palomar. The daughter of

*(Continued on page 5)*

## SECalendar

the Egyptian god Ra and wife of Ptah {see planets (2100) and (5011), respectively}, Sekhmet was a lion-headed sun goddess. Her role was that as defender of the divine order, not as creator of it. Her title was the "Mighty One", and she was a fierce goddess of war and strife and bringer of destruction to the enemies of Ra. She was considered the Eye of Ra, representing the scorching, destructive power of the sun. (M 24917) Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg

May 15, 1836 Francis Baily (1774-1844) UK, during an annular eclipse in Scotland, calls attention to the brief bright beads of light that appear close to totality as the Sun's disk is blocked except for the sunlight streaming through lunar valleys along the limb. This phenomenon becomes known as Baily's Beads.

May 15, 1921 First record of Aurora Borealis observation during day time? Aurora have been seen in New Zealand and surrounding islands. September 18, 1941, in the north, Michigan, Aurora Borealis have been reordered during daytime. (ref. SaT 3/1954 and 12/1953)

May 17, 1836 Sir Joseph Norman Lockyer (1836-1920), British physicist and astronomer was born at Rugby on May, 17th 1836 to Mr. Joseph Hooley Lockyer, a lecturer on scientific subjects at Rugby School and his wife Anne Norman. Sir Joseph Norman Lockyer (1836-1920) founded the magazine Nature in 1869. Observed the sun and discovered one unknown line in the spectra: helium. Observed 8 total solar eclipses. Passed away August 16, 1920 in Salcombe Regis, Devon England. Ref. Bibliography of Astronomers by Paul Luther, 1989.

May 17, 1882 A comet is discovered and photographed by Sir Arthur Schuster (1851-1934), Germany/UK, during an eclipse in Egypt: first time a comet discovered in this way has been photographed. The Total Solar Eclipse had been observed by Sir Joseph Norman Lockyer (1836-1920), Ranard and Schuster from England, Tacchini from Italy, Trépied, Thollon and Puiseux from France. Observation from Sohag at the Nile.

May 18, -0602 (603 Bc) ". . . there was war between the Lydians and the Medes five years. . . They were still warring with equal success, when it chanced, at an encounter which happened in the sixth year, that during the battle the day turned to night. Thales of Miletus had foretold this loss of daylight to the Ionians, fixing it within the year in which the change did indeed happen. So when the Lydians and Medes saw the day turned to night, they ceased from fighting, and both were the more zealous to make peace." Probably refers to the total solar eclipse of 28 May 585 BC in Asia Minor. Herodotus, (c485-c420 BC) History I, 74. Quoted in Historical Eclipses and Earth's Rotation, by F Richard Stephenson, Cambridge University Press, 1997, page 242. Also in Greek Astronomy by Heath, and in Total Eclipses of the Sun, by Zirker, and referred to in The Fontana History of Astronomy and Cosmology by North. The Encyclopaedia Britannica CD 98 says that this eclipse must have been predicted by means of the Saros and the eclipse of 18 May 603 BC. Ref FE 01/01

May 18, 1901 Merapi 536: Minor planet discovered 1904 May 11 by G. H. Peters at Washington. Named after a mountain in west central Sumatra, site of the U.S. Naval Obs and other expeditions to the Solar Eclipse of May 18, 1901. It gives off smoke more or less continuously and the name means "with fire". The discoverer was a member of the Eclipse expedition. Ref. VK 6/97

May 18, 1901 Rainbow observed during the total solar eclipse on Mauritius. Early in the morning the eclipse was accompanied by a rainbow. It was unearthly, containing a bright pink line, a spectrum of the sun's chromosphere. (ref. The Understanding of eclipses, Ottewell, 1991)

May 19, 1985 Dr. Rudolf Gulyaev, once made attempt to carry out photographic observation of the partial solar eclipse below the horizon (May 19, 1985). He put the task to estimate how much the sky brightness at the horizon is reduced during the eclipse occurring under the horizon. Maximum eclipse magnitude was about 0.8 by the Sun altitude of minus 3 degrees. The observations were made at elevation more than 2000 meters above the sea level (Mondy, near Irkutsk, Siberia). Regretfully, the sky was cloudy above the horizon, however there were small gaps between the clouds. Visually, it seemed that the sky above the horizon (towards the Sun) was more dark than at zenith on the contrary to normal conditions prior the sunrise. (ref. personal mail 7/98)

May 20, 1825 Birth of George Phillips Bond at Dorchester, Massachusetts. July 28, 1851 First American eclipse expedition to Europe when George Phillips Bond (1825 - 1865) led a team to Scandinavia. Died of tuberculosis on 17 February 1865 in Cambridge, Massachusetts. Ref. Bibliography of Astronomers by Paul Luther, 1989.

*(Continued on page 6)*

## SECalendar

May 20, 1903 Minor planet (510) Mabella Discovered 1903 May 20 by R. S. Dugan at Heidelberg. Named by the discoverer in honor of Mabel Loomis Todd, daughter of the mathematician and astronomer Elias Loomis. She was the wife of David P. Todd {see planet (511)}, the discoverer's professor of astronomy at Amherst College. (H 55) See the remark for planet (497). Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg. Her books about eclipses are well known.

May 20, 1947 George Van Biesbroeck did observe a comet the day of the total solar eclipse of May 20, 1947. The comet was of magnitude 4 to 5. Several sources do mention as he observed this comet during the eclipse. This is wrong. He observed the comet on the morning of eclipse day, before dawn.

May 21, 1951 Birthday of (eclipse) eye specialist Ralf Chou. Ralph (Canada) is famous for his studies and work on eye safety at solar eclipses.

May 22, 0133 Solar eclipse which is the nearest with Whitsunday (25 May 133). A solar eclipse can never be on Whitsunday. Easter is on a Sunday, 21 days after full moon. Whitsunday is 49 days after Easter. The age of the moon can only be between 5 to 11 days, or short before first quarter or short before full moon. On Whitsunday, or on Easter there will never be a solar eclipse. Whitsunday of 133 is only 3 days after new moon, or the solar eclipse of 22 May 133.

May 22, 1724 Giacomo Filippo Maraldi (Italy/France) concludes that the corona is part of the Sun because the Moon traverses the corona during an eclipse.

May 23, 1221 "On the first day of the fifth month (May 23), at noon, the Sun was eclipsed and it was total. All the stars were therefore seen. A short while later the brightness returned. At that time we were on the southern bank of the river. The eclipse (began) at the south-west and (the Sun) reappeared from the north-east. At that place it is cool in the morning and warm in the evening; there are many yellow flowers among the grass. The river flows to the north-east. On both banks there are many tall willows. The Mongols use them to make their tents. [Later] (Ch'ang-ch'un) asked (an astronomer) about the solar eclipse on the first day of the month (May 23). The man replied: 'Here the Sun was eclipsed up to 7 fen (6/10) at the hour of ch'en (7-9 h)'. The Master continued, 'When we were by the Lu-chu Ho (Kerulen River), during the hour wu (11-13 h) the Sun was seen totally eclipsed and also south-west of Chin-shan the people there said that the eclipse occurred at the hour szu (9-11 h) and reached 7 fen. At each of these three places it was seen differently. According to the commentary on the Ch'un-ch'iu by K'ung Ying-ta, when the body (of the Moon) covers the Sun, then there will be a solar eclipse. Now I presume that we must have been directly beneath it; hence we observed the eclipse to be total. On the other hand, those people on the sides (of the shadow) were further away and hence (their view) gradually became different. This is similar to screening a lamp with a fan. In the shadow of the fan there is no light or brightness. Further away from the sides (of the fan) then the light of the lamp gradually becomes greater.'" Refers to a total solar eclipse of 23 May 1221. From: Ch'ang-ch'un Chen-jen Tao-ts'ang('The Journey of the Adept Ch'ang-ch'un to the West'). Ref. FRS 1997, page 254.

May 25, 1267 "At that time the Moon obscured the Sun when it was in the 4th part (degree) of Gemini, at the 3rd hour before mid-day on the 25th day of May in the year 6775 (AD 1267). It was a total eclipse of about 12 digits or points. Also, such darkness arose over the Earth at the time of mid-eclipse that many stars appeared. No doubt this portended the very great and destructive calamities which were soon to be vented on the Romans by the Turks." Refers to a solar eclipse in Constantinople of 25 May 1267. From: Nicephori Gregorae Byzantinae Historiae. Ref. FRS 1997, page 404.

May 25, 1939 Sir Frank W. Dyson died off the coast of South Africa while on a sea voyage from Australia. He was an active member of several expeditions to study total eclipses of the sun and in 1906 he published a book in which he discussed data he had obtained on these occasions on the spectrum of the solar chromosphere. Born January 08, 1868 in Ashby de la Zouch, Leicestershire UK. Dyson proved that Albert Einstein (1879-1955) was right about light being bent by gravity. Co-writer of the book Eclipses of the Sun and Moon, 1937 (with R.v.d.R. Woolley). Ref. The Bibliographical Dictionary of Scientists, edited by David Abbott, 1994.

May 25, 2142 Next total solar eclipse in Ostend, Belgium. The last total solar eclipse took place more than 11 centuries ago, 29 September 878. But only 9 years later, on 14 June 2151, there will be another one. Ref. JM 9/99.

May 27, -0668 (669 BC) "If the Sun at its rising is like a crescent and wears a crown like the Moon: the king will capture his en-

*(Continued on page 7)*

## SECalendar

emy's land; evil will leave the land, and (the land) will experience good . . ." Refers to a solar eclipse of 27 May 669 BC. Rasil the older, Babylonian scribe to the king. FRS 1997, page 125.

May 28, -0584 (585 BC) ". . . there was war between the Lydians and the Medes five years. . . . They were still warring with equal success, when it chanced, at an encounter which happened in the sixth year, that during the battle the day turned to night. Thales of Miletus had foretold this loss of daylight to the Ionians, fixing it within the year in which the change did indeed happen. So when the Lydians and Medes saw the day turned to night, they ceased from fighting, and both were the more zealous to make peace." Probably refers to the total solar eclipse of 28 May 585 BC in Asia Minor. Herodotus, (c485-c420 BC) History I, 74. Ref. FRS 1997, page 242. The Encyclopaedia Britannica CD 98 says that this eclipse must have been predicted by means of the Saros and the eclipse of 18 May 603 BC.

May 28, -0584 (585 BC) A total eclipse in the midst of a battle between the Lydians and Medes scares both sides; hostilities are suspended, according to the Greek historian Herodotus (several other dates are possible).

May 28, -0584 (585 BC) The first known prediction was made by the Greek philosopher Thales, who forecast the eclipse of May 28, 585 BC (by year, day, place, time?). This occurred at sunset in the Mediterranean area, and is said to have put an end to a battle between the forces of King Alyattes of the Lydians and King Cyaxares of the Medes. It was in the midst of their battle and scared both sides. Ref. ENB013

May 28, 1900 ". . . the semi-darkness, for there was no real blackness, came on suddenly, and during totality, computed to last 1m 28s., everything terrestrial took on a cold iron hue, altogether different from the gloom of evening. The distant town and more distant mountains were almost blotted out from view, whilst in the heavens above round the moon's black disk, as if by the touch of a magician's wand, there flashed out the corona in grandeur of form and of pearly whiteness. Mercury, too, in close proximity, shone with the brilliance of a miniature sun, and enveloping the whole was a halo of soft white light; a spectacle whose unique beauty words fail utterly to describe." Refers to a total solar eclipse at Naval Moral, Spain, of 28 May 1900. From: T Weir, a member of the British Astronomical Association eclipse expedition. Ref JH and RT Chasing the Shadow.

May 28, 1900 Total Solar eclipse where Mercury is very close or touching the corona or only 7 radii from the eclipsed sun. For a Mercury corona transit you have to wait till 3269 and 3853. (ref. ENB 9/1998)

May 28, 2291 Regarding the reoccurrence of eclipses observable from the same location on a 300 year cycle, but looking in to this, one finds that eclipses 6 saros numbers higher, and 6 to 7 series numbers higher are frequently visible at the same location. One might be total and the others partial, but still visible from the same location. The path of the 2291 May 28 total eclipse of saros 142 nearly duplicates that of 1991 July 11 saros 136 eclipse over the Baja and mainland Mexico. More interesting is the fact that it too will be a Great eclipse in that it will be more than 6 minutes in duration. DB 09/01

May 29, 1919 Albert Einstein (1879-1955) predicted that light passing the Sun would be bent a certain amount by the object's gravitational field. The Solar Eclipse of this date gave the light from the stars in Hyades were bent by the gravity of the Sun according to Einstein's theory. Thus Einstein was propelled into permanent and worldwide celebrity. Prediction of Einstein confirmed by Eddington, Cottingham, Crommelin and Davidson.

May 29, 1919 Arthur S. Eddington (UK) and Co-workers, (Cottingham, Crommelin and Davidson) observing a total solar eclipse from Principe, an island W of Africa and Sobral, NE coast of Brazil, confirm then bending of starlight by gravity as predicted by Einstein in his general theory of relativity. Pictures of the stars near the sun compared with star pictures months later.

May 30, 1903 Minor planet (511) Davida Discovered 1903 May 30 by R. S. Dugan at Heidelberg. Named by the discoverer in honor of David P. Todd (1855-1939), professor of astronomy and director of the Amherst College Observatory (1881-1920). (H 55) See the remark for planet (497). Dictionary of Minor Planet Names - ISBN 3-540-14814-0 - Copyright © 1999 by Springer-Verlag Berlin Heidelberg. David Todd was the husband of Mabel Todd, who wrote books about solar eclipses. David has also a drawing of a painting of a solar eclipse in one of his books.

May 31, 1921 Death of John Herschel. During the eclipse of 18 August 1868 from the Red Sea through India to Malaysia and New Guinea, prominences are first studied with spectroscopes and shown to be composed primarily of hydrogen by James Francis

*(Continued on page 8)*

## SECalendar

Tennant (1829-1915), UK, John Herschel (1837-1921, UK - son of Sir John Frederick William Herschel 1792-1871, grandson of Sir William Herschel 1738-1822), Jules Pierre Jules Cesar Janssen (1824-1907, France), George Rayet (France), and Norman Pogson (UK/India). (Ref Rc 1999)

May 31, 2003 Some central eclipses are so extreme, so they do not have a northern or southern limit. An example was the annular eclipse of 31 May 2003. Derryl Barr tried to observe this eclipse on his birthday (1944) in northern Scotland. Though he (and may others) were clouded out.

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

Best regards,

Patrick and Joanne

solareclipsewebpagesSENL200405btopenworld.com  
<http://solareclipsewebpages.users.btopenworld.com>



### SECalendar - 3 items

From: "Friedhelm Dorst" <sietisSENL200405gmx.de> To: "Patrick Poitevin" Date: Sun, 18 Apr 2004 23:50:41 +0200

1. When checking solar eclipse dates of the past I noticed that a ring eclipse occurred on July 20, 1944, just the date when Claus Graf Schenk von Stauffenberg tried to assassinate Adolf Hitler. Has this only been a timely coincidence or has some astrological "assistance" played a role when choosing this date for Hitler's assembly in the "Wolfsschanze" or considering this date as promising in order to terminate the Nazi's rulership ?

2. The "Black Drop Phenomenon" expected for the Venus transit this June might be investigated during more frequent events being similar to transits in front of the sun : The inner contacts of shadows of the Galilean satellites with Jupiter's limb ! The relative sizes of the satellite shadows when compared with Jupiter's apparent size resembles the ratio of Venus' disk diameter to that of the sun. The penumbral shadows surrounding the umbra may mimic the atmosphere of Venus, only the scale of the scintillation amplitude may unfavour a drop-like appearance of the shadows during ingress and egress of Jupiter's disk. Has anyone noticed such behaviour of Jovian satellite shadows during transits across Jupiter's cloud blanket ?

