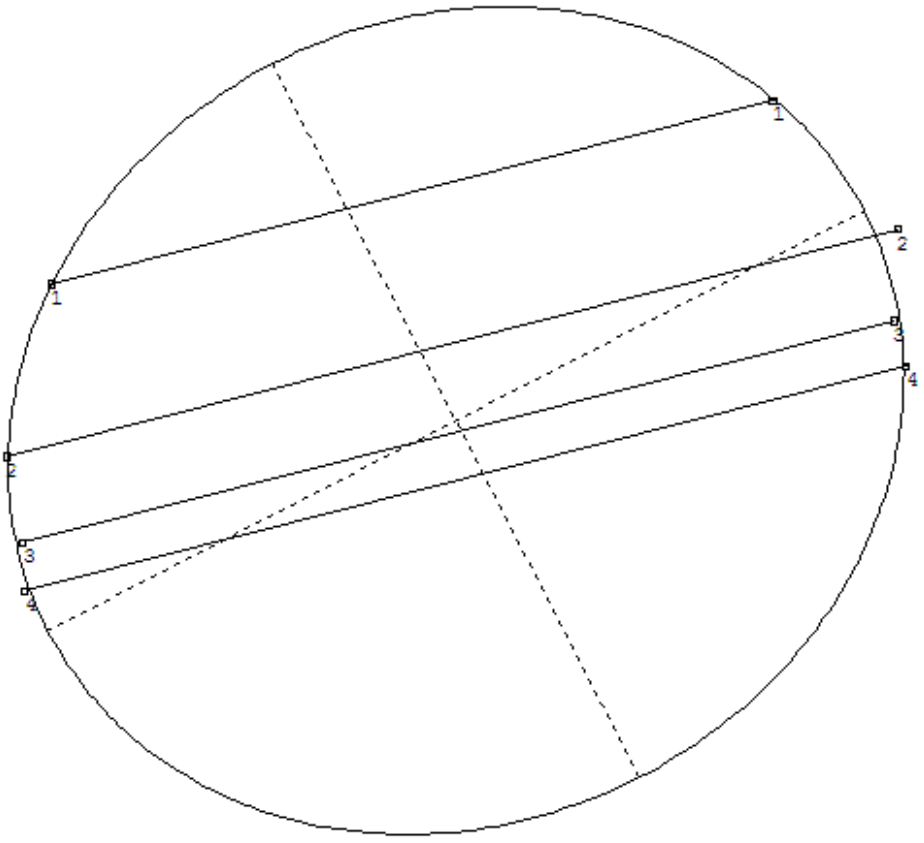
Occultation Newsletter

Volume 13, Number 1 January 2006 $5.00 North Am./$6.25 Other

(2) 2006 Jun 12 524.9 ±2.9 x 459.0 ±30.8 km PA -62.8 ±8.0
Geocentric X 2678.1 ±1.7 Y 1146.2 ±8.2 km N

E



Roger Venable's Four Station Occultation Event

In this Issue

ON THE COVER:

Figure from Roger Venable's four station occultation event. Here's Roger's description:

When 2 Pallas at magnitude 9.6 occulted a Tycho catalog star at mag 11.7 on the night of June 11-12, I was waiting with four stations. I set up one in my backyard in Augusta, GA, one an hour down the road, and one an hour past that. I had planned to drive an hour further south for the fourth station, but as I drove south I ran into the cloud bands of hurricane Alberto, so I hastily returned northward and set up the fourth station between my second and third ones, just in time for the event. As luck would have it, there were no clouds at the north and south stations, and the other two had intermittent cirrocumulus. All four stations recorded a hit. This is the first time an observer has gotten four hits on a single event. I have never gotten three to match David Dunham, so I just leapfrrogged him. Five, anyone? 8-)

The mag drop was only 0.15, and the videos do not reveal the drop when I am watching them. However, Limovie brings out the data beautifully for the north and south stations. The attended station required only a small amount of data mining, with good results. However, the second station (north-middle station) required lots of data mining and I was able to extract with surety only the reappearance. The disappearance may have an uncertainty as large as a second. So, I got 7 really good timings out of 8, and one fair timing. Since the occultation lasted about 36 seconds, the one-second error is not so bad. Using the plotting function of WinOccult, I get an asteroid shape that's an ellipse with major and minor axes of 500 km by 536 km. This agrees well with the shape & size obtained by the May 29, 1983 event that had hundreds of timings -- that, as I recall, was 530 by 513.