3. When looking at Spirit's and Opportunity's dull solar images one detail apart from rare eclipses by Phobos and Deimos might have developed since the landing of both surface probes and it really is perceptible : the solar disk diameter has shrunk by a small relative amount when comparing Spirit's images obtained on early January dates with those of present dates. The greater eccentricity of Mars' orbit in relation to earth's one makes it possible to detect this effect though its perception is not very apparent in mid-April !  
 Freddy

### SECalendar May - Annular 1994

From: "John Leppert" To: SOLARECLIPSESENL200405AULA.COM Date: Mon, 3 May 2004

Was there any particular reason that you chose not to have included the great annual eclipse that crossed the United States ten years ago 10 May and which was observed by millions? John Leppert

From: "Evan Zucker"

We can only WISH that it was an "annual" eclipse <g>. Of course, you meant "annular." But I do concur that it is worthy of mention in next year's June eclipse calendar. -- EVAN



## SECalendar

### SECalendar May - Mouradian

From: "Magda Stavinschi" To: "Patrick Poitevin" Date: Mon, 3 May 2004

Dear Patrick, I receive regularly your monthly calendar and I appreciate very much what you are doing. As you include the birthdays of some personalities, I suggest to include a French important solarist (Romanian-Armenian), still very active. We worked together for NATO ARW in 1996 and NATO ASI in 1999. His birthday is on 10 July. You could find more on him on <http://www.astro.ro/mouradian.html> Thank you for all, Magda Stavinschi

Zadig Mouradian

1. Born in: Bucharest, Romania, on 10 July 1930.

2. Studies:

Licentiate's degree: Faculty of Mathematics and Physics, Bucharest University  
Degree of Doctor in Physical Sciences: University of Paris.

3. Left Romania on: October 1958.

4. Some personal data: Married, two children.

5. Relatives still living in Romania: No more

6. The most important works:

- Discovery of material transport toward corona by spicules
- Measure of solar limb profile (quoted in "Astrophysical Quantities")
- First observation of magnetic field before and after a flare
- Discovery of relation of solar activity to the rigid rotation
- Discovery of thermal disappearance of solar prominences
- More than 130 publications

7. Scientific fellowship:

International Astronomical Union  
European Astronomical Society  
Societe Francaise des Specialistes en Astronomie  
Academia Oamenilor de Stiinta

8. Other information:

- "Mouradian's effect" in optical thick lines
- building of solar spectrograph in Pic du Midi Observatory
- observation of 6 solar total eclipses
- organize first pre-eclipse meeting (NATO Workshop) in Sinaia
- solar physics lectures in Bucharest Faculty of Physics
- editor of "Cartes Synoptiques de l'Activite Solaire", publication of Observatoire de Paris

**Picture mouradian (internet)**



## SEDates

### Invitation lecture

Date: Wed, 28 Apr 2004 From: "K. Wiersema" To: solareclipsesSENL200405@uva.nl

Hi all, I thought this might be of interest to (some of) you. Cheers, Klaas Wiersema

### INVITATION TO ATTEND A PUBLIC LECTURE FOR THE ACADEMIC COMMUNITY

#### The Treatment of Eclipses in Babylonian Astronomy

At the occasion of the 2nd Regensburg Workshop on Babylonian Astronomy to be held at the University of Amsterdam from 26-28 May 2004 a Public Lecture will be given for the academic community entitled The Treatment of Eclipses in Babylonian Astronomy by Dr. John M. Steele (University of Toronto, Canada).

In this lecture Dr. Steele will explore the role of eclipses in the development of Babylonian astronomy and astrology and their importance as one of the first astronomical phenomena to be treated mathematically. In his talk he will also discuss the early contributions to this field of research made by the German Jesuit fathers Joseph Epping and Franz Xavier Kugler who lived and worked in the Netherlands and by Anton Pannekoek, the first professor of Astronomy at the University of Amsterdam.

Dr. Steele is an internationally known expert on ancient astronomy and the author of *Observations and Predictions of Eclipse Times by Early Astronomers* (2000). In recognition of his research, he was awarded the inaugural CAENO Chronology Scholar prize by the CAENO Foundation (New York) in December 2003.

Date: Thursday 27 May 2004 Time: 16.15 (doors open at 16.00 pm), drinks will be served afterwards Location: Room 0.07, Herengracht 182, Amsterdam Admission: Free entrance. Please register by sending an email to [infoSENL200405@science.uva.nl](mailto:infoSENL200405@science.uva.nl) More information: <http://www.science.uva.nl/zoeken/object.cfm?objectid=307B8406-327E-4573-8F2DB76EC5E874F6>

drs. K. Wiersema Room F3.29, tel +31 20 525 7471 Astronomical Institute "Anton Pannekoek" University of Amsterdam Observational GRB research (GRACE collaboration)



## SEScannings

### SENL April 2004 Index

Dear all, Please find herewith the Index of the April 2004 issue of the Solar Eclipse Newsletter (SENL). Beside the topic, the page number is listed. Please post your solar eclipse related contributions to us. Thank you.

The SENL can be downloaded free of charge. You only need Adobe Acrobat Reader on your computer. For Adobe see

<http://www.adobe.com/products/acrobat/readstep2.html>

.../...

See the latest SENL and also the complete SENL Index since November 1996 at our Solar Eclipse WebPages at

<http://solareclipsewebpages.users.btopenworld.com>

The SENL will be soon on the WebPages of Fred Espenak/NASA. See

<http://sunearth.gsfc.nasa.gov/eclipse/SENL/> and the index at

<http://www.mreclipse.com/SENL/SENLinde.htm> with example: SENL0011.pdf

<http://sunearth.gsfc.nasa.gov/eclipse/SENL/SENL0011.pdf>

Comments and contributions are welcome at [solareclipsewebpagesSENL200405btopenworld.com](mailto:solareclipsewebpagesSENL200405btopenworld.com)

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

Best Regards,

Patrick and Joanne

[solareclipsewebpagesSENL200405btopenworld.com](mailto:solareclipsewebpagesSENL200405btopenworld.com)

<http://solareclipsewebpages.users.btopenworld.com>



### Understanding Eclipses by Guy Ottewell

The price is \$14 plus shipping. Obtainable from: Universal Workshop c/o Sky Publishing Corporation 49 Bay State Road Cambridge, MA 02138 U.S.A.

OR PHONE 800-253-0245 (toll-free); from outside US and Canada, +617-864-7360 OR FAX 617-864-6117 OR E-MAIL [ordersSENL200405SkyandTelescope.com](mailto:ordersSENL200405SkyandTelescope.com)

In 1991 was the first edition. The 2nd edition was with 4 pages added, and was in October 1991. Reprinted in 1993. And now the 3rd edition in February 2004.

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Observed since previous edition: 1999 T Mexico, 1994 A Texas, 1995 T India, 1997 T Mongolia, 1998 T Ship Guadeloupe - Antigua, 1999 T Turkey, 2002 T Ceduna Australia, 2003 A Orkney

## SEScannings

*(Continued from page 11)*

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Extra on contents: Page 46 Further aspects of the eclipse - two pages; page 84 Eclipses to come (changed of course); page 94 Graph of durations.

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Extra at the end is a graph where the maximum duration of the eclipse is plotted against the years from 1900 to 2115. Some are connected with lines and show the saros. This is a very interesting graph and man can plot their own observations with durations on. Of course for your own life span.

Overall, as it was for the first edition, this revised edition is still THE eclipse book all eclipse enthusiasts should have in their collection. A wonderful easy read booklet with lots of graphs and eye for detail on eclipses. Patrick Poitevin 19 April 2004

From: "Guy Ottewell"

Dear Patrick, I am amazed and grateful: you have already looked through the revised "Under-Standing of Eclipses" with acute attention! I am storing up all your comments in case of a further chance to reprint. I am also abashed that there were so many flaws or inconsistencies for you to detect and which I had not yet detected myself. But you will understand that it took me months to get the whole thing onto the computer in current technology.

Certainly post your comments to your mailing list.

The price is \$14. Obtainable from:

Universal Workshop c/o Sky Publishing Corporation 49 Bay State Road Cambridge, MA 02138 U.S.A. OR PHONE 800-253-0245 (toll-free); from outside US and Canada, +617-864-7360 OR FAX 617-864-6117 OR E-MAIL ordersSENL200405SkyandTelescope.com Best wishes, Guy Ottewell

From: "Guy Ottewell"

Dear Patrick, P.S. to my reply: one might have to add that the cost of UE (Under-Standing of Eclipses) is \$14 plus shipping (which customers might have to find out from Sky Publishing). I hope that those in Britain don't also have to pay VAT.

.../... Best regards, Guy Ottewell

Guy Ottewell revised his book Understanding Eclipses. Owners and eclipse enthusiasts appreciated the first and second edition. Please see below the revision of the latest issue:

Understanding Eclipses by Guy Ottewell

*(Continued on page 13)*

## SETalk

*(Continued from page 12)*

The price is \$14 plus shipping. Obtainable from: Universal Workshop c/o Sky Publishing Corporation 49 Bay State Road Cambridge, MA 02138 U.S.A.

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## SETalk

**Delta T**

Date: Sat, 3 Apr 2004 From: "Jean Meeus"

On 2004 March 1, the difference between the uniform Dynamical Time and the Universal Time UT (\*not\* UTC!) was 64.60 seconds.

This is an increase of only 0.09 second since 2003 March 1. Jean Meeus

**Antarctic Eclipse Short Film**

From: "David Makepeace" To: SOLARECLIPSES-SENL200405AULA.COM Date: Fri, 2 Apr 2004

I have produced a 5 minute film about the icebreaker expedition to Antarctica last November and have posted it on my site. It gives you a taste of what the adventure was like and includes the complete totality sequence so you can see how close we came to being completely clouded out!

It is an Mpeg4 video file and you will need a recent version of QuickTime to see the movie. Links to download the most recent QuickTime player are located on my site. With a high speed connection and QuickTime it should only take a few minutes to download the film. And worth the wait!

Visit <http://www.eclipseguy.com>

and follow the link to the Antarctica Report page, then to Antarctic Eclipse Short Film. Enjoy! David.

From: "Dave Balch

David It is FANTASTIC - thank you for this wonderful gift.

From: "Jean-Paul GODARD"

GREAT One of the most remarkable topic is sound.. Its clear and brings a real contribution to the feeling Thank you for Sharing Cordialement, Martine & Jean-Paul

From: "David Makepeace"

I'm glad people are enjoying the short film.

I used a Sony PD-150, 3-chip DVCAM with a wide eye for most of it, with some MiniDV shots also appearing during the totality sequence. Makepeace.

From: "Dale Ireland"

Very very nice video. What camcorder did you use to record

it all? Dale

From: KCStarguySENL200405aol.com

David I like your panorama with the shadow and the eclipsed sun to the left and the people in front of them to the side. Did you take the panorama by sticking images or did you take a wide angle lens? I have panoramas of the 1999 eclipse 360 degree about 2 minutes before totality and the 2001 eclipse during totality. I stiched those together.

From: klipsiSENL200405bluewin.ch

Great video, David ! and here is my little contribution. in mpeg 1 format

IMPORTANT : the video should be viewed in 16-9 widescreen format. if you just click the links below it will play in 4-3 normal format, thus the view is squeezed. In order to view it correctly, use a videoplayer which allows you to set the ration to 16-9 independently. e.g. download the free Zoom player

[http://www.inmatrix.com/files/zoomplayer\\_download.shtml](http://www.inmatrix.com/files/zoomplayer_download.shtml)

install it, run it. then right click on the interface, to choose aspect ratiosettings, activate 16-9. Then rightclick again in the interface to choose open URL and type the following URL :

<http://eclipse.span.ch/antarcticaclip2.mpg>

and

<http://eclipse.span.ch/antarcticaclip1.mpg>

both are between 12 and 15 Mb .

these two clips won't show the eclipse, but some scenery and animals.

despite the compression you may watch it in full screen 16-9 mode. enjoy Klipsi

From: "Dave Balch,

Thank you for sharing, Klipsi... I enjoyed your reports by satellite phone posted on the web during the trip and was sitting on the edge of my chair during your totality.

Your videos are a wonderful gift... not nearly as good as being there, but a heckava lot cheaper!! Dave

From: "Fraser Farrell"

(Continued on page 15)

## SETalk

*(Continued from page 14)*

David, Well done! I didn't need Quicktime either - the embedded media player in Konqueror was sufficient. Now, can you do something similar for your Lyndhurst eclipse sequence please? The movie links on your website don't work for this Linux user....

### NASA employee spotlight

From Fred Espenak



Thought you might enjoy the NASA employee spotlight:

<http://www.nasa.gov/vision/universe/watchtheskies/espenak.html>

### Auroras and Eclipses

Date: Wed, 7 Apr 2004 From: "Francis Graham" To: SOLARECLIPSESEN200405AULA.COM

Dear List, I noticed that the August 1, 2008 TSE goes right over the geomagnetic pole. Has anyone photographed an aurora during a TSE? Is this possible? Francis Graham

From: "Brian Seales"

Hi All, I asked the same question about Auroras being visible during a TSE once before. It was addressed to one of the Aurora forums on the web (can't remember which one!). They assured me that the sky would be too bright during a TSE to see an Aurora. If I remember correctly the question was answered by some of the resident Aurora experts in Fairbanks, Alaska. It would be nice to hear an opinion from the SEML as well. Ever optimistic as usual.....:-) Regards, Brian Seales [www.ecliptomaniacs.com](http://www.ecliptomaniacs.com)

From: "Glenn Schneider"

Chaston et al 2001, JGR vol 107, indicate that auroral arcs of appx 1 km wide can be driven to optical brightnesses up to about 100 kiloRayleighs. So, it SHOULD be possible. I was hoping for that with TSE 2003, but didn't happen.

There is a WONDERFUL movie of an aurora during an eclipse at: [http://www.jpl.nasa.gov/images/jupiter/eclipse\\_C\\_caption.html](http://www.jpl.nasa.gov/images/jupiter/eclipse_C_caption.html)

I may be interpreting Francis's question a bit loosely in pointing that out, but I am sure others here will appreciate the above. Glenn Schneider <http://nicmosis.as.arizona>

edu:8000

From: "Dale Ireland"

I have never seen an eclipse that was even close to being dark enough to view an aurora. Also the aurora are not that common at the geomagnetic pole. They are more common in the auroral ring some distance away from the pole. Dale

From: "Jen Winter"

During our observations at the Novo station, we sought to try to answer some of these questions. Prior to traveling, we consulted with several associates, including Prof. Hans Neilson of the University of Fairbanks, Alaska.

His department seemed to have interest in the topic, as it related to formation of the Auroral arc. What is known now (please understand that I am not able to represent the immense and complicated science involved)...I'm sure someone will correct me about accurate representation... but as Hans explained, that when Auroral Arcs are formed, the energy is able to move FROM the sunlit or day side over TO the dark or night side where it is visible overhead. When inside the auroral oval, the mechanisms themselves are different. Instead of the energy arriving in disbursements of arcs, the energy tends to either rain down rather evenly, or in geomagnetic pillars which take the energy straight to the ground. There are a number of factors involved in that formation of the Auroral arc which is the artifact visible to us to represent the energy. A large question remains relating to the role of the ionosphere. Models indicate that it may need to be lowered as during the night in order for the conditions to exist under which the arc can form. We were hoping to have a team dedicated to exploring this question... but funding never arose. We did take some photos with some results we feel contribute. Also, Professor Brian Warner of the University of Cape Town spent his time during totality at the Novo observation point looking for naked-eye aurora specifically.