Publication Date for this issue: Early November 2006

Please note: The date shown on the cover is for subscription purposes only and does not reflect the actual publication date.

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Occultation Newsletter subscriptions (1 year = 4 issues) are US$20.00 per year for USA, Canada, and Mexico; and US$25.00 per year for all others. Single issues, including back issues, are 1/4 of the subscription price.

Memberships include the *Occultation Newsletter* and annual predictions and supplements. Memberships are US$30.00 per year for USA, Canada, and Mexico; and US$35.00 per year for all others. Observers from Europe and the British Isles should join the European Service (IOTA/ES). See the inside back cover for more information.

IOTA Publications

Although the following are included in membership, nonmembers will be charged for:

Local Circumstances for Appulses of Solar System Objects with Stars predictions US$1.00
Graze Limit and Profile predictions US$1.50 per graze.
Papers explaining the use of the above predictions US$2.50

Asteroidal Occultation Supplements will be available for US$2.50 from the following regional coordinators:
South America--Orlando A. Naranjo; Universidad de los Andes; Dept. de Fisica; Mérida, Venezuela
Europe--Roland Boninsegna; Rue de Mariembourg, 33; B-6381 DOURBES; Belgium or IOTA/ES (see inside back cover)
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All other areas-Jan Manek; (see address at left)

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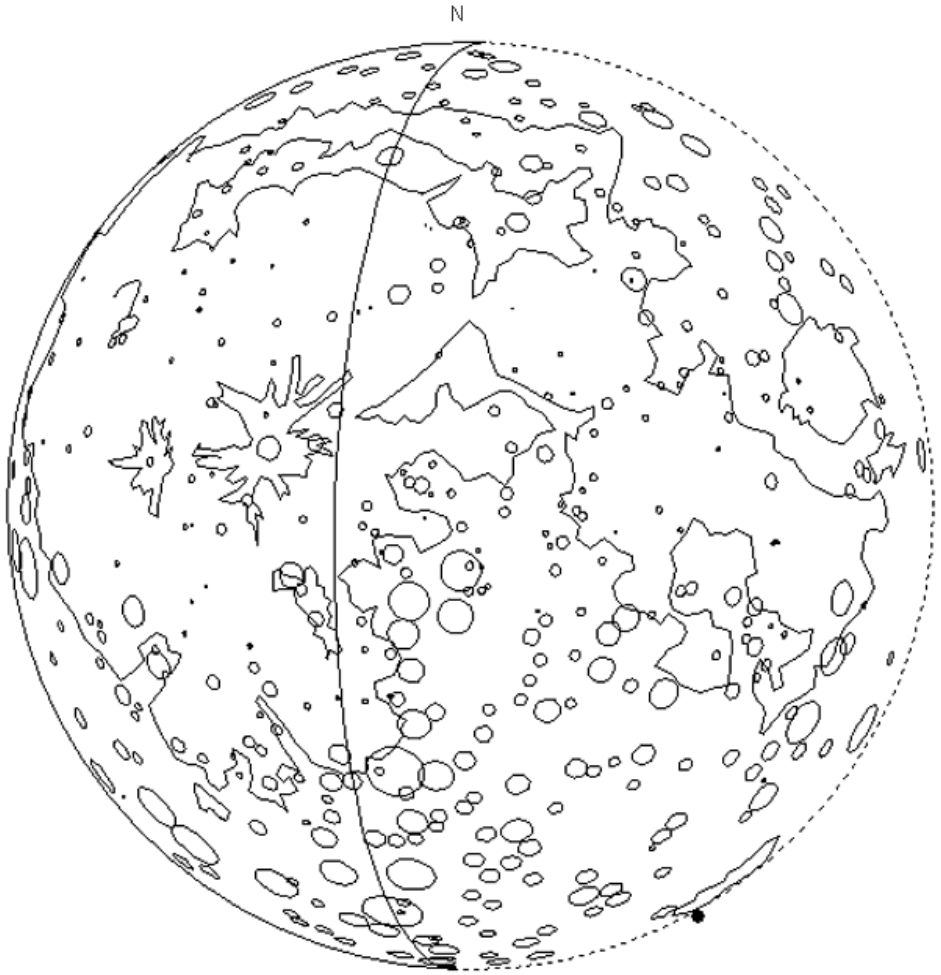
Stellar Photometry and Astrometry during Lunar Occultations

Dave Gault

WinOccult[1] provides a wealth of information for the occultation observer, where the user enters their own site coordinates and telescope specifications and the program will search for events and provide all the information that is necessary to successful observations. Below is an example of the information generated by WinOccult for an event I observed 31st May 2005; the reappearance of ZC3514 (aka 24 Piscium), a bright double star in Pisces, with luck a step event might be observable, where each component of the double star reappears separately and it appears as though the star switches on in stages.