The concern was not so much that the sky would not be dark enough. (while some contend that a low altitude eclipse would allow light to enter the upper part of the atmosphere even it was dark at the bottom.) We would hope that the area of sky would be able to reveal photographically some variation or fluctuation in spectra inside the umbral shadow overhead if Aurora was formed. Some programs analyze the spectra of the sky in relative comparison in the transmission lines of the gasses excited during aurora. This might mean, that we could image during the eclipse, and look carefully in the exposures for a variation in red, blue or green channels. Perhaps the fluctuations might be small and not discernable to the naked eye.. but they should appear on a film exposure.

All of our naked-eye and photographic images imply that no aurora was visible or present in the spectra. Perhaps the upper atmosphere

*(Continued on page 16)*

## SETalk

*(Continued from page 15)*

was still slightly lit. Perhaps the ionosphere's interaction is key to the formation of that auroral arc. But at 70 degrees south, during totality, and under VERY dark skies... darker than other conditions under which we have visually observed aurora... we observed and recorded none.- BTW, activity was very high at that time. It would be unlikely that our findings were related to a low solar activity level. Clear Skies, jen

From: "Glenn Schneider"

Although a negative result was reported, it is of historical interest that 50 years ago the Royal Canadian Air Force launched a flight into the path of totality of the 30 June 1954 TSE SPECIFICALLY to attempt an auroral observation during totality. The aircraft flew between northern Labrador and Greenland, and did indeed witness an airborne totality, but no aurora. This is described in a short report in the Journal of the Royal Astronomical Society, vol. 49, p 127H (1955). The experiment is described in more detail in The Observatory, vol. 74, p 246-247 (1954). Both should be read by those with interest in auroral observations during TSEs - the account in The Observatory is great reading! Glenn Schneider <http://nicmosis.as.arizona.edu:8000>

From: "Francis Graham"

Dear List, Thanks to everyone who provided expert advice. I conclude from all of this information that on planet Earth at least, aurorae are not observed in TSE's due to sky brightness and the way energy is transferred during an aurora. However, there is hope that an exceptionally bright aurora may possibly happen during a TSE, but it would be anomalous. Thanks for the information! Francis

From: "Patrick Poitevin"

Dear All, Sorry it took so long (holidays): See our webpages for Aurora during solar eclipses at [http://solareclipsewebpages.users.btopenworld.com/SECalendar\\_files/SpecialObservations.PDF](http://solareclipsewebpages.users.btopenworld.com/SECalendar_files/SpecialObservations.PDF)

Aurora Borealis during Eclipses

Polar lights have already been observed during the day. But it will still last until 14th June 2151 before the chance exists that the polar lights will be visible during a total solar eclipse. So far, I know of no observation of the aurora during totality. Yet, a lot of attempts have been made during total solar eclipses, that is those of 29th June 1927, 30th June 1954, 20th July 1963, 10th July 1972 and 22nd July 1990.

Of course the path of totality has to be situated in the aurora zone, the Sun's altitude must be optimal, the solar activity favorable and preferably near maximum, and the angle of the eclipse path with the aurora zone not too big. Between 1950 and 2000 there were 9 solar eclipses of which 4 favorable ones. See above the data. The recent eclipse of 9th March 1997 was not that favorable. The following after that of 2151 will take place on 4th June 2160.

### Astronomy & Esperanto

Date: Wed, 7 Apr 2004 From: "Eva Isaksson" To: HASTRO-L@LISTSERV.WVU.EDU

Robert H. van Gent asked a couple of weeks ago: Perhaps there are more astronomy publications which used Esperanto - who knows any other publications of this kind?

I can report that Liisi Oterma (1915-2001), professor of astronomy at Turku, Finland did write occasional articles in esperanto. Here is a pick of those:

5-decimalaj valoroj de  $X - \sin X$ ,  $\sin X$ ,  $\cos X$ ,  $\operatorname{tg} X$  kun  $X$  en radianoj. Helsinki : Astronomia observatorio de Universitato de Turku, 1948

Pri la kometo 1939 IV P/Väisälä Ser<sup>^</sup>cefemerido por 1971-1972 Turku : Astronomia-optika societo, 1970

*(Continued on page 17)*



## SETalk

*(Continued from page 16)*

Perioda kometo 1942 II (Väisälä) Turku : Astronomia-optika societo, 1971

There is a web page with more information about prof. Oterma: <http://www.helsinki.fi/akka-info/tiedenaiset/english/oterma.html>

There was also a brief note about her passing on the website of the World Esperanto Association: <http://www.uea.org/dokumentoj/komunikoj/gaz121d.htm>

From: "Gent van R.H."

Dear Eva Isaksson, Thank you for providing additional evidence for the use of Esperanto in astronomical publications.

I very much enjoyed reading your biographical web page on Liisi Oterma, she was a remarkable astronomer. Best wishes,

### **The mathematics of solar eclipses**

From: "Daniel Lynch" To: SOLARECLIPSESEN200405AULA.COM Date: Sun, 11 Apr 2004

Hi all, I'm in the middle of a maths degree and am interested in reading into the area of the mathematics of solar eclipses. I'm wondering if people could suggest (off-line) some books regarding eclipses and transits.

Thanks, Daniel Lynch

From: Jay.M.PasachoffSEN200405williams.edu

Hi, Daniel. For transits, I did a set of reviews of four books about transits, and they are posted at [www.transitofvenus.info](http://www.transitofvenus.info). They include books by Maor, Sellers, Maunder/Moore, and Fernie. A newer book by Sheehan has just come out and we will soon add it to the Web page.

As for eclipses, I like my own books, which are listed at [www.solarcorona.com](http://www.solarcorona.com): Peterson Field Guide to the Stars and Planets (Pasachoff) Nearest Star: The Exciting Science of Our Sun (Golub and Pasachoff) Cambridge Eclipse Photography Guide (Pasachoff and Covington) A more technical book, perhaps suitable for your maths degree, is my The Solar Corona (Golub and Pasachoff), a text.

Other books on eclipses include those by Littman/Willcox/Espenak (see [www.mreclipse.com](http://www.mreclipse.com)), Guillermier/Koutchmy, Maunder/Moore, and Harrington. Happy observing! Jay Pasachoff

From: JpdowningSEN200405aol.com

Hi Daniel, If you're interested in how early astronomers worked, see Ptolemy's impressive book, The Almagest, (2nd Century AD) which contains a geometrical derivation of the obscuration of the disk of the sun during a total eclipse. He also creates a table based on his theoretical study that predicts the magnitude of eclipses at various latitudes. A similar, less thorough derivation appears in Copernicus's Revolutionibus (1543). James Downing [jpdowningSEN200405aol.com](mailto:jpdowningSEN200405aol.com)

From: "John Tilley"

Daniel - I think you are asking about solar eclipse calculations. The best single book is the 1961 Explanatory Supplement to the Astronomical Ephemeris (out-of-print) - you should find a copy in your college library or a hunt on the internet second-hand book sites should find you one. I have the 1977 reprint. Chapter 9 covers eclipses and transits (pages 211 to 276).

Beware of the 1992 Explanatory Supplement to the Astronomical Almanac - although it's in print and uses vector notation - there are several errors in the eclipse chapter. The 1961 book has worked examples in it - which makes it more approachable. I exchanged

## SETalk

*(Continued from page 17)*

emails with John Bangert (co-author of the 1992 version) - he said " I still find the eclipse chapter in the old Explanatory Supplement useful." Good Luck - John

From: "Jay Friedland"

Hi Dan, I hope most on this list will agree that if you are interested in the mathematics of eclipses an ideal place to start is with Dr. Jean Meeus' books.

Specifically, I'll recommend his *Astronomical Formulae for Calculators* (1979, 1982, 1985 and 1988) which has been widely acclaimed by both amateur and professional astronomers. Further works, published by Willmann-Bell, Inc., are *Elements of Solar Eclipses 1951-2200* (1989), *Transits* (1989), *Astronomical Algorithms* (1991), *Astronomical Tables of the Sun, Moon and Planets* (1983 and 1995), *Mathematical Astronomy Morsels* (1997) and *More Mathematical Astronomy Morsels* (2002).

These are all available from his publisher (<http://www.willbell.com>) or the usual outlets. Enjoy and good luck! - Jay

From: "Jean Meeus"

I wish to let you know that my 'Astronomical Algorithms' is actually outdated. It was written mainly in 1979 (with a few changes made later), and it used the old planetary theories of Newcomb and Gaillot which were constructed about 1900. The modern planetary theory VSOP87 did not yet exist then.

Moreover, the 'Formulae' used the old reference frame of 1950.0.

It is mainly for these reasons that I later wrote the 'Algorithms'. Here use is made of the VSOP87, the new reference frame of J2000.0, besides other improvements and much added material. In fact, the 'Algorithms' replace the old 'Formulae'. Jean Meeus

From: "Jean Meeus"

I wrote: <I wish to let you know that my 'Astronomical Algorithms' is actually outdated.

Sorry. I made an error. It is my "Astronomical Formulae" which is outdated. Instead, my "Algorithms" should be used. Jean Meeus

### Timing of contacts during eclipses or transit

From: "Jean-Paul GODARD" To: solARECLIPSES-SENL200405AULA.COM Date: Mon, 12 Apr 2004

Some of us may find interest in a precise timing of different contacts in eclipse or transit.

It may be difficult to assume a good reproducible precision away from office, with a lot of stress, or lack of practice (personally, I never saw a venus transit. ;-)) )

I tried to set up an approach with some devices that we (Martine and Me) commonly have with us when we travel to an eclipse site: DV videocam and GPS..

Description of the procedure is at: <http://MsEclipse.free.fr> (full site)

or directly in english at [http://mapage.noos.fr/eclipses/transit\\_timing\\_en.htm](http://mapage.noos.fr/eclipses/transit_timing_en.htm) In French: [http://mapage.noos.fr/eclipses/transit\\_timing.htm](http://mapage.noos.fr/eclipses/transit_timing.htm)

Please feel free to comment offline [or online if it's closely "eclipse related"] Cordialement, Martine & Jean-Paul

### Venus eclipsed by the Moon...look for software

From: "Wil Carton" To: "SE" <SolarEclipsesSENL200405Aula.com> Date: Tue, 13 Apr 2004

Venus occulted by the Moon, on 21 May 2004

In the current issue of 'Sky and Telescope' there is a map of the Southeastern region of Asia with the area of visibility of the occultation of Venus by the Moon on 21 May 2004 in the local evening dust. Here in Europe the occultation takes place during full daylight. The mathematical background of this kind of computations is very similar to the Besselian Elements of Solar eclipses. Who can tell me, how to get PC-software to compute and plot Venus-occultations by the Moon on my PC-screen (and printer), for the previous, current and next century, please. Wil Carton

From: "Jean-Paul GODARD"

You may use "OCCULT VERSION 3.1 FOR WINDOWS 95/98/2000/ME/XP/NT" from IOTA <http://lunar-occultations.com/iota/occult3.htm>

Enjoy Cordialement, Martine & Jean-Paul

## SETalk

**THE OUTBACK ECLIPSE STORY**

Date: Wed, 14 Apr 2004 From: klipsiSENL200405bluewin.ch To: SOLARECLIPSESEN200405AULA.COM

a DVD of the 2002 total eclipse has been produced by this chap, Luke Robinson of New Zealand. Some of my footage appears in it. I haven't seen it yet. The DVD is for sale. Read message below. I will receive the DVD soon. Klipsi

>-- Message original -- Date: Wed, 14 Apr 2004 01:52:41 - 0 7 0 0 ( P D T ) F r o m : \* L U K E \* <psychedelukeSENL200405yahoo.com> Subject: RE: THE OUTBACK ECLIPSE STORY To: klipsiSENL200405bluewin.ch

>Just doing postal orders at present but please feel free to forward on this message to interested parties

>  
>THE OUTBACK ECLIPSE STORY is now available and you can be one of the owners of this special first edition DVD of which only five hundred copies have been made...

>  
>There are three ways to organise payment and delivery of DVD's: Either send a bank cheque for 50\$ made out to Lastlight films to the address below with a return postal address : P.O Box 147086 Ponsonby,Auckland,NZ

>  
>or direct deposit into >Account name: Lastlight films >Bsn number: BKNZNZ22 >Bank: Bank of New Zealand >Branch: Ponsonby, Auckland , NZ >Account number: 020 248 0182 039 00 >Please be sure to provide transaction details and a delivery address to send the DVD.

>  
>Or you can pay by PAYPAL. Email lukeSENL200405lastlight.co.nz for details.

>  
>If you would like a courier service the additional cost is 50 \$ and takes three working days. Alternatively registered post costs an additional 15\$ and takes 10 days. Regular post is no extra charge however there is no insurance offered on this service. Please allow three weeks for delivery. All prices are in Australian dollars.

>  
>Feel free to contact me should you have any questions.

>  
>Lovin the vibe

>Luke Robinson Lastlight Films P.O Box 147 086 Ponsonby,Auckland New Zealand Ph 0064 21 440 244 psychedelukeSENL200405yahoo.com

From: "Dale Ireland"

Was this guy with you? Any details about the DVD and the sites covered? Dale

From: klipsiSENL200405bluewin.ch

no, the guy was not with me. I don't know him really. He was looking for footage for his DVD , he contacted me long ago, and I gave him some. My footage is probably just a few seconds , not much of the whole thing. I should receive the DVD soon and will tell you if it is worth ordering it. If I remember well he did the concert festival thing there. The DVD may cover much of the outback concert festival and the eclipse as bonus. no idea. Will tell asap. However, I leave in 2 weeks for the great Plains. If the DVD has not arrived till then I will only report about it in June, once I am back

**Eclipse from United States, Pittsburgh, Pennsylvania**

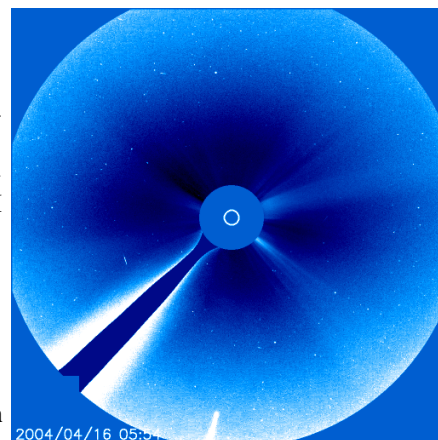
From: adregerSENL200405wilkinsburgschools.org To: solareclipsewebpagesSENL200405btopenworld.com Date: Fri, 16 Apr 2004

Dear Mr. Poitevin, I am a middle school science teacher and I am in the midst of a earth/space unit. After introducing the concept of solar and lunar eclipses I found the students and my interest increased greatly. As I was lucky enough to see a solar eclipse some years ago, I would like to be able to tell the students if and when one can be viewed from the United States, Pittsburgh, Pennsylvania actually. If you could share with me how you are able to predict and track when eclipses occur I would be greatly appreciative. Just as the moon's cycle is posted on many calendars is there such a calendar for eclipses? Thanks for your time. Sincerely, A. Dreger

**A comet visible during total eclipse - right now !**

From: "Klipsi" To: SOLAR ECLIPSES - SENL200405AULA.COM Date: Fri, 16 Apr 2004

a bright comet is visible during a total solar eclipse. Right now ! New comet Bradfield is visible in the C3 SOHO coronagraph <http://sohowww.nascom.nasa.gov/data/realtime/realtime-c3.html> at bottom of image. see also [www.spaceweather.com](http://www.spaceweather.com)



What a shame that next monday's solar eclipse is not total !!!

## SETalk

**GPS accuracy**

Date: Mon, 12 Apr 2004 From: Jay.M. Pasachoff@SENL200405williams.edu To: solareclipses-SENL200405aula.com

A colleague comments: Unfortunately, handheld GPS units usually display the time late by up to 2 seconds. A hiker in the woods doesn't care, and this doesn't affect positional accuracy. This delay varies and so can't be effectively calibrated out.