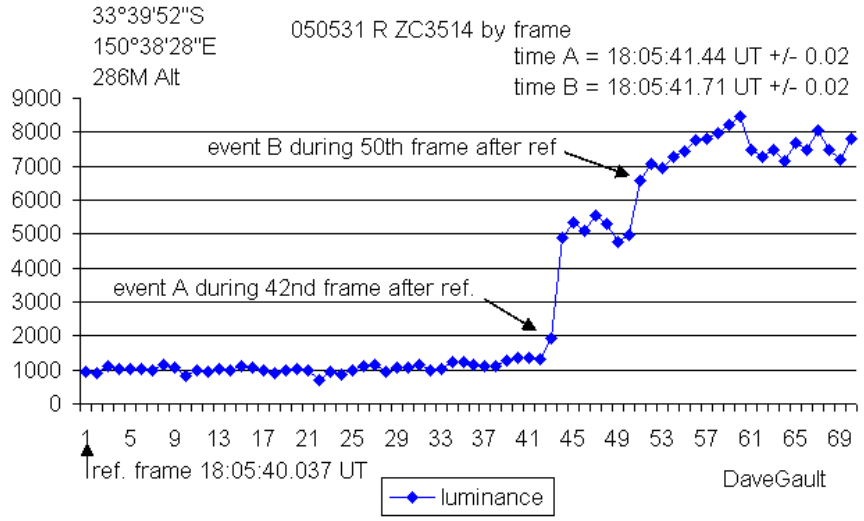
Occultation Predictions for Hawkesbury Hts in May 2005
E.Long. 150 38 52.0 Lat. -33 39 28.0 Alt. 285m. T.dia 245mm. dMag -1.0

	day	Time	P	Star	Sp	Mag	% ill	Elon	Sun Alt	Moon Alt	Moon Az	CA	PA	VA	WA	Libration L	Libration B	A m/o	B m/o	RV "/sec	Cct	R.A. (J2000)	Dec
y	m d	h m s		No	D	V		o	o	o	o	o	o	o	o	o	o					h m s	o m s
05	05 31	18 5 43	R	3514cG9		5.9	35-	73		37	66	31S	187	317	209	+6.0	+2.6	+0.3	+2.7	.301	-133	23 52 55.6	- 3 9 20

3514 = 24 Piscium
3514 is double : 6.7 6.7 0.095" 43.4

I got up at 3:30am and quickly had the scope, video and GPS timing gear running and navigated to the right spot. I saw the step event 'live' on the monitor but the fun really started once I had the sequence transferred onto the PC where I could analyze it properly.

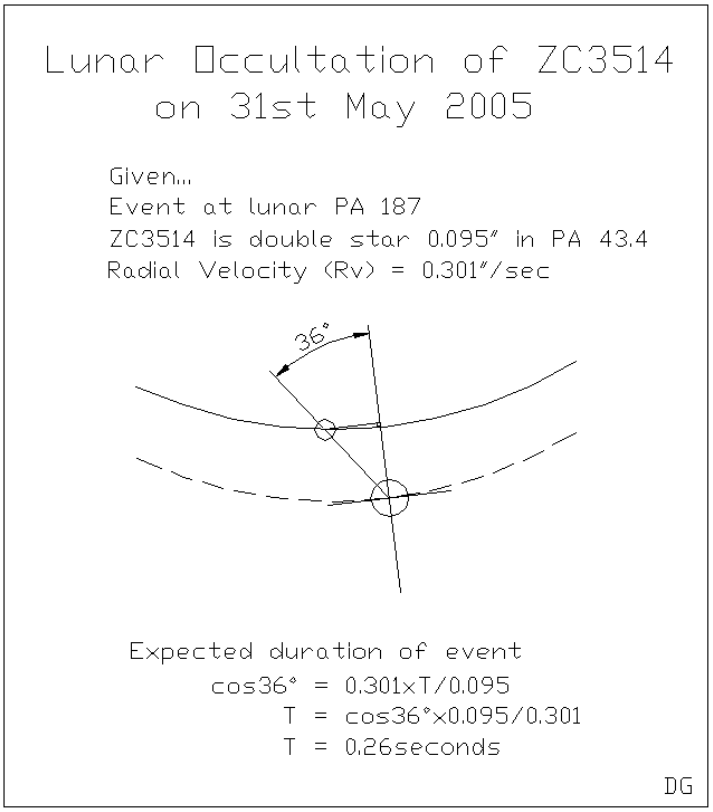
Limovie[2] allows for the measurement of the subject for every frame of the recording which can be plotted using spreadsheet techniques. Here is the light curve for the event.