Does anybody know more about this? Jay Pasachoff

From: KidinV@SENL200405aol.com A

The following information was copied from the Garmin.com website... I don't know how useful it will be, but it does offer a crude understanding about the errors in GPS receivers....

**Sources of GPS signal errors**

Factors that can degrade the GPS signal and thus affect accuracy include the following:

**Ionosphere and troposphere delays** – The satellite signal slows as it passes through the atmosphere. The GPS system uses a built-in model that calculates an average amount of delay to partially correct for this type of error. **Signal multipath** – This occurs when the GPS signal is reflected off objects such as tall buildings or large rock surfaces before it reaches the receiver. This increases the travel time of the signal, thereby causing errors. **Receiver clock errors** – A receiver's built-in clock is not as accurate as the atomic clocks onboard the GPS satellites. Therefore, it may have very slight timing errors. **Orbital errors** – Also known as ephemeris errors, these are inaccuracies of the satellite's reported location. **Number of satellites visible** – The more satellites a GPS receiver can "see," the better the accuracy. **Buildings, terrain, electronic interference, or sometimes even dense foliage can block signal reception, causing position errors or possibly no position reading at all.** **GPS units typically will not work indoors, underwater or underground.** **Satellite geometry/shading** – This refers to the relative position of the satellites at any given time. Ideal satellite geometry exists when the satellites are located at wide angles relative to each other. Poor geometry results when the satellites are located in a line or in a tight grouping. **Intentional degradation of the satellite signal** – **Selective Availability (SA)** is an intentional degradation of the signal once imposed by the U.S. Department of Defense. SA was intended to prevent military adversaries from using the highly accurate GPS signals. The government turned off SA in May

2000, which significantly improved the accuracy of civilian GPS receivers. Hope this helps a bit. Rick Brown EclipseSafaris

From: "Evan Zucker"

This is news to me. Does anybody know why there would be a difference between handheld GPS units and any other type of GPS?

I have had a factory-installed GPS navigator in my car (2000 Honda Odyssey) for the past 4 years, and the clock has always been exactly accurate to the second. I check it against the CBS News time signal at the top of the hour on KNX-AM radio out of Los Angeles. Evan Zucker San Diego, California

From: "Brian Garrett"

My understanding is that a GPS receiver, although it is receiving a signal that contains data generated by an atomic clock, is designed in such a way that processing the time-of-day information from that signal takes a back seat to everything else. It is a positioning device first, after all, so it handles all its positioning duties first before updating the time display--a process that usually results in a delay of between one and three seconds, in my experience.

Living as I do in Orange County, I have noticed that KNX and KFVB, the two local news stations that broadcast time signals on the hour, broadcast the signal anywhere from about a half-second to two seconds early as checked against my WWVB wristwatch. Even allowing for the fraction of a second my watch is fast due to its having gained that much since synchronizing itself the night before, the time offset in the MW radio stations' signals is consistent with its being controlled by a consumer-grade GPS device (as distinct from GPS antennas and receivers such as those sold by, for example [www.gpsclock.com](http://www.gpsclock.com), which are designed to process time-of-day info from the signal for the purpose of synchronizing computer networks). Were the signal being controlled by a WWV(B) receiver, or better yet, an atomic frequency standard, one would expect to see much better accuracy in the commercial stations' time broadcast.

--begin mandatory eclipse-related stuff--

For positioning oneself on the center-line, or wherever else on the path of totality/annularity one may choose, a handheld GPS is great. I would not want to use it for timing the contacts or other phenomena, though. I seem to recall warnings on the IOTA (International Occultation Timing Association) website urging its members to avoid consumer-grade GPS equipment for astronomical timing \*unless\* a tried-and-true method is available to deal with the latency. Brian

From: "Glenn Schneider"

(Continued on page 21)

## SETalk

*(Continued from page 20)*

There was a fairly long discussion of this via SEML some time ago. The bottom line is that the GPS system, and GPS receivers are intrinsically extremely accurate - as discussed here earlier and not repeated in detail. However, many consumer "hand-held" units have firmware programs which service and update their displays infrequently (i.e., about once per second) and asynchronously, i.e., with a variable phase delay which may depend upon when the unit was turned-on or last asked to do a "higher priority" task, which can introduce an "error" again as much as a second on some units. This is not a "bug" but simply a design decision made by the manufacturer(s) assessing what 99% of their user base need and want. Much of this is historical when microprocessors in hand-held GPS units were taxed at their lower cycle speeds and "compute power" compared to what are available in some today - but have inherited legacy S/W (firmware), i.e., "if it works, don't fix it" - even if for some purposes (like sub-second timing accuracy) it does not "work". Nav systems which rely on accurate instantaneous differential positions and velocities rely on the high precision timing available from GPS, but it simply may not be displayed often enough, or phase-locked, on "hiker" units for you to see it. -GS-

From: "Nick Quinn"

A much better alternative is to use a unit such as the Garmin GPS 16HVS module which outputs a pulse every second, accurate to 1 microsecond. There is no display so the module must be connected to a PDA or computer to read the time & position information.

Used with a Video Text Overlay Unit from The Black-BoxCamera Company Ltd. this enables a timestamp to be added to a video recording allowing events such as occultations to be timed to 1/25th. second. Clear skies, Nick Quinn.

From: "Dale Ireland"

Hello I have quite a bit of experience with this problem from my years of making lunar and asteroid occultation timings. Consumer gps units are accurate to +/-1 second. Very poor. A few OEM units are made for incorporation into other equipment by Garmin. They have 1PPS accuracy. That is one Pulse Per Second with a pulse accuracy of 0.1ms. I have the unit below which inserts the time into video frames. It is about \$400 assembled and I recommend spending the extra money to get the gps unit and assembly from blackbox.

Precision GPS OSD Time Inserter

<http://www.blackboxcamera.com/STV5730A/astro.htm>

The confusion arises because GPS units are accurate to plus or minus one second but don't have one Pulse Per Second accuracy. Dale

Hi Jay, As an early adopter of handheld GPS (I had a Trimble unit with me in Bolivia in 1994. Part of the inducement Glenn had to make room on his crowded bus as Craig Small and I jumped ship to Glenn's group) I had noticed this discrepancy.

The problem is not with the clock in the unit, but in the update of the screen. With all the complicated electronics in these units, corners were cut in the updating of the LCD screens. Hence the delay in updating the clock display. There is nothing else in the unit that needs to be updated as rapidly as the clock display. The newer, more expensive units cut fewer corners and don't display the discrepancy. I now have a high end Magellan unit and have found that it matches the time signals from WWV.

From: "Carter Roberts"

Jay, A few years ago I was at Greenwich. I had my Garmin 40 (a first generation unit). There is a machine there by the Prime Meridian that you can put a coin in and push a button to get a souvenir printout of the exact time. I pushed the button exactly when the Garmin appeared to me to be reading exactly at something and 30 seconds. The offset was in the tens of milliseconds (30 or 40 I think). My second generation Garmin also shows no visually detectable (ie watching it while listening to WWV) offset from UTC. I no longer worry about having exact time at an eclipse. Gone are the days of looking for the UT clock at any observatories one visits on a trip just to see how far ones watch has drifted. (Heading for Kenya for the 1980 eclipse we did this with the big clock at Greenwich!)

GPS time differs from UTC in that there are no leap seconds. The big question is whether the software in a particular unit handles the leap seconds or not. This can be easily tested long before an eclipse. Clear Skies, Carter Roberts

From: "Evan Zucker"

I think that amount of offset could be completely due to how long it takes for the nerve impulses to travel from your eyes to your brain and then to your finger and for your finger to press the button. In fact, I would expect that to take even longer than 40 milliseconds.

Evan Zucker San Diego, California

From: Jay.M.Pasachoff@SENL200405williams.edu

Though 30-40 ms may not matter for eclipse timing for most purposes, I have recently been using my eclipse CCD, a rapid-readout design with 16-bit data depth, for observing occultations of stars by Pluto, to study Pluto's

*(Continued on page 22)*

## SETalk

*(Continued from page 21)*

atmosphere, and we will be expanding to more Pluto + KBO's. It turns out that delays of 40 ms can matter there; we have run into such a discrepancy in the relative timing between a telescope I used on Mauna Kea and another telescope on Maui, when we were trying to line up atmospheric disturbances observed in data from both sites. So it is good to try to understand discrepancies in GPS readouts even on that small delay level.

From: "Jean-Paul GODARD"

I tried to set up a measurement of the GPS discrepancies using a radio controlled Clock (DCF77) A simple way is to video tape both instruments to detect time differences between the two clocks through an image by image analysis.

Its easy to record both signal and compare them offline. See a picture at [http://mapage.noos.fr/eclipses/transit\\_timing\\_en.htm](http://mapage.noos.fr/eclipses/transit_timing_en.htm)

You may consider 2 period for the discrepancies in GPS readouts

- acquiring signal and calculating
- refreshing the estimate

Only the second situation has to be considered as beeing reproducible.

Its then easy to get an estimate of the difference between the two displays... Regards, Cordialement JP from Martine & Jean-Paul

From: "Carter Roberts"

Jay et al, I'm sure that offset I saw was eye-hand coordination issues. That particular unit obviously had an insignificant delay. Clear Skies, Carter Roberts

### First filming of solar eclipses

Date: Sat, 17 Apr 2004 From: "Patrick Poitevin" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

Dear All, Anybody knows when the first filming of solar eclipses took place? Looking forward to your replies. Best regards,

From: "Rolf Sinclair"

Hi Patrick -- The first one I know of was the filming ("by motion picture cameras") of the eclipse of June 9, 1937. It was filmed in color at various altitudes in South America, and from a commercial airplane at 25,000 feet altitude. I was told that a copy of some of these films is still in the American Museum of Natural History, New York City. (See "The Scientific Monthly", Vol. 45, July-Dec. 1937, pp. 186 et seq.) Rolf Sinclair

From: "LARRY KLAES"

National Geographic Magazine showed the first natural color photos of a total solar eclipse in the 1930s:

[http://www.mreclipse.com/SENL/SE\\_NGS/NGINDEX.htm](http://www.mreclipse.com/SENL/SE_NGS/NGINDEX.htm)<[http://www.mreclipse.com/SENL/SE\\_NGS/NGINDEX.htm](http://www.mreclipse.com/SENL/SE_NGS/NGINDEX.htm)> Larry

From: "Patrick Poitevin"

Indeed, this is my contribution on the webpages of Fred Espenak. This is photography though, not filming. PP

From: "Tom English"

Patrick, The 1900 solar eclipse was captured by John Nevil Maskelyne (the magician) at Wadesboro, NC using his "kinematograph", which captured 299 images during the minute and a half of totality. Maskelyne was part of the BAA party at Wadesboro under Rev. J. M. Bacon.

I believe there were similar attempts to film eclipses using such equipment earlier than 1900. Bacon's Wadesboro report laments his misfortune at an earlier expedition in India in which the film for the kinematograph was stolen. I think there were others trying to bring similar technology to eclipses during this time period - I'll see what else I can dig up.

*(Continued on page 23)*

### Total Lunar Eclipse 04/05/2004 - Live webcam from Gran Canaria (Canary Islands)

From: farrSENL200405vodafone.es To: solareclipses-SENL200405aula.com Date: Wed, 28 Apr 2004

Dear friends, SAROS Groups Scientific Expeditions will broadcast in live the next total lunar eclipse from the Astronomical Observatory Melia Tamarindos Hotel in the South of Gran Canaria (Canary Islands)

The URL is <http://live.saros.org> Clear Skies ! Best Regards Francisco A. Rodriguez Ramirez [www.astroeduca.com](http://www.astroeduca.com) [www.saros.org](http://www.saros.org)

## SETalk

*(Continued from page 22)*

I am compiling quite a lot of information about the Wadesboro eclipse expeditions, so if you have any further questions, I may be able to answer them. -Tom English Cline Observatory, GTCC Jamestown, NC, USA

From: anthony.kinder@SEN200405LINEONE.NET

Dear Patrick, If my memory serves me correctly, one of the earliest such recordings was undertaken in about 1898 during the eclipse in India, by Maskelyne. Apparently the film was 'lost' or 'stolen' during the passage home to England. It may be referred to in the BAA Memoir "The Indian Eclipse" edited by Edward Walter Maunder in 1898/1899. If I can find out further, including a more precise reference I will let you know. Tony Kinder (Director, Historical Section, British Astronomical Association).

From: "Bob Garfinkle"

Hi List, This probably is not the earliest filming of a total eclipse, but in the July 1937 issue of "The Sky" there is a brief report of the filming of the June 8, 1937 total eclipse from an airplane by Major Albert W. Stevens used a 16mm Eastman color movie camera to capture the eclipse from about 25,000 feet. They were in the total shadow for about 3-1/2 minutes. The article details the camera type used and other facts about the expedition.

Maybe this is the earliest filming from an airplane??? By filming, I mean motion picture vs still single shots. Take care.

From: "Rolf Sinclair"

You probably noted Bob Garfinkle's note to HASTRO yesterday in which he wrote that the July 1937 issue of "The Sky" had a brief report of the filming of the June 8, 1937 total eclipse. (I believe "Sky" later joined with "Telescope" to form (you guessed it) "Sky & Telescope".)

### Eclipse travel planning - recommended PC atlas

Date: Wed, 28 Apr 2004 To: SOLARECLIPSES-SEN200405@aula.com From: "Sheridan Williams"

Can anyone recommend better (PC-based) world mapping software than Microsoft's World Atlas for planning where to go when observing eclipses? The software should show small towns and villages and roads and tracks and be able to enlarge the scale to at least 1:100,000 (2km to 1cm).

From: "Peter Tiedt"

Sheridan This is a major source of frustration - and not only for you and I.

Once you are out of Europe and the US, there is very little of reasonable quality out there, ESPECIALLY at the scales you mention. This is both for free download and for purchase :- ( Almost zilch out there

Much of the stuff that is available is also GPS brand restricted to either Magellan or Garmin, and very pricey.

I have a number (9) of 1:250 000 topos (GeoTIFF format) of my immediate surrounds, and that is a full CD ~ 600MB.

To get the world, would require an astronomical number of CDs as each of the above topos are 2deg long x 1 deg lat. [9 = 1 CD = 18 sq degrees]

Of course, going out to 1:1 000 000 or 1:2.5M reduces the storage requirement, but you did mention 1:100K.

There are some solutions, but these are all time consuming ...

1. Scan your own from purchased maps, and use software such as GPS Trackmaker to calibrate. (www.gpstm.com) However, you need to scan in small chunks, then stitch the images, and UTM is better than other projections.

2. Use the NASA Landsat images - almost all the world available at 28.5 metres per pixel (Africa = 7 CDs). But these are in MrSID format, and requires software such as GlobalMapper to view, or the purpose made Internet Explorer Plugin. If you want this URL for the images and software, email me off list and I will supply. Another problem here is the use of false colour for the images. Global Mapper allows you to overlay anything over the landsat images. The shareware version however is crippled to only 4 loaded images.

*(Continued on page 24)*

## SETalk

*(Continued from page 23)*

These are very accurate.

3.

Roll your own by downloading the necessary .shp files from the various GIS websites, of which there are a few around. Again - I can supply the URLs for these datasources. This is however the most tedious of the lot.

I am sure that this is only JUST on topic, but will elave it to Patrick to say if we can continue or not ..... Peter

From: "John Tilley"

Sheridan and Peter This is an interesting area and I am working on a program that will draw eclipse maps onto Digital Chart World (1:1 million) that might interest you - I plan to be at SEC in August and I could demo it to you then.

Digital Maps - You can freely download VMAP0 and VMAP1 data and you can look at these using ESRI's free ArcExplorer Version 2. It will give you an idea of what is available. VMAP0 is 1:1 Million and VMAP1 is 1:250000 - VMAP1 coverage is very limited though. <Note VMAP replaced

Digital Chart of the World>

A good place to start is <http://www.mapability.com/> which points to sources for getting the data - you need a broadband internet connection as VMAP0 is almost two gigabytes once unzipped.....

Be warned that the accuracy for VMAP0 is limited to around 1-4 kilometres.

Place names - there is a CD available of 5 million place names with lat/lon - for US99.95 from

<http://data.geocomm.com/> <click on Gazetter>

Commerical products - I would have a look at Manifold <I haven't bought it - its US245>

[http://www.manifold.net/products/manifold\\_world/cathedrals\\_eclipse.png](http://www.manifold.net/products/manifold_world/cathedrals_eclipse.png)

is an eclipse map of the August 1999 eclipse.

Good Luck - John

From: "Peter Tiedt"

Thanks for that John - these are some new sources for me ; -)

Up to now, I have used the ESRI world political boundary shapefile, and overlaid eclipse tracks etc onto that by...

creating tab delimited text files of the paths (north limit, south limit and centreline) using Occult, (or even Fred's mapping co-ordinates).

Massaging the columnar formats by importing into MS Excel and processing with a macro, then saving the output as a comma delimited text file.

Converting the comma delimited text file to an ESRI shapefile using wayp2shp.exe.

In Global Mapper, I then overlay the paths, the political boundary shapefile, and any Landsat tiles I want, together with pointfiles of place names.

The end result is pleasing, but the process quite tedious :-)

However, I will have a look at what you have shown, and maybe improve things ... Thanks for the feedback. Peter



**Observation location of Frans Van Loo (Belgium) and his son for the Mercury Transit on 7 May 2003**



**European Web site on Venus Transit VT-2004**

Date: Wed, 7 Apr 2004 From: "LARRY KLAES"  
To: HASTRO-LSENL200405LISTSERV.WVU.EDU

With only 62 days until this extremely rare celestial event on June 8th, 2004, the exceptional Venus Transit 2004 (VT-2004) programme is rapidly gaining momentum. More amateur groups, planetaria and other educational institutions (also from outside Europe) are joining the VT-2004 Network daily and prospective observers from many countries are signing up to participate in the unique attempt to reenact the determination of the distance from the Earth to the Sun. There is a clearly growing media interest and more and more reports are appearing in the national and local media.

In order to further prepare for this event, representatives of the VT-2004 Nodes in two dozen countries and members of the International Steering Committee will get together at the ESO headquarters (Garching, Germany) on April 17, 2004.

You will find extensive information about the transit event itself, its rich historical aspects, as well as the many related opportunities at the comprehensive VT-2004 website at: <http://www.vt-2004.org/> Kind regards, The ESO EPR Dept.

**I wonder...about this concerning the Venus Transit**

Date: Wed, 7 Apr 2004 From: "Francis Graham" To: SEML

Dear List, I recently noted a picture of the International Space Station crossing Jupiter. Forgive me, but I did not bookmark the source. Apologies to the observer. I was wondering if there is any place on Earth where the ISS will be seen to transit Venus or the Sun while Venus is transiting the Sun. Imagine the ISS moving across the Sun, dipping into the black drop of Venus, and exiting the other side. Now that would be a rare image (if it's possible to get such an image)!  
Francis Graham

From: "Dale Ireland"

This subject is often discussed on the SeeSat mailing list. Free prediction software is available there and others who can make the predictions. You can join the list and find other info about it via the lists home page. <http://www.satobs.org/seesat/seesatindex.html> Dale Ireland

From: "Michael Gill"

Francis, Tom Fly is attempting to predict just such an occurrence. Check out the following URL: <http://iss-transit.sourceforge.net/IssVenusTransit.html> A text file giving co-ordinates of the ground track can be downloaded here: <http://iss-transit.sourceforge.net/IssVenusTransit.txt> (Load these into a GPS and you can get to the central line of the ISS transit track) These are just tentative predictions as the atmospheric drag on the ISS is variable and there may be orbital boosts between now and June 8th. So, just bookmark the pages for now and check back closer to transit day. Cheers, Michael

**Ancient Venus-Transits ?**

Date: Mon, 12 Apr 2004 From: "Ari Belenkiy" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

Peter: you incidentally confused Al-Battani and al-Betrudgi.

Al-Battani lived and worked in ar-Raqqa, Syria.

But the solution is truly remarkable. What did he say then about Venus? Ari Belenkiy

From: "LARRY KLAES"

Without the aid of a telescope and filter, how could one view a Venus transit with the naked eye, and would the planet be visible against the Sun even if you could diminish the glare?

Which leads to the next question, what evidence is there for telescopes before the time of Galileo? Larry

From: "Dr. B. Pfeiffer"

Dear historians, it is said that no transits of either Mercury or Venus were reported prior to 1631.

I suppose that the precision in the predictions of positions of the Sun and Mercury or Venus, respectively, were sufficient to calcu-

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late such events already for astronomers like Kidinnu and the hellenistic astronomers. If I am correct, are there reports that transitions had been predicted in antiquity (but not observed)? Regards Bernd Pfeiffer

From: "Dr. B. Pfeiffer"

Dear Larry, these are severe technical problems, but unrelated to the question if a Venus transit could have been predicted.

During the last transit of Mercury, I looked with my eclipse protective glasses, knowing that Mercury is too small. I saw nice sunspots, nevertheless. No living person has seen a Venus transit. But it might be possible, we will see soon.

But according to the "Planetary Hypotheses" of Ptolemy, the planets were much closer to us and therefore also expected to be seen with a greater angle. Some articles say that Gassendi in 1631 was much surprised how small Mercury really was. So perhaps, antique astronomers tried to see a transit. Regards Bernd Pfeiffer

From: "Herbert Prinz"

Dear Bernd, In fact, a Mercury transit WAS reported prior to 1631. In 1607, Kepler believed to see one when observing the sun while Mercury was near conjunction. The telescope had not yet been invented, but the camera obscura effect was well known prior to that. It turned out later that Kepler had actually observed sun spots.

Where the prediction in antiquity up to Kepler's time is concerned, there are two different questions: 1. Had a prediction ever been attempted and 2. Could it successfully have been done? Although Ptolemy never tried to do so himself, Neugebauer has shown that predictions for Venus as well as Mercury transits are possible with the theory of the Almagest. Ptolemy remarked that if they happened, they would not be observable. Best regards Herbert Prinz

From: "Peter Louwman"

Dear Bernd, Indeed, because in ancient times the effect of "irradiation" was not yet known, bright stars and planets, when seen with the naked eye, were thought to have observable tiny discs. Due to their brilliance, these stars and planets gave the impression of having discs with a diameter of at least a few arc minutes.

This is why the Albatagnius (or, Al Battani, or Alpetragius), the famous Morrocan astronomer, who died in 929, was puzzled he never saw the disc of Mercury transitting the solar disc. It should be large enough, he thought, to see Mercury's tiny little dark disc crossing the sun's disc. Still, Albatagnius was convinced Mercury revolved around the sun, so he came with a most remarkable explanation why he thought he couldn't see Mercury's disc projected against the solar disc during inferior conjunction: Mercury must be transparant! P e t e r L o u w m a n

From: "Chris Linton"

Dear all Goldstein (1969) discusses the transit reports of al-Kindi, 9th century, Ibn Sina (Avicenna), 11th century, Ibn Rushd (Averroes) and Ibn Bajja (Avempace), 12th century. The only one which could possibly have been a transit is that of Ibn Sina.

Goldstein, B. R. (1969), "Some medieval reports of Venus and Mercury transits", Centaurus, vol 14(1) pp49--59. [Reprinted in "Theory and Observation in Ancient and Medieval Astronomy" by B. R. Goldstein, Variorum Reprints, London, 1985]

### New Transit of Venus window at Much Hoole

From: "Andrew White" To: SOLARECLIPSESEN200405AULA.COM Date: Tue, 13 Apr 2004

If anyone is interested, then there is a new "roundal" window installed at Much Hoole church to commemorate the 2004 eclipse. This complements the victorian window showing Jeremiah Horrocks observing the transit in 1639 from Much Hoole. For a photo see: [http://www.vanda.eclipse.co.uk/images/Astronomy/2004\\_transit/Venus\\_transit.htm](http://www.vanda.eclipse.co.uk/images/Astronomy/2004_transit/Venus_transit.htm) The new window is the emblem that is being used in the transit merchandise that has been produced by the church see <http://www.hoolechurch.org.uk> Val and Andrew White

**Transit of Venus medal**

Date: Tue, 13 Apr 2004 To: SOLARECLIPSESEN200405AULA.COM From: "Fred Espenak"

I found a photo of a French medal which was issued to commemorate the 1761 transit of Venus. Inscribed on the medal is the Latin phrase:

"quo distent spatio sidera iuncta docent" Can anyone translate this for me? Thanks, Fred Espenak

From: "John Leppert"

You might consider downloading a Latin translator tool from this link... <http://www.quicklatin.com/> John Leppert 13 Apr 2004 1228 CDT

From: "cc\_marlot"

Dear Fred, Dear all, I don't think there was ever such a french medal issued to commemorate the 1761 transit. At least I never found any information about any medal in the 18th century during all my search on the transits of Venus history in France. In fact, the medal you ask for was issued after the transit of 1874 by the Institut de France, to all observers who takes part to the expeditions for chasing the shadow of Venus.

The metal is bronze, and the medal is about 7 cm in diameter, 4 mm thick. One of my friends, who had an ancestor who takes part to the Janssen's mission in Japan in 1874, show me this great medal ; it show by now a very nice green and dark patina ... The message "quo distent spatio sidera iuncta docent" is translated as following in the Camille Flammarion's *Astronomie populaire* : "Par leur rencontre, les astres nous font connaître les distances qui les séparent", which should be translated as this in my poor english : "By their meeting, the [stars and] planets let us to know the distances between them." (don't hesitate to give a better translation please ;-) ) I don't know if there is a better word for the french word "astre" than, for exemple : celestial body. "Astre" means about all of this in french, but about the transit of Venus, the only planet are concerned, of course.

The Flammarion's book show an engraving of this medal ; in should be interesting that you have a look at this engraving ... just in case you found another medal, with the same latin sentence. Christophe Marlot

From: "Fred Espenak"

Christophe - You are right! The medal is for the 1874 transit, not 1761. I have a black and white photo of the medal from Flammarion's book. However, I would like to find a better photo especially in color. Does anyone know where I might find this?

Also, does anyone have a translation of the phrase on the medal ( "quo distent spatio sidera iuncta docent") that differs from what Christophe has told us? Thanks, Fred Espenak

From: "Onderbeke Julien"

I never learned Latin, so I asked a collegue of mine, who is a teacher in Latin, what the sentence could mean. The word "iuncta" could be translated as "connected", but we think it can be interpreted as "being close together/ conjunction". So the sentence could be interpreted and/or translated as

"The conjunction of the stars (Venus and the Sun) learn us about the distance they are remoted"

Maybe it means that a transit of Venus on the solar disk can afford an opportunity to measure the apparent diameter of the planet with high accuracy and to compare it with that of the solar disk. So it can give a method to calculate the distance of Venus at that moment.

This is just what we think. There are certainly persons who know more about it, but we tried...

From: "Daniel Lynch"

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>> "quo distent spatio sidera iuncta docent"

I studied Latin for 6 years but that's no guarantee. Latin translations can be quite flexible and vague. Given the context, I would tend to agree with a previous translation given, roughly:

"From their meeting, the celestial bodies tell us their distances."

Contextually, I think it is appropriate to translate iuncta as a meeting, almost certainly the transit itself. It seems sensible to imagine that the quote refers to distances being calculated thanks to the transit. I've left "celestial bodies" as vague as possible, translate that otherwise as you will. It's certainly plural, so again I think it safe to presume it refers to the sun and venus.

That's my hack at it anyway.

Thanks to those who replied to my request regarding the mathematics of solar eclipses. I'm following them up. Regards, Daniel

From: "Dale Ireland"

I think it means something like

How widely separated are the stars, by their conjunction is revealed Dale

From: "Dale Ireland"

The other problem is that it is you have to know French since it might be a French phrase translated to Latin. I entered the phrase in yahoo and it took me to a Polish site that refers to a medal with the same inscription commemorating the transit of 6 Dec 1882

<http://www.apan.waw.pl/medale.html> item #145 Dale

From: "cc\_marlot"

Fred : I will do my best to get a photo of the medal from my friend ; I know he own a digital camera, so it could take only a couple of day by email. If he agree. I asked previously to put such a photo on my coming book on the transits of Venus, but he never really agreed until it was too late ... :( Christophe Marlot

From: "Onderbeke Julien"

Please have a look at

You can read the meaning of the sentence : "La mythologie reparaît un instant sur la scène moderne. Vénus va passer devant Apollon, tandis que la Science observe : "Par leur rencontre les astres nous font connaître les distances qui les séparent".

Quo distent spatio sidera juncta docent.

The translation of the French sentence is : "The mythology appears for an instant on the modern scene. Venus will pass by Apollo, while science observes : "Because of their encounter, the stars let us know the distances that separate them".

You can find it on <http://www.ac-nice.fr/clea/Venus01.html> Julien Onderbeke

From: "cc\_marlot"

Dear all, Maybe there was a new edition of the 1874 medal by the Institut de France after the 1882 transit of Venus - which seems logical. - but I never heard of this, including after reading "in deep" the Comptes rendus des séances de l'Académie des Sciences.

*(Continued on page 29)*

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But I could have miss something. Indeed, the medal was ordered in 1874, as far as I know. You can have a look at it with a couple of rather large photo of both sides, I just put on my website, thanks to my friend Nathanael Berger, who send me some photos of his ancestor's medal. Be patient, the webpage is somewhat heavy, with other documents related to the 1874 transit. <http://astrosurf.com/carnets-astronome/transits/passagesvenus-complements11.htm> Th medal is shown at the bottom of the page.

To Fred : I tried to contact you privately about thoses photos, but it seems there is an anti-spam filter on your email box, so all my mails to you were rejected. Christophe Marlot

#### **Shades of Venus: 4/17/04 - Science News Article**

Date: Mon, 26 Apr 2004 From: "Jay Friedland" <jaySENL200405cinemagic.com> To: "SOLARECLIPSESENL200405AULA.COM" <SOLARECLIPSESENL200405aula.com>

Hello all, For those of you that receive the weekly US magazine Science News, there is an excellent article on using the upcoming Transit of Venus to further research into extrasolar planets. Our own Glenn Schneider was interviewed for the article (and provided an illustration). If you have a subscription, you can see the full HTML article online at: <http://www.sciencenews.org/articles/20040417/bob8.asp> Cheers, - Jay

Here's the text only version: Science News Online - Week of April 17, 2004; Vol. 165, No. 16

Shades of Venus Our neighbor in the solar system holds a lantern on faraway planets Ron Cowen

"We are now on the eve of the second transit of a pair, after which there will be no other 'til the twenty-first century of our era has dawned upon the Earth, and the June flowers are blooming in 2004."

—U.S. Naval Observatory astronomer James Harkness, just before observing the 1882 transit of Venus

On June 8, sky watchers will be treated to a celestial event that no one alive today has ever seen. For the first time in 122 years, earthlings will witness the silhouette of Venus moving across the face of the sun. During this miniature version of a solar eclipse, Venus appears as a black dot against the roiling solar surface. Unlike the moon, which looms so large on the sky that it covers the entire sun during a solar eclipse, Venus during a transit masks only one-thousandth the area of the sun's surface and blocks a mere 0.1 percent of its light.