-The vertical value is calculated from measurements within 2 apertures set by the user of Limovie. The algorithm compares the target aperture to the background aperture and give a unit-less reading.
-The horizontal value is the number of video frame. It is difficult to align the curve to the scale on this plot, however the user of the software can point to one of the dots on the line to receive the reading for both values.

Calculating the event times[3] was the first task and these were entered into WinOccult for sending to ILOC[4].

The WinOccult details that the two stars have a separation of 0.095" and have a position angle (PA) of 43.4 degrees and the event occurred at PA 187 from this we can calculate the time it would take for the two stars to reappear and then compare that to the observed time to determine if the separation and PA figures are correct. The method is as follows;



The expected duration of 0.26seconds matches the observed difference between the timed events of 0.27seconds and confirms the separation and PA figures.

The catalogue also details that these stars have the same magnitude; 6.7 and 6.7, however the light curve chart shows that the first star to reappear is brighter than the second[5]. I had very little understanding how to calculate the star's magnitudes from the chart[6] so I went looking on the internet. I found a web page[7] that showed the method that I could use to calculate the magnitudes of my two stars, as follows;

from the chart...	luminance of first star =	5200-1000
	=	4200 units
	luminance of second star =	7500-5200
	=	2300 units
	luminance of the pair =	6500 units
from the catalogue...	magnitude of the pair =	5.9
the formula...	$m_1 - m_2 =$	$2.5 \times \log(b_2/b_1)$
the difference in magnitude of the two stars is...		
	$m_1-m_2 =$	$2.5 \times \log(4200/2300)$
	=	0.65
if the mag. of the pair is 5.9 then the mag. of the first star is...		
	$m_1-5.9 =$	$2.5 \times \log(6500/4200)$
	$m_1-5.9 =$	0.474
	$m_1 =$	6.37
then the magnitude of the second star is	=	7.02

It is worth noting that the Dawes Limit for a 10inch objective is 0.48 arc seconds and I think it is amazing that using a video camera and an occulting disk (the moon) one can make precise measurements of stars that are closer than this threshold by a large margin, in this case 0.095 arc seconds.

History of events concerning this star.
WinOccult[1] has the capability to search for historical occultations and I found a previous event[6] where a step event occurred. On the morning of 16th October 1986 (15thUT) Seizi Futinoue recorded (photo electrically) a step event of 0.12 second duration from the Bisei Observatory in Okayama Japan. At the time ZC3514 had different separation and PA figures and Seizi had to combat a 95% full moon. It is possible to extract data for the star/moon interaction and estimate a duration of 0.08 seconds, however due to the difficult observing conditions and the very brief duration, this event can not confirm separation and PA for this star.

Conclusion
My observation confirms the separation and PA of ZC5314 at the time, however the measured magnitudes (6.4 & 7.0) differ considerably from the stated figures (6.7 & 6.7). This could be explained by differences in spectral colour of the two stars as my simple video camera is more sensitive to the red end of the spectrum.
I have been contacted by Brian Mason of USNO, who comments that my measurements should be included in the Washington Double Star database for this star; WDS No. 23529-0309. I am most pleased. This whole exercise has been a great and worthwhile learning experience for me.

Notes and Acknowledgements…

1) WinOccult by Dave Herald http://www.lunar-occultations.com/iota/occult3.htm
2) Limovie by Kazuhisa Miyashita http://www005.upp.so-net.ne.jp/k_miyash/occ02/limovie_en.html
3) Which frame to choose? Due to the diffraction of light at the lunar limb the event is said to occur when the star appears to be at 25% of it's un-occulted brightness.
4) International Lunar Occultation Centre http://www1.kaiho.mlit.go.jp/KOHO/iloc/docs/iloc_e.html
5) First mentioned by Brian Loader of RASNZ http://occsec.wellington.net.nz/
6) Dave Herald did this first and aided in searches and calculations

See… http://www.astro.wesleyan.edu/~anna/Astro211/0326a.html

New Double Star Discoveries

Henk J.J. Bulder

This publication is a follow-up on the publication in ON v12, No.4 , pages 9-10.