[IMAGE] PLANETARY LINEUP. Artist's depiction of a transit of Venus, which occurs when the orbits of Earth and Venus cross and the planets align with the sun. Courtesy JPL, Raytheon Corp. Artists: H. Smith, C. Hawley

As seen from Earth, a transit of Venus occurs just twice every century or so, in pairs spaced 8 years apart. Each transit lasts about 6 hours. For the June 8 event, observers in Europe and Asia will be best placed. In the eastern United States, about 1.5 hours of the transit, from sunrise until roughly 7:25 a.m. Eastern daylight time, should be visible. Observers should not look directly at the sun, taking the same precautions as they would when viewing a solar eclipse.

To record these rare events in the 1700s and 1800s, Captain James Cook and other explorers traveled the world. Transits provided the only means at that time for accurately measuring the scale of the solar system (see "Transitory History," below). Now, some astronomers are planning to observe the June 8 transit to learn about solar systems far beyond our own.

"Transits are the one way we can now study key properties of extrasolar planets," says Sara S. Seager of the Carnegie Institution of Washington (D.C.).

Sun-watching space observatories such as SOHO (Solar and Heliospheric Observatory) and TRACE (Transition Region and Coronal Explorer), which orbit above Earth's turbulent atmosphere, should have ringside seats for the transit.

Overcoming obstacles

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Characterizing extrasolar planets in distant solar systems hasn't been easy. Against the glare of the star it orbits, each orb is too faint to be seen outright. So far, astronomers have detected extrasolar planets only indirectly, almost exclusively through the gravitational tug they exert on their parent stars.

Scientists have an opportunity to learn much more about a distant planet when it passes between Earth and its star. The duration of the transit and the amount by which starlight is dimmed by the planet's passage provide the only way astronomers can now determine the mass, size, and orbital inclination of these unseen bodies.

Among the more than 125 known extrasolar planets, astronomers have observed transits for just two. These transits have involved giant, Jupiter-mass bodies that closely orbit their parent stars and therefore block more starlight than smaller planets do.

By analyzing the specific wavelengths of starlight absorbed during a transit, astronomers have also made the first discovery of an extrasolar planet's atmosphere. Using the Hubble Space Telescope to monitor the periodic dimming of the star HD209455, already known to have a massive planet closely orbiting it, scientists deduced that the planet has a bloated atmosphere that contains hydrogen, sodium, carbon, and oxygen (SN: 2/14/04, p. 109; Available to subscribers at <http://www.sciencenews.org/articles/20040214/note12.asp>).

Therein lies the grand opportunity of Venus' June 8 transit: The planet's passage across the sun will provide the only local counterpart to a distant, atmosphere-bearing planet crossing the face of its own parent star. The upcoming transit of Venus will therefore provide a valuable benchmark for interpreting data from extrasolar transits.

[IMAGE] LUNAR REFLECTION. Simulation of Venus' transit of the sun as reflected in moonlight. Schneider

The astronomers observing the June transit will have an ace in the hole: They already know the composition of Venus' atmosphere, thanks to spacecraft that have directly measured it. By matching theory with observations, says Seager, "we can test the models for completeness and accuracy," in a way that hasn't before been possible.

Seager calls the June 8 event a "rare chance." In 2012, she notes, Venus' follow-on transit could double the bonanza. After that, the next transit won't occur until 2117.

During the upcoming transit of Venus, says Seager, she would like to tease out the role of two factors that make it tricky to interpret observations of extrasolar transits. One factor is the rotation of a parent star, which broadens the spectrum of the filtered starlight. The other, which can also alter the spectrum, is the tendency of a planetary atmosphere to act as a lens, bending or distorting the starlight passing through it. Observations of these effects during the June 8 transit should help planetary scientists eke out more information from future glimpses of extrasolar transits, Seager notes.

In attempting to treat the transit of Venus as if it were a replica of an extrasolar transit, researchers face an obstacle. As seen from Earth, all the light filtering through the atmosphere of an extrasolar planet appears to emanate from a single source—the unresolved image of the parent star. In contrast, the relatively nearby sun effectively comprises many points. To put the transit of Venus on equal footing with its extrasolar counterparts, astronomers have to devise ways to observe the sunlight as though it were coming from a single point.

One way to achieve this effect is to use an Earth-orbiting satellite, such as ACRIM, that monitors the total amount of radiation that the sun emits at wavelengths ranging from the near-ultraviolet to the near-infrared. Astronomers plan to analyze the decrease in this solar irradiance recorded by ACRIM during the Venusian transit.

Glenn Schneider of the University of Arizona in Tucson has come up with another strategy. Instead of looking at the sun, he proposes to look at the moon. When light from the sun reflects off the moon, it gets integrated into a single signal akin to the point-like appearance of a distant star.

Even if Schneider wanted to directly image the Venusian transit, he couldn't do so from Arizona, where the transit will be finished before the sun rises. But the moon will be visible just over the horizon at the tail end of the transit, so Schneider and his colleague Paul S. Smith expect to have about a half-hour window in which to view the transit's reflection from the Steward Observatory in Tucson.

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Toward the future

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By whatever means the June 8 transit is observed, the resulting data could become even more important after the scheduled launch of NASA's Kepler satellite observatory in 2007.

Kepler will for the first time enable astronomers to search for extrasolar planets the size of Earth or even smaller, says Kepler lead scientist William Borucki of NASA's Ames Research Center in Moffett Field, Calif. During its 4-year mission, Kepler will scan 100,000 stars for signs of transiting planets.

By using Kepler data on the orbit of a transiting planet as well as the known properties of its star, astronomers will attempt to determine whether any of the orbs lie in its solar system's habitable zone, where liquid water could exist on the planet's surface. If Kepler fails to find any Earthlike planets, says Borucki, "then such planets must be rare in our galaxy, and we might be the only extant life."

Even if Kepler were to find a multitude of planets the size of Earth, it isn't equipped to record their spectra and thereby indicate whether the planets have atmospheres. Indeed, "such studies are currently well beyond the limits of precision of even the largest observatories," says David Charbonneau of the California Institute of Technology in Pasadena.

It's still unclear when scientists will have the tools to characterize extrasolar planets' atmospheres with enough precision to recognize signs of life.

Or, as the U.S. Naval Observatory astronomer James Harkness put it 122 years ago: "What will be the state of science when the next transit season arrives, God only knows.... As for ourselves, we have to do with the present."

Transitory History

Including the little-known fact that Captain Cook explored Venus

Sky watchers since the ancient Greeks have attempted to measure the size of the solar system. But after the work of Johannes Kepler early in the 1600s, the challenge focused on determining just one number—the distance between Earth and the sun. This number, known as the astronomical unit, could then be used to calculate the distance between other planets and the sun.

[IMAGE] TRANSIT HUNTERS. Before fanning out across the globe to view the 1874 transit of Venus, members of several expeditions gathered on the lawn of a U.S. Naval Observatory facility in Washington, D.C. USNO

According to Kepler's famous third law, the cube of a planet's distance from the sun is proportional to the square of the time the planet takes to complete one orbit about the sun. Because this period can be easily measured, Kepler's third law provides the planets' relative distance from the sun but not their absolute distance.

In 1716, Edmond Halley, of Halley's comet fame, noted that the rare transit of Venus could be used to determine the Earth-sun distance—if observers fanned out over the globe to record the event. Venus appears to take a different path across the sun depending on where on Earth an observer is standing. The phenomenon known as parallax underlies that effect and can also explain why a finger held at arm's length seems to shift position depending on whether you peer at it with your left eye or your right.

If observers could measure such a shift in Venus' position, they could use simple geometry to find the distance to the sun. However, the actual shift is so slight that Halley advised that observers instead compare the times of the start and finish of a transit from widely separated locations. Astronomers could then use surveying methods to directly measure the distance between Earth and Venus.

For the next pair of transits after Halley's proposal, in 1761 and 1769, British and French expeditions observed the events from several remote locations. One of the most famous observers was Captain James Cook. While circumnavigating the globe and exploring the southern Pacific Ocean, he stopped in Tahiti to view the 1769 transit. Most of the transit observations that year were of poor quality. Nonetheless, the data narrowed the Earth-sun distance to between 150 and 153 million kilometers.

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TRANSIT OF VENUS

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The United States had a leading role in observing the 1874 and 1882 transits. For the 1874 expeditions alone, Congress appropriated what was then a whopping \$177,000.

Since 1882, astronomers have developed even more-accurate ways to determine the Earth-sun distance. The methods include bouncing ground-based radar off the surface of Venus.

Now, the transit is luring astronomers who seek to investigate worlds far beyond the solar system.

If you have a comment on this article that you would like considered for publication in Science News, send it to editors@SEN200405sciencenews.org. Please include your name and location.

References:

- For information on the transit and the history of its observations, go to <http://www.transitofvenus.org/>, or <http://image.gsfc.nasa.gov/poetry/venus/TransitFAQs.html>, or [http://sunearth.gsfc.nasa.gov/sunearthday/2004/vt\\_observe\\_2004.htm](http://sunearth.gsfc.nasa.gov/sunearthday/2004/vt_observe_2004.htm).
- An online description of a new Smithsonian Institution exhibit on the transit of Venus is available at <http://www.sil.si.edu/exhibitions/chasing-venus/>.

Further Readings:

Cowen, R. 2004. Poof goes an atmosphere. Science News 165(Feb. 14):109. Available to subscribers at <http://www.sciencenews.org/articles/20040214/note12.asp>.

Sources:

- William Borucki NASA Ames Research Center Moffett Field, CA 94035-1000
  - David Charbonneau California Institute of Technology 105-24 (Astronomy) 1200 East California Boulevard Pasadena, CA 91125
  - Glenn Schneider Steward Observatory Department of Astronomy 933 North Cherry Avenue University of Arizona Tucson, AZ 85721
  - Sara S. Seager Carnegie Institution of Washington 5241 Broad Branch Road, N.W. Washington, DC 20015
  - <http://www.sciencenews.org/articles/20040417/bob8.asp> From Science News, Vol. 165, No. 16, April 17, 2004, p. 247.
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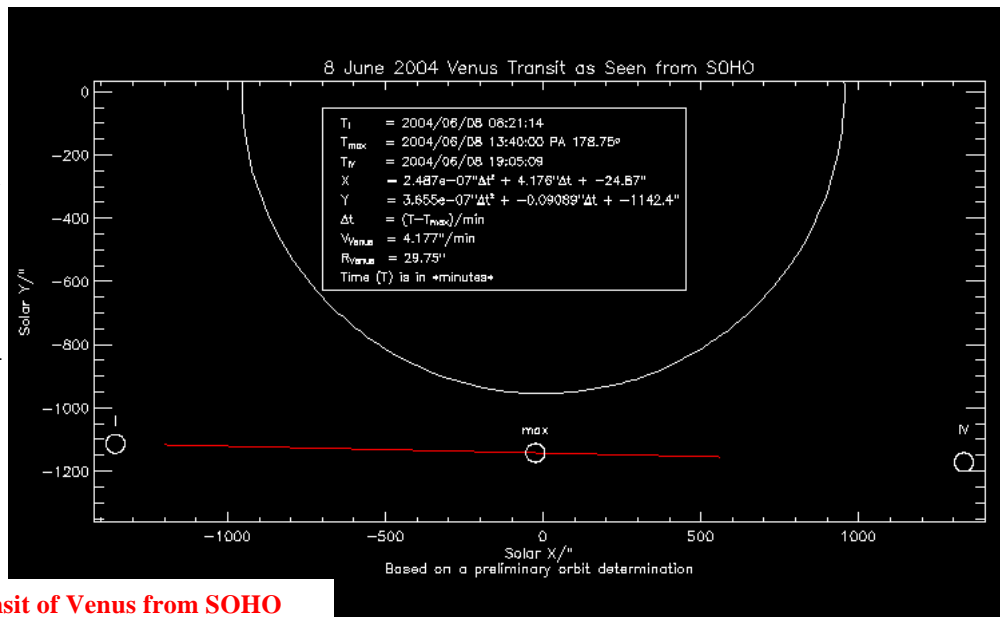
From: "Michael Gill"

The Science News article said: Sun-watching space observatories such as SOHO (Solar and Heliospheric Observatory) and TRACE (Transition Region and Coronal Explorer), which orbit above Earth's turbulent atmosphere, should have ringside seats for the transit.

TRACE should be okay but viewed from SOHO Venus will miss the solar disc: <http://sohowww.nascom.nasa.gov/soc/venus2004/>

>From SOHO this is only a coronal transit.

Cheers, Michael Gill



Transit of Venus from SOHO



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S**Scientific American article on the historical Transit of Venus**

Date: Fri, 30 Apr 2004 From: "LARRY KLAES" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

May 2004 issue THE TRANSIT OF VENUS By Steven J. Dick

When Venus crosses the face of the sun this June, scientists will celebrate one of the greatest stories in the history of astronomy

<http://www.sciam.com/article.cfm?SID=mail&articleID=000B38FC-1BD5-1085-94F483414B7F0000&chanID=sa006><<http://www.sciam.com/article.cfm?SID=mail&articleID=000B38FC-1BD5-1085-94F483414B7F0000&chanID=sa006>>

From: "Sepp Rothwangl"

Hi Larry, A cite from this article: "We are now on the eve of the second transit of a pair, after which there will be no other till the twenty-first century of our era has dawned upon the earth, and the June flowers are blooming in 2004.... What will be the state of science when the next transit season arrives God only knows." --U.S. Naval Observatory astronomer William Harkness, 1882

And what does God know now? Is he more clever now?

From: "Hermann Hunger"

Do we need useless insults on this list?

Hermann Hunger

From: "Sepp Rothwangl"

Dear Prof. Hunger, I donno know if you need insults, but if you feel insulted it seemed to be your religious problem and not a scientific. Is God and his "knowledge" (or better the knowledge of people who pretend to obtain and to know the word of God) still an object of astronomical and historical science?

How can this "knowledge" know of the state of science during the recent (next) Venus-transit, if it does not even know of the origin of its (God's) own AD-count, or at least neglects or denies it. May I respond to the accusation of insulting and may I comment the hypocritically Venus - transit (crusade-)mission of the US Army and Notre-Dame Jesuits (<http://listserv.wvu.edu/cgi-bin/wa?A2=ind0404&L=astro-1&D=0&T=0&X=5BF072300FE4225AD6&Y=calendersignSENL200405gm>.at&P=2452) in Iraq with Horrocks own words: from his diary: "...than I saw a very pleasant spectacle, because the aim of my wistfully wishes, an abnormal great and absolutely round stain has moved to the left part of the solar disc. Benefit to you, eyes, who look into farest out wrinkle of the Sun and with the help of a tube dare to see a stain on this eternal light....Consider, so I repeat, about this extreme remarkable event, which in my lifetime can not be observed again. Planet Venus left his hiding place and showed in front of the sun simple and naked it's true size, where it's normal lovely form appeared as a dim darkness." .... and Horrocks from <http://image.gsfc.nasa.gov/poetry/venus/VT8.html> "In short, Venus was visible in the Sun throughout nearly the whole of Italy, France, and Spain; but in none of those countries during the entire continuance of the transit. But America! O fortunatos nimium bona Si sua norit! Venus! Which riches dost thou squander on unworthy regions, which attempt to repay such favors with gold, the paltry product of their mines. Let these barbarians keep their precious metals to themselves, the incentives to evil, which we are content to do without. These rude people would indeed ask from us too much should they deprive us of those celestial riches, the use of which they are not able to comprehend. But let us cease this complaint O Venus! and attend to thee ere thou dost depart.'