First of all I have to make a correction on the correction I published last time. Thorough investigation learned that OCC 235 (Taygeta) was not confirmed to be double by Bob Sandy and Hal Povenmire as I stated but was in fact discovered to be double by them. The double star files have been altered accordingly. Bob and Hal more than deserve the credits for this discovery made back in 1969.

In the past Jean Bourgeois video recorded occultations of stars with a double star code without recording any gradual or step event. Personally I visually observed such stars without seeing any fades or steps. In 2006 Dave Herald and Dave Gault video recorded such events and reduced the records with LiMovie. The resulting graphs showed no step events nor any fades. Together we have come to the conclusion that when such observations are made by two independent observers the double stars should be considered to be single. From now on we will keep a log of such observations. So, if you have made such negative observations of doubles in the past, please report them to me. Table 1 contains all corrections made. The original discoverer is mentioned between parenthesis.

OCC	X	SAO/ZC	MAG1	MAG2	SEP	PA	DATE	DISCOVERER	REMARKS
132	11060	1122	3.8	-	single		20060309	(W M Worssell)	video D Herald & D Gault iota Geminorum
133	12917	1279	6.3	-	single		20060504	(W M Worssell)	video D Herald & D Gault upsilon 2 Cancri
134	12894	80234	8.6	-	single		20060504	(W M Worssell)	video D Herald & D Gault
135	12873	1274	5.7	-	single		20060504	(W M Worssell)	video D Herald & D Gault upsilon 1 Cancri
235	4831	539	4.6	6.1	.1	0	19690806	R Sandy & H Povenmire	correction of discoverer 19 Tauri (Taygeta)

TABLE 1 Corrections on previous discoveries of double stars

Since the last publication I received several nice graphs of observed new double stars. Most of them concern video records that were processed using LiMovie. I have included a single example here concerning XZ 117172 sent to me by David Gault. I strongly urge other observers to process their video recordings of occultations with LiMovie to see if any double effects are present.

In table 2 all 13 (possible) new double stars are presented. For stars for which no estimates were given for the individual components both components are assumed to be equal in magnitude. If the sum of the reported estimates does not match the total magnitude of the pair, the estimates are up- or downgraded until they do. That is why the magnitudes can differ from the ones reported. If the first component is reported to be fainter than the second 180 is added to position angle.

OCC	X	SAO/ZC	MAG1	MAG2	SEP	PA	DATE	DISCOVERER	REMARKS
1117	5200	76371	9.9	9.9	.03	52	20060305	J Bourgeois	
1118	6352	76857	9.7	9.7	.05	55	20060306	H Bulder	
1119	7786		10.5	10.5	.1	82	20060307	H Bulder	
1120	9053		9.6	9.6	.15	62	20050122	H Bulder	
1121	10122	78899	9.9	9.9	.06	88	20050319	R Sandy	
1122	11372	1149	4.1	8.5	.04	70	20050416	D Breit et al.	graze upsilon Geminorum
1123	14708	98744	9.6	9.6	.25	113	20060505	B Mills	
1124	15874	99197	9.6	11.6	.6	90	20060603	D Gault	
1125	64253		11.1	11.1	.05	27	20060304	H Bulder	
1126	78191		9.8	12.0	.05	115	20060404	S Messner	
1127	108624		10.6	12.0	.17	117	20060504	S Messner	
1128	117172		11.0	11.4	.6	78	20060506	D Gault	
1129	175991		11.5	11.7	.06	294	20051108	D Gault	

TABLE 2 New double star discoveries till 1-8-2006

The graze of upsilon Geminorum was observed by Breit, Morgan, Morana, and Nolthenius using video equipment. All videos clearly showed duplicity and were examined by Michael Richmond to come to estimates of separation, position angle and magnitude.

Updated XZDoubles.DAT, XZDoubles Discoveries.DAT and XZConfirmations.DAT can be downloaded from http://www.lunar-occultations.com/iota. Copy these files to the StarCats directory in WinOccult. Don't forget to use option 6 (Update XZ catalogue if new double files...) in star catalogues menu to make them active.

The Spectacular Lunar Occultations of the Pleiades over the United States on July 20, 2006

Hal Povenmire

On the morning of July 20, 2006, the 23% sunlit waning Moon made a spectacular Pleiades passage across east central United States. An expedition was planned for the most favorable graze, Alcyone across Illinois, Indiana or Michigan. The weather pattern did not permit observations of this graze so the grazing occultation of 24 Tauri (Z.C. 549) which ran parallel and to the east was chosen. This binary star, a magnitude +6.3, AO spectral class Pleiad was favorable. It grazed approximately 12° on the dark north limb.

Three observers, David Dunham and Wayne Warren from Greenbelt, Maryland and Hal Povenmire from Indian Harbour Beach, Florida met in Columbus, Ohio to map out a final strategy. The site chosen was near a small town northeast of Columbus called Marengo. David Dunham attempted to set up several remote video stations. Wayne Warren used a single video station and Hal Povenmire used a base visual station.

The sky was very thick with aerosols and the Moon was extincted and reddened by about 2 magnitudes. The seeing was only fair to poor. In spite of this, several stations got good data on 24 Tau and also recorded a number of reappearances of stars from the dark limb of the Moon. Several of the brighter stars were recorded disappearing on the bright limb. Frances Graham also timed a number of total occultations from East Pittsburg, Pennsylvania.

All of these observers were long-term veterans of the Graze Program and the accumulated observing experience was well over 145 years. In spite of weather problems, this graze was well observed. A south shift is suspected but the reduction must be made to confirm this. This data will be reported to IOTA and ILOC.

The Discovery of Minor Satellites of Asteroids

The Asteroidal Occultation of (129) Antigone on October 12, 1974 Hal Povenmire

Gordon Taylor of the Her Majesty's Nautical Almanac Office (HMNAO) issued a notice of asteroid (129) Antigone occulting Z.C. 1281, a magnitude +6.26, binary star in Cancer, across extreme southeastern United States on October 12, 1974. This star is of KO spectral class and is also known as SAO 97913 and HIP 42010. I would not likely have attempted this observation but there was a lunar grazing occultation of Z10378 (SAO 118338) about 2 hours later than the asteroidal occultation. I chose an observing site just west of Cooper City, Florida. The night prior to the two events, I memorized the star field for the asteroidal occultation.

At the time of occultation, the star and asteroid were only about 12° elevation over the Atlantic Ocean. The sky was transparent but the seeing was the typical tropical seeing which was only fair. The Moon was 12% sunlit and in the waning phase. The magnitude of Antigone was +13 so it was never observed. The star briefly blinked out for approximately .7 second very near the predicted time. I was certain that this was a definite occultation instead of the tropical seeing.

It was my impression that I must have just caught the tip of the asteroid. I did not think of the concept of an asteroidal satellite. I reduced this observation and also the graze of Z10378 and reported these observations to Gordon Taylor, David Dunham and Brian Marsden at the Minor Planet Center in Cambridge, Massachusetts. Shortly after, Gordon Taylor sent me a note of congratulations. David Dunham made no response at the time and Brian Marsden sent me a note indicating that he was very skeptical. I then sent him a tape of the two events and let him reduce them himself. He later followed up with a note but stated that this was not a proven case. David Dunham wrote me a note that later astrometry indicated that the asteroid path had gone way south over Colombia, South America. This was far greater than the predicted diameter of (129) Antigone so this observation was clearly not accepted as genuine. It was not worth any argument from my standpoint so I carefully filed the observation and put it out of my mind.

This observation was forgotten about until March 10, 1978. Approximately 880 days later, Gordon Taylor announced that (6) Hebe was going to occult magnitude +3.6 magnitude Gamma Ceti across southern United States. At this time I was Director of the Satellite Beach Observatory that had an excellent 16" telescope. The skies were clear and I watched the asteroid (6) Hebe sail right past the star without a blink. This is called a clean Miss.

In Victoria, Texas, a highly experienced occultation observer, Paul Maley observed this same event and saw the star blink out for approximately .5 second. Shortly thereafter, word reached David Dunham that consistent reports of multiple stations in Mexico had recorded the occultation of (6) Hebe near the predicted path. Almost immediately, David Dunham and some astronomers at the U.S. Naval Observatory declared that asteroids had satellites.

Calculations indicated that the primary asteroid's gravitational influence could extend out to about 50 radii of the diameter of the asteroid strong enough to hold a satellite.

In the years following, there were several photoelectric recordings of possible secondary objects during asteroidal occultations but most of them were considered weak evidence. The science of predicting asteroidal occultation events also became more refined. This controversy was finally ended when the Galileo Spacecraft passed close to asteroid (253) Ida and discovered a small 1.6 km. diameter moon orbiting it. This moon was later named Dactyl. The case for asteroids having satellites was now considered proven. Since that time, many other asteroids have been found to have satellites. It is now believed that at least 20% of asteroids have satellites. Many of these are binary asteroids and some asteroids have multiple satellites.