There exists also another HIStory and view, than only the Catholic one ... If this list is insulted by such views, you should forbid it and better call this list CATHastro. You should also condemn ESO as ESOTERIC, for publishing websites as: Cosmic Ballet or Devil's Mask : <http://www.spaceref.com/news/viewpr.html?pid=14112> with regards Sepp Rothwangl

From: "Gary Thompson"

(Continued on page 34)

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I think your continuous unrestrained rudeness is very much your problem Sepp and something you should address. But perhaps that, and the expectation that you actually have something new (and hopefully relevant) to say, is expecting too much. A starting point might be for you to refer to "respect" in a dictionary and reflect on such. GDT

From: "Steve McCluskey"

Setting aside the intemperate way Sepp opened this discussion, the answer to his question of whether the knowledge of God is a matter of historical study must be an unequivocal yes. The fact that William Harkness chose to frame his ignorance of twenty-first century science in terms of God's presumed knowledge of the future tells us much about the beliefs and culture in which nineteenth century astronomers practiced. Speaking about the beliefs of other times and places is a central element of historical inquiry.

On the other hand, God and religion are not objects of astronomical investigation -- but then this is a history list, not an astronomy list. Steve McCluskey

From: joannecoSENL200405MAINE.RR.COM

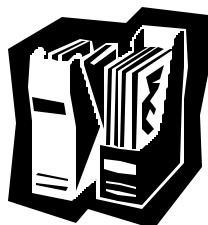
I do not see the quote from William Harkness as having anything to do with God or religion. The phrase "God only knows" to me is an expression equivalent to "none of us know (or can know)" The operative word is "only." Harkness is simply wondering aloud in the conventional language of his day i.e., Victorian purple prose) what the world will be like some 120+ years from when he wrote. Harkness probably also called piano legs "limbs." So

what? I can't even see this quote is demonstrating what he may have actually believed about any deity. Joanne Conman

From: "Sepp Rothwangl"

Hi Joanne, I don't want to start another useless thread about believe. But IMO your respond reveals clearly what your mind and language is identifying logically. God = nobody!

With best regards Sepp (with no more posting from me on this thread)



**Jeremiah Horrocks**

Date: Sun, 25 Apr 2004 From: "Ron Dwyer" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

Hello: Currently I am reading the recently published book *The Transits of Venus* by William Sheehan and John Westfall. I've found it informative and what follows is a synopsis of a chapter concerning Jeremiah Horrocks. I am interested in comments. This synopsis previously appeared in the yahoo group *History\_of\_Astronomy* of which I am one of the moderators. I do not consider myself to be an expert in the subject. I welcome new members to the yahoo group:

The recently published book *The Transits of Venus* has a chapter on the astronomer Jeremiah Horrocks (sometimes Horrox), who lived from 1619-1941. As those dates show, he died quite young; yet he made important contributions to astronomy. A good part of the chapter discussed his life and times, which has a measure of importance, but I will not bring up much here. What I'm going to focus on instead is his astronomy.

Apparently there was a time that when Kepler's reputation stood high on the Continent, he was scarcely known in England. Not only that, but according to the book, the newly founded Harvard College was a backwater of astronomical science--the Ptolemaic system was being taught. Obviously they did not have means of rapid communication like the Internet which we have today.

When Horrocks eventually came across the work of Kepler and Brahe, it seemed like a revelation. Horrocks decided to work in the Keplerian research program.

One of the things that Horrocks worked on was to improve the accuracy of Kepler's tables of planetary motion. Horrocks took in reconsideration Kepler's theory of the motion of Venus.

Horrocks discovered that Venus' next crossing of the node of its orbit--one of the two intersection points of its orbital plane with that of the earth--would probably transit the sun. Kepler had correctly predicted the Venus transit of 1631, but had missed predicting the upcoming one for 1639. Many transits of Venus occur in pairs of eight years apart. Such a pair will occur in our century- -in 2004 and 2012.

Horrocks observed the Venus transit. Horrocks used the projection method--he set up his telescope to project the sun onto a sheet of paper so as to form a disk like image six inches across. Then on Nov 24 in the Julian calendar--Dec 4 in the Gregorian--at quarter past three in the afternoon, Horrocks reports:

"The clouds, as if by divine interposition, were entirely dispersed, and I was once more invited to the grateful task of repeating my observations. I then beheld a most agreeable spectacle, the object of my sanguine wishes, a spot of unusual magnitude and of a perfectly circular shape, which has already fully entered upon the Sun's disk on the left, so that the limbs of the Sun and Venus precisely coin-

*(Continued from page 34)*

cided, forming an angle of contact. Not doubting that this was really the shadow of the planet, I immediately applied myself to sedulously observe it."

Horrocks took measurements from this transit of Venus, which lead him to infer other things:

1. The diameter of Venus--Horrocks set it 1'16", ten times smaller than expected.
2. The orbital elements for Venus--Horrocks corrected the ratio of the mean distances of Venus's orbit to that of the earth from Kepler's 0.72414 to 0.72333.
3. Horrocks attempted to determine the absolute distance of the earth to the sun. Horrocks assumed that Venus was about the same diameter as the earth, and with his astronomical measurements of the transit, inferred that the distance of the earth from the sun was about 78 million miles. We now know that Venus does not have the same diameter as the earth. But Horrocks determination of the distance of the earth from the sun was about 5/6th of its actual distance.

Horrocks also made contributions to lunar theory, which were later studied by John Flamsteed and Isaac Newton.

Jeremiah Horrocks, though he had a short life, made contributions which places him in the firmament of the great astronomers. Best Regards, Ron Dwyer

From: "Chris Linton"

Dear all

On 25 Apr 2004, at 21:19, Ron Dwyer wrote:

> Horrocks took measurements from this transit of Venus, which lead him to infer other things:

>

> 2. The orbital elements for Venus--Horrocks corrected the ratio of the mean distances of Venus's orbit to that of the earth from Kepler's 0.72414 to 0.72333.

0.7233 is just the value obtained from applying Kepler's third law to the accepted value for Venus' orbital period and it is interesting to note that Kepler did not do this. There is good reason to believe that Kepler never thought of the harmonic law as an accurate predictive device, rather it reflected God's overall design of the Universe but was probably subject to minor deviations.

> 3. Horrocks attempted to determine the absolute distance of the earth to the sun. Horrocks assumed that Venus was about the same diameter as the earth,

You mean angular diameter (as seen from the sun) here. Horrocks assumed that the diameters of the planets were proportional to their orbital radii, because calculations for Venus (based on his transit observations) and those for Mercury (based on transit observations by Gassendi) both gave an angular diameter of 28". Chris Linton E-mail: C.M.Linton@SEN.L200405@lboro.ac.uk <http://www.lboro.ac.uk/departments/ma/staff/chrisLinton.html>

From: "Ron Dwyer"

Thanks for the reply and attempt to give a more accurate account. I was going by what the book says, on page 86:

"In addition, he obtained at once improved orbital elements for the planet-- in particular, the exact position of one of the nodes--and corrected the ratio of the mean distances of Venus's orbit to that of the earth from Kepler's 0.72414 to 0.72333 (the latter is essentially the value still used in astronomical tables today). This was, of course, only a ratio--the absolute distance of the earth to the sun was still unknown. Horrocks took a wild guess at it by assuming that Venus was about the same diameter as the earth, and though the assumption was arbitrary, it turned out to be curiously near the truth. In that case, the sun's distance from the earth would be about 125 million kilometers (78 million miles, about five-sixths of its actual distance).

From: "Ari Belenkiy"

*(Continued on page 36)*

*(Continued from page 35)*

Ron: what is the right diameter of Venus?

what would be the result if Horrocks would know the right diameter of Venus? what is the actual formula? Ari Belenkiy

From: "Ron Dwyer"

Interesting questions. The book did not say, nor am I a professional astronomer. But I was eventually led to this web site which might be relevant to your post. I knew trig would be involved. [http://www.dsellers.demon.co.uk/venus/ven\\_ch4.htm](http://www.dsellers.demon.co.uk/venus/ven_ch4.htm)

### **Venus history in Iraq and Afghanistan**

Date: Tue, 6 Apr 2004 From: "Chuck Bueter" To: HASTRO-LSNL200405LISTSERV.WVU.EDU

Dear Hastrolians, In a liaison with the Third United States Army, our community is sending "eclipse shades" to 20 different sites in Iraq and Afghanistan for the transit of Venus. We seek to share the common experience of this uncommon event with the troops and the people with whom they interact. Accompanying the shades will be an informative flyer, tentatively to be translated into Arabic, Kurdish, and Farsi (which dialects I do not know at this time). The flyer is intended to describe briefly how to view the transit of Venus and its significance.

I write to seek input on what you, the community of astronomy historians, deem significant about the transit of Venus as it pertains to the intended audience. I welcome a paragraph or so--a written soundbite--that sums up the role of Venus in the history of the region. Please email me your comments with an acknowledgement that I may quote you online, including at <http://www.transitofvenus.org/peace.htm>; I may quote you for press releases; and I may quote you in the multi-lingual flyer that will accompany the shades. If you wish to volunteer a translation as well, that is appreciated but not required.

We invite transit of Venus enthusiasts to join us in the South Bend, Indiana, area for the June 8th celebration. Locally we expect to have observing opportunities (sunrise at 5:10 EST; third contact at 6:05 EST); a webcast of the event from Spain; an art exhibit commemorating the transit; performance of John Philip Sousa's "Transit of Venus March;" historic artifacts on display; the "Transit of Venus" planetarium program; and even a Transit of Venus Sunrise Ale from the Mishawaka Brewery. The latter item gives us something to cry in if we get clouded out. Informal details are at <http://www.transitofvenus.org/roadtrip.htm>.

Thank you in advance for participating via your respective areas of expertise. Feel free to contact me if you have any questions or comments. I recommend you write "HASTRO" somewhere in the email's "Subject" line so you aren't inadvertently deleted by my spam filter. Best regards, Chuck Bueter 15893 Ashville Ln. Granger, IN 46530 USA 574-271-3150 bueterSENL200405transitofvenus.org Eastern Standard Time (UT-5)

From: "Sepp Rothwangl"

Sound like a repetition of the attempt of Columbus using the appearance of an eclipse to survive his hopeless situation after having problems with the aborigine new world people. Do you really think anybody who has no peace on Earth, nothing to eat and is overruled, actually is interested in a transit of Venus? What a childish idea ... It must be born in the kitschy brain of a Notre Dame Jesuit Catholic. What else will Iraqis and Afghanis wish, as AMIS and XIANS GO HOME! Are you going to present this celestial event to the ignorant people as another divine miracle or sign, caused by the praying to the powerful God of your church? Are you going to present them the Venus transit as a divine gift as an exchange for their stolen oil? Would it be better you tell them that AD is a fake and Y2K thus is only result of a superstitious and wrong end of the world plot. Sepp Rothwangl

From: "JuergenHamel"

Dear Hastrolians, when the American soldiers tell the people at Iraq - should it be the appearance to bring culture, peace and humanity to this region? The people will be lucky to hear about the measuring of cosmic distance by the Venus transit? But I think they will thinking more about their own distance to the American Forces on Earth!

Culture, freedom, humanity? The reach USA had so many chances in history. But how many bloody wars were fought against the

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people in the whole world, how many bloody dictators ruled over "their own" countries only because they had the support of American Presidents! And now the Venus transit should give an alibi? Happy Easter Juergen Dr. Juergen Hamel c/o Archenhold-Sternwarte Alt-Treptow 1 D-12435 Berlin

From: "Axel Harvey"

Let's just worship Venus for a change.

From: "David Iadevaia"

Sepp...from your comments it seems apparent to me that you never experienced a total solar eclipse with people from a culture other than your own...I can tell you from my own experience going to various places on this planet to observe total solar eclipses that people all react in a similar way regardless of their economic, religious or cultural systems. It is a wonderful thing to see, the reaction that is. For a moment the normal everyday flow of events is affected by something happening above our heads. Celestial happenings affect people, be it a total solar eclipse or the transit of Venus across the solar disk. Something which within the capacity of the observer of celestial events gives rise to thinking beyond the moment. It gets you to look up. That might be just the distraction needed for people to pause and contemplate their situation. Sepp go outside and look up sometimes. It will help you keep things in perspective. What Chuck is proposing is a very positive activity. David Iadevaia <http://ecc.pima.edu/~diadevaia/>

From: "Ari Belenkiy"

Sepp: In this case (I mean your night forest) you will surely NOT miss the transit of Venus. Do not give up easily, Sepp! Ari Belenkiy

From: "Ari Belenkiy"

Juergen: I think you forgot what democratic Germany owes to the USA. Human - German? - memory is short, shorter than 60 years... Ari Belenkiy

From: "Sepp Rothwangl"

Bravo, Herr Hamel! Danke!

From: "Sepp Rothwangl"

Am Donnerstag, 08.04.04 um 15:35 Uhr schrieb David Iadevaia: Sepp go outside and look up sometimes. It will help you keep things in perspective.

David, I am out everyday and look up at night into the bright sky above my forest.

> What Chuck is proposing is a very positive activity.

Positive for whom? For US oil companies, yes.

Sorry, I see nothing else than another Xian attempt to deceive people by mixing up a celestial event with divine information.

"That in former times scholars explained the aurora borealis by the shine of herrings is far not as weird as the metaphysical explanation the world is the work of a almighty, all-good, all-knowing God." KH Deschner (author of the criminal history of Christianity) Sepp Rothwangl

From: "Sepp Rothwangl"

Am Dienstag, 06.04.04 um 17:29 Uhr schrieb Chuck Bueter: Dear Hastrolians, <http://www.transitofvenus.org/peace.htm>

*(Continued on page 38)*

TRANSIT OF VENUS

*(Continued from page 37)*  
 a cite from this website: All things being equal, Iraq might make a good observing site. After all, here, within the Fertile Crescent between the Tigris and Euphrates, lay the ancient Mesopotamia, where Venus was once worshipped as Innana and more famously as Ishtar, the Queen of Heaven, the Evening Star who followed the Sun into kur the Underworld.

Why dont you say also that planet Venus, having a period of visibility of about 9 month was Goddess of sexuality and therefore was condemned as upper devil "Lucifer" by the Xians???? WHY you hide how Xians decept people?

"See how clerics save in the body of mothers, what they spend in war: As if they collect in the bellies of women - victims for cannons (KH Deschner, author of Christian criminal history) Sepp Rothwangl

From: "Eduardo Vila Echague"

The Epic of Gilgamesh is the first 'best seller' of the human race. It was originally written in Sumer, in Southern Mesopotamia, in the 3rd. millenium B.C., and was later widely copied and expanded by Chaldeans in Middle Mesopotamia and Assyrians in Upper Mesopotamia, until the first centuries B.C., when it was ignored by the next cultures, Greeks, Christians and Muslims.

In that Epic both Venus and the Sun play a central role. The goddess Venus was named Istharr among the Chaldeans and Inanna among the Sumerians, while the names of the Sun were Shamash and Utu, respectively.

Perhaps you should read the Epic to see if you can find there ideas to include in the pamphlet. Be careful, however, no to hurt the religious feelings of the local people who regard all those 'gods' as idols to be despised and ignored. Eduardo Vila Echague

**List protocol**

Date: Sun, 2 May 2004 From: "Chuck Bueter" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

First, I have a question about HASTRO-L protocol. Is it the understanding of this listserve that excerpts from HASTRO-L are public domain and can be published within the context of Fair Use provisions of copyright law, or is this considered a private discussion among subscribers? In particular, as June 8th nears I wish to post HASTRO-L excerpts at www.transitofvenus.org. While I would typically extend the courtesy of asking permission from the respective individuals being quoted, for the next 35 days I expect to be too busy to ask and to await a reply for every valuable HASTRO-L excerpt. Hence, I ask for clarity up front.

Second, as of this writing, University of Notre Dame is not affiliated in any way with the distribution of "eclipse shades" as detailed at www.transitofvenus.org/peace.htm, nor do I represent the interests of the University of Notre Dame. Also, I do not believe University of Notre Dame is a Jesuit-founded institution. Those notions were erroneously asserted by a HASTRO-L contributor. However, I will celebrate the transit (www.transitofvenus.org/celebrate.htm) near the city of South Bend, Indiana.