In August 2006, astronomer, Richard Nugent who specializes in astrometry used the revised diameter of 144 km. for (129) Antigone and the improved orbital elements of Antigone to reconstruct the October 12, 1974 observation. This revised computation placed the path much closer to Florida and well within the expected distance from the primary. The time was also within 6.0 seconds of the predicted time. Even though it took 32 years to see this observation corrected and vindicated, it still gave some satisfaction to see this controversy put to rest. ¦

Hal Povenmire
215 Osage Drive
Indian Harbour Beach, FL 32937

Photo courtesy of Tom Polakis

In Memoriam, Denise Nye
1946-2006

Denise Nye, wife of Derald Nye, died suddenly 13 March 2006. Denise was an avid astronomer and world traveler and accompanied Derald on 28 solar eclipse trips. She visited all the world's continents, 60 countries and 52 islands.

Roger Venable wrote: "Denise accompanied Derald on all his eclipse-chasing trips, and as such was a real world traveler. There are only a few persons in the world who have seen more solar eclipses than Denise saw (and, I think, one of those few is Derald himself). Many times I have listened fascinated to the tales the two of them had to tell about the things they had seen and done together. Prominent in my mind is the trip to Ascension Island to videotape (with complete success!) the simultaneous lunar occultations of Jupiter and Venus, an event of which the path of visibility had no landfall except that isolated island. (You and I can see a similar event about 4,000 years from now, if we care to wait.) Year after year, their travels brought them special views such as that one. Denise and Derald have been a pair of master occultationists"

Gene Lucas wrote: "I found in my briefcase several postcards sent to me by Denise and Derald on their various trips to strange and exotic places, usually chasing some occultation shadow (lunar or solar), a transit or whatever. The JOURNEY was the thing, I think. The latest card came in the mail just a few days ago.... marked "via international air mail", but more likely partly carried by boat, donkey back, or whatever, typically arriving about the same time they would be back in Tucson! Denise was usually the one to write, encapsulating a stage of their latest adventure in a few words. The last one read (in part): 'After twelve nights on board, and 12 nights at the Captain's table ... arrived offshore (the island) today. Derald and I will descend down a rope ladder to a small dinghy to go ashore tomorrow for our visit...' Over the years, every Christmas would arrive a nice long travelogue with another spectacular photo of an eclipse or a rare occultation, often as not taken by Denise"

Countries/Areas visited with Denise - (listing by Derald Nye)
Antarctica
North America (3 countries) – Canada, Mexico, United States
Middle America (13 countries) – Bahamas, Barbados, Bonaire, Costa Rica, Curacao, Dominica, Grenada, Martinique, Panama, Puerto Rico, St. John, St. Thomas
South America (7 countries) – Argentina, Bolivia, Brazil, Chile, Columbia, Ecuador, Peru,
Europe (21 countries) – Andorra, Belgium, Denmark, England, France, Germany, Gibraltar, Greece, Iceland Italy, Luxembourg, Monaco, Netherlands, Norway, Portugal, Scotland, Spain, Sweden, Switzerland, Vatican City, Wales
Asia (10 countries) – China, Cyprus, India, Japan, Malaysia, Philippines, Singapore, Taiwan, Turkey United Arab Emirates
Africa (5 countries) - Cape Verde, Kenya, Morocco, Senegal, South Africa,
Australia (8 Territories) - Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Tasmania Western Australia, Victoria
Islands (52) – Ascension, Bali, Borneo, Cape Verde, Christmas Island, Kiribati, Cook Islands Group – Atiu, Manuae, Raratonga, Crete, Easter Island, Falkland Islands, Fiji, Galapagos Islands, Gambier Islands Group – Mangareva, Greenland, Guam, Java, Madeira, Majorca, Majuro Marquesas Islands Group – Fau Hiva, Hiva Oa, Ua Pou, Micronesia Group – Chuuk, Kosrae, Pohnpei, Yap, New Zealand, Palau, Pitcairn Islands Group – Ducie, Henderson, Pitcairn, St. Helena, Saipan, Society Islands Group – Bora Bora, Huahine, Mopelia, Raiatea, Tahiti, South Georgia
Spitsbergen, Taiwan, Tenerife, Tinian, Tristan da Cunha, Tuomoto Group – Ahe, Manihi, Mataiva, Puka-Rua, Vanuatu – Efate, Espirito Santo, Tana. ¦