Third, I thank those of you who have volunteered information and links for inclusion in the website. Chuck Bueter

**Ancient views on Venus**

Date: Mon, 3 May 2004 From: "LARRY KLAES" To: HASTRO-LSENL200405LISTSERV.WVU.EDU

<http://www.mywisecounty.com/news/050304-3.htm><<http://www.mywisecounty.com/news/050304-3.htm>>

Venus Dazzled Ancients and Will Again Modernists on June 8, 2004

By: My Wise County

High Knob, Va. --- Venus, the dazzling morning or evening star, outshines all the other stars and planets in the night sky. It's the brilliant "evening star" until early June. It then disappears in the Sun's glare for a few days for the highly unusual Venus Transit, but emerges by mid-month as the "morning star" for those who cast their head skyward.

The Venus Transit will occur on Tuesday June 8 for the first time in 122 years and the planet has been growing brighter and climbing higher into our evening sky lately. It has evolved into an "evening lantern" but will abruptly disappear into the Sun orbiting between it and the Earth.

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The eclipse of Venus between the Earth and Sun is among the rarest of astronomical events. In fact, between the years 2000 BC and 4000 AD there are only 81 Venusian "transits," as astronomers call them.

When a transit occurs, the Sun, Venus and Earth are all in a direct line. But Earth and Venus do not orbit in exactly the same plane around the Sun, so often each planet is either above or below the location that would allow a transit.

By coordinating a great many observers spread between the poles astronomers can obtain a very precise geometric determination of our local astronomical unit (AU), the accuracy of which directly affects the rest of astronomy, navigation and cosmology.

Astronomer Joseph Ashbrook (1918-1980) wrote in "The Astronomical Scrapbook" (Sky Publishing Corporation, 1984): "For those who witness the transit of June 8, 2004, there comes the awesome thought that not a single human being remains alive that observed the last transit of Venus, in December, 1882."

Venus transit is an astronomical event where the planet Venus passes between the Earth and the Sun - a sort of eclipse. Venus transits lasts for 6-7 hours and come in pairs separated by exactly 8 earth years minus two days. As far as human measures go such pairs of transits occur only rarely or once a century plus!

Below is a list of the years of the most recent occurrences, where the second transit in the pair is given within parentheses:

- 1518 (1526)
- 1631 (1639)
- 1761 (1769)
- 1874 (1882)
- 2004 (2012)



Not until more than a century, December 11, 2117 to be exact, will Venus again pass in front of the Sun and again on December 8, 2125.

It is interesting to note that spiritualists and astronomers will take a deep interest in the Venus transit.

Venus is rich in archetypal symbolism. As the Morning Star, it is the Bringer of Light. It is related to love, human unity, beauty, and oneness, note those looking for spiritual meaning in the Venus transit.

To some the ancient Mayan calendar resembles a cosmic timing code, and reflects a deep understanding of long-term cycles of creation. As evolutionary cycles of cosmic energies are absorbed into Earth's electromagnetic fields via the Sun, human consciousness responds in a predictable manner, following a cosmic pattern of dark and light. The Mayan calendar describes the sequence and timing of these patterns - the year 2012 symbolises the end of certain cycles of history based on duality and separation, and represents the birthing of a Golden Age of Enlightenment.

The second passage of Venus across the Sun's disc will take place on June 6, 2012. The eight-year period in between represents a "doorway" through which Unity consciousness will come to dominate our mass consciousness. This is a 130-year cycle and every time this transit has happened, it has represented a new level of harmonisation. Interestingly, the Taj Mahal, a great monument to love, was built during the Venus Transit of 1631-1639 AD.

The current "doorway of Venus" is especially significant, spiritualists say, because it remains open until 2012 AD, the completion of our current cycle of human evolution. Some refer to this date as the end of linear time, the end of a period of human consciousness conditioned by separation and duality.

The Mayans refer to it as the Return of Quetzalcoatl, the Plumed Serpent, and look to this eight-year doorway as the timeframe within which mass enlightenment of humanity will take place. The ancient Mayan calendar ends at 2012 oddly enough.

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If you are an amateur astronomy or looking of spiritual insight, then mark your calendar boldly for June 8 for either the first of two Venus transits to happen in your life time; and, or, the opening of the doorway to a Golden Age of Enlightenment.

From: "Sepp Rothwangl"

Hi Larry, I suspect, the door to a "Golden Age of Enlightenment" will not be opened as long as it will be not revealed, why planet Venus is demonized as Lucifer (Light-bringer, morning star) and Noctifer (Night-bringer, evening star, with greetings from Nosferatu) for Christians. Why did Christians demonize this planet, which period of visibility represents or mirrors the period of female pregnancy? Was it only to overcome former pagan calendars? Regards Sepp Rothwangl

From: "Dr. B. Pfeiffer"

Is this a list for the history of astronomy or astrology?

From: "Axel Harvey"

> I suspect, the door to a "Golden Age of Enlightenment" will not be opened as long as it will be not revealed, why planet Venus is demonized as Lucifer (Light-bringer, morning star) and Noctifer [ ... ]

To steer this thread slightly away from Eurocentric religious wars, I would like to know if any member of this list knows about the treatment of Venus in \*North\* American native cultures. In Gunther Michelson's A\_Thousand\_Words\_of\_Mohawk\_ (National Museums of Canada, 1973), there is this note:

thrvtvhawítha "He brings daylight", Planet Venus. "Forbidden" personal name in Caughnawaga.

Is it a forbidden name because of the early Christianization of Kahnawake Mohawks? Or is there an original native tradition in light of which the proscription would make sense?

From: "LARRY KLAES"

Because they knew Venus was hot as hell and smelled of sulfur, of course.

From: "Joan Griffith"

<http://planetarynames.wr.usgs.gov/venus/venumons.html>

This U.S. government web site lists names of Venus in many North & South American and worldwide groups, as well as a lot of numerical data I do not comprehend. Joan I have no special talents. I am only passionately curious. - Albert Einstein





**Mounts and tracking**

From: "Fraser Farrell" To: "eclipses" <SOLARECLIPSESEN200405AULA.COM> Date: Thu, 8 Apr 2004

Glenn Schneider wrote:

>>We were at such a low latitude and the sun moving in retrograde,

>

> I think the meaning was high (70S) latitude? But, isn't referring to the solar motion as "retrograde" northern-hemisphere chauvinistic? An Aussie friend (who is not on this list) complains we in the northern hemisphere harp on the backward motions of the sky in the Southern hemisphere.

Glenn, Actually there are a surprising number of commercial telescope mounts which will -not- track correctly from the southern hemisphere, without user intervention. A few examples come to mind:

- Many pre-1985 Celestron drives needed their motor's power wires swapped over to reverse its direction of spin. Not a problem; if you have a soldering iron, and a lot of dealers here would do it for you before delivery.

- Celestrons from ~1985 to ~1997 -require- the "optional" remote hand controller to be plugged in at all times, so that the motor spins correctly for the southern hemisphere. If you unplug it, ever, then you need to go through an annoying keypress sequence to make the motor spin correctly again. What idiot approved this design? Also adds \$Aust 300-400 to the cost of an already-expensive telescope.

- The prominent embossed "N" on the Vixen GP-series mounts needs to be pointed -south-, contrary to manufacturer's instructions. Even if the motor includes a N-S hemisphere switch. Ditto for a lot of the GP clones.

- Lots of the cheaper go-to telescopes default to alignment stars such as Polaris, Mirfak, Dubhe, Capella. To actually align on the bright stars high in the sky here typically involves lots of keypresses. And why can't they call a certain well-known star "Alpha Centauri"? NOBODY here calls it Rigel Kent or Toliman!

- Meade have generally been good at producing world-usable telescopes; but I recall that their early LXD drives would not track anything below the altitude of the South Celestial Pole. A firmware bug, apparently.

And although not really a hemisphere-specific problem; I note that many telescopes cannot be used within ~15 degrees of the equator. Their mount's latitude adjustment can't cope...and if you extend a tripod leg to compensate, then the telescope is at risk of falling over. Observers in far northern Australia include big bricks and a rope in their observing kit.

None of these issues affects me personally. I use either big binoculars, or a Dobsonian :-)) cheers,



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**Eclipses During 2004**

Date: Sat, 10 Apr 2004 From: Jay.M.Pasachoff@SENL200405williams.edu To: SOLARECLIPSE@SENL200405AULA.COM

Hi. I'll be in Cape Town for the partial eclipse of April 19, and will give a lecture at the MTN ScienCentre, Canal Walk, at 6 pm on April 17 to a group of amateur astronomers.

Will anybody else from this list be in Cape Town? I'll be at the Mt. Nelson Hotel April 17-20. Jay Pasachoff please respond off list

**Nome Alaska 13 october**

Date: Wed, 14 Apr 2004 From: klipsi@SENL200405bluewin.ch To: SEML

>dear friends, Re: 13/14 october partial solar eclipse

>

>Good news from Nome, Alaska !

>

>I met (online, that is) John Russell who lives in Nome, Alaska. He confirms that Northern Lights are good usually in October in Nome and so is the weather "sometimes" , he says. check out his website <http://www.northernlightsnome.com/>

>

>so, for those who join me in Nome for the eclipse, there will be more than "just" the eclipse to do.

>



>here is a gif animation I did , showing the eclipse in Nome <http://eclipse.span.ch/Nome%20animation.gif> Note : it does not include atmospheric flattening of the Sun (nor does it show the possible clouds ... ;-). the eclipse maximum occurs BEFORE sunset. The eclipse is still going on AT sunset. Should give a great photo opp !

**Umbra Oct 14**

From: "Dale Ireland" To: "Solar Eclipse List Date: Wed, 14 Apr 2004

Is there an image or animation somewhere that shows the Moon's umbra in relation to the earth during the partial eclipse of 14 Oct? Since Moon perigee occurs 3 days after the eclipse the end of the umbra is probably sunward of the maximum eclipse point on Earth. I am just wondering where and how close to earth it passes. Dale

From: "Dale Ireland"

Hi Answering my own question... I found details about the path of the umbra during the 14 Oct 2004 partial eclipse. In Guy Ottwell's Astronomical Calendar 2004 available from Sky and Telescope online. The umbra passes just 220km above the Earth's surface and extends 1.69 Earth radii past the central plane of the Earth due to it being just 4 days past perigee. There are some interesting diagrams of the Umbra/antumbra and the relative motions of the Earth, Moon, and umbra. 220Km is well below even the height of the International Space Station but even though the ISS orbital inclination brings the craft to it's most northern latitude near the umbral path it will still be too far south to enter the Umbra. Dale Ireland

From: "Dale Ireland"

That should read, Guy Ottwell

**Any Webcam is South africa to look at the Partial eclipse?**

To: solaRECLIPSE@SENL200405AULA.COM Date: Mon, 19 Apr 2004

Any Webcam is South africa to look at the Partial eclipse? Cordialement,



**Solar eclipse report from Cape Town**

Date: Mon, 19 Apr 2004 From: SchoppmeyerSENL200405ksoft.de To: SOLARECLIPSESENL200405AULA.COM

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Together with Jay Pasachoff and Tony (sorry I don't know his last name), a guy from the local planetarium, Monika and me observed the partial eclipse under unbelievable clear blue skies here in Cape Town. Weather forecast was bad with rain almost the whole day. But the day started with a blue sky which remained all the time !

We built up all the stuff in a beautiful garden in the Mount Nelson Hotel. By coincidence, there was a model-shooting for a german magazine at the same time. Some guests and some people from the hotel were curious and took a look through the telescopes and cameras. Eclipse started as predicted at 14h52 local time, maximum was at 16h11 and it ended at 17h22.

Thanks also to Mount Nelson Hotel for the possibility to built up our stuff in the garden.

Even it was just only a partial eclipse, the trip was worth going and I will never forget this hours. Joerg Schoppmeyer

From: Jay.M.PasachoffSENL200405williams.edu

I second Joerg's nice report below. I very much enjoyed watching today's 51% partial eclipse with Joerg and Monika as well as Prof. Tony Fairall of the University of Cape Town, who is also director of the planetarium. Tony had joined me in 1992 on a flight south of Cape Town to see the total eclipse of that year.

The weather was almost as good for an eclipse as I have ever seen--not a cloud in the sky except for a "tablecloth" cloud that appeared on top of Table Mountain, which dramatically loomed above our site at the Mt. Nelson Hotel.

It was fun to see the few sunspots covered and uncovered by the moon. Jeorg had a small telescope for direct view in addition to cameras and a video camera. Tony had a small refractor with wonderful eyepiece projection. I had 500 and 400 mm VR Nikon lenses on Nikons N90 and F5, respectively. We all had wide angle viewing, of course, and there were some nice pinhole images falling on the ground and on walls. I'll post some images as soon as I get home on Wednesday and then get the film developed.

I, too, am glad that I was able to see the partial eclipse. It makes me even more eager to see the one in Hawaii in October. Jay Pasachoff

**19-Apr-2004 PSE Report - Tswaing Meteorite Crater**

Date: Wed, 21 Apr 2004 From: "Michael Gill" To: "SOLARECLIPSESENL200405AULA.COM"

After a nice family safari holiday in the North-West and Limpopo provinces of South Africa I had a view of the partial solar eclipse on the journey back to Johannesburg airport.

I had intended to observe the whole event at the Tswaing Meteorite Crater, close to Pretoria. However, the crater is closed to the public at 16:00 local time (before eclipse maximum). Nevertheless, I wanted to visit the site. So, we observed the early stages at the memorial to Eugene Shoemaker, overlooking the crater. Then, we relocated to the outside of the gates to the crater at 15:59 (to ensure that we weren't locked in for the night!) and we resumed observing at the barrier to the site, this time joined by two employees who were previously unaware that the eclipse was happening.

As cloud build up increased in the late afternoon, we moved one last time, heading in the direction of Johannesburg where we stopped at a crossroads where the eclipsed Sun could be once again seen.

I then packed my equipment and we headed off to a chaotic Johannesburg airport only to find out that our flight home was heavily overbooked. Happily, enough other passengers accepted the airline's blandishments to stay over and we got seats.

On my return I checked the SOHO coronagraph images of Comet Bradfield (C/2004 F4) – what a shame this was only a partial eclipse. Cheers, Michael Gill

## PSE 2004

### PSE report from Madagascar

Date: Thu, 22 Apr 2004 From: "Chris O'Byrne" To: SOLARECLIPSESEN200405AULA.COM

Just got an email from my ecliptomanaic friends who are in Madagascar.

"We saw the shark fin eclipse but slight cloud interfered. Not sure what we got on camera until we return. Looked exciting though."

(Yes, I know, it's a terse report, but Madagascar is a place where you are lucky to find roads, never mind internet cafes!). Chris.

### Images of last week's eclipse

Date: Wed, 28 Apr 2004 From: Jay.M.PasachoffSEN200405williams.edu To: solareclipses-SEN200405aula.com

I have posted a few images of last week's partial eclipse (maximum of 51%) in Cape Town, South Africa, and surrounding scenes and people, at <http://www.williams.edu/astronomy/eclipses> under Archive

You can go directly to the page from <http://www.williams.edu/astronomy/eclipse/eclipse2004/2004partial1/index.html> Jay Pasachoff

**images of latest  
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**From the archives of Frans Van loo  
(Belgium)  
Variable Star observers in Belgium  
13 February 1982  
PP 3rd from left, Frans 1st from**



Joanne & Patrick

*The sole Newsletter dedicated to Solar Eclipses*



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# Solar Eclipse Conference SEC2004



Open University  
Milton Keynes UK  
20 - 22 August 2004

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[solareclipsewebpages@btopenworld.com](mailto:solareclipsewebpages@btopenworld.com)

It is a forum for discussing anything and everything about eclipses.

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

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

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