ESOP XXV

25th European Symposium on Occultation Projects
25th-27th August 2006

Friday, August 25tn Location: Observatory "Leidse Sterrewacht"
Sterrenwachtlaan
2311 GW Leiden

18:00	Entrance Observatory and registration
19:00	Opening talk Harrie Rutten, President DOA, Chairman LOC
19:05	Opening talk Hans-Joachim Bode, President IOTA-ES
19:10	Opening talk Henk Olthof, Chairman KNVWS*
19:20	Regulations about tours in Observatory, Wim Nobel, LOC
19:30	Opening Buffet
20:15...21:30	Every 15 minutes starts a tour, max. 10 pers. Duration 1 hour
22:15	Closing Buffet
23:00	Closing Observatory

Saturday, August 26th Location: Leiden University
Gorlaeus Laboratorium
Einsteinweg 55

From	Until	Lecturer	Title
8:15		Opening Gorlaeus Laboratory	
8:30		Opening Conference Room	
		Board messages	
9:00	9:05	Harrie Rutten	Opening ESOP XXV day 1
		Session: History	
		Session chairman: Harrie Rutten	
9:05	9:25	Wim Nobel	Leidse Sterrewacht (Leiden Observatory)
9:25	9:40	Hans Joachim Bode	ESOP I - ESOP XXV / A brief Review of its History and Highlights
9:40	10:20	Dr. Eberhard Bredner	My twenty five years of video observation
10:20	10:45	Coffee / Tea break	
		Session: Techniques	
		Session chairman: Adri Gerritsen	
10:45	11:15	Wolfgang Beisker	The Pluto Occultation on the 12th of June 2006.... The atmosphere is still alive !
11:15	11:45	Thomas Flatres	How to manage several consecutive occultations
11:45	12:15	Detlef Koschny	Smart-1 will impact the moon - proposed observations and expected results
12:15	13:30	Lunch	
		Board messages	
13:30	13:35	Harrie Rutten	Opening

Session: Eclipses			
Session chairman: Eric Limburg			
13:35	14:05	Adri Gerritsen	Computer Similation of the Baily's Beads
14:05	14:20	Hans-Joachim Bode	Determining Variations of the Diameter of the Sun
14:20	14:45	Carles Schnabel	Our grazing observation of the annular solar eclipse on 2005 Oct 3rd
14:45	15:15	Martina Haupt	Bailey's Beads in Tunisia
15:15	15:45	Coffee / Tea break	
Session: Observing			
Session chairman: Jan Maarten Winkel			
15:45	16:10	Pawel Maksym	Total Solar Eclipse Polish Expedition Egypt 2006
16:10	16:45	Jan Manek	Small tool for total occultation observers (SW for PDA)
16:45	17:20	Steve Preston	Analysing video's from occultations by asteroids
Board messages			
17:20	17:25	Harrie Rutten	Info Social Dinner and closing
17:30	18:00	Closing Gorleaus Laboratory	
Social Dinner			
Rest. Haagse Schouw (Hotel v.d. Valk) Haagse Schouwweg 14 Leiden			
19:30		Entrance dining room	
22:30		Closing dining room	

Sunday, August 27th Location: Leiden University
Gorlaeus Laboratorium
Einsteinweg 55
2333 CC Leiden

From	Until	Lecturer	Title
8:15			
8:30		Opening Conference Room	
Board messages			
9:00	9:05	Harrie Rutten	Opening ESOP XXV day 2
Session: Observing			
Session chairman: Jan Maarten Winkel			
9:05	9:20	Vaclav Priban	Using of the Occultation Technique for Measuring of the Sun Chromosphere Thickness
9:20	9:50	Hans Govaarts	How DOA prepares expeditions to grazing occultations in the Netherlands
9:50	10:05	Harrie Rutten	"Optical improvement in Cassegrain like telescope systems for observing occultations"
10:05	10:20	Wim Nobel	Occultation of Regulus by Rodope
10:25	11:00	Coffee / Tea break	
Session: Hardware			
Session chairman: Hans-Joachim Bode			
11:00	11:20	Pawel Maksym	Faint Star Grazing Occultation registered in Poland
11:50	11:50	Wolfgang Beisker	Towards a New Occultation Camera: Investigation of CCD chips
11:50	12:30	Hellmuth Cuno & Harrie Rutten	Optical Time Inserter for Webcams
12:30	13:30	Lunch	
13:30	13:35	**GROUP PHOTO ESOP XXV**	

Board messages			
13:40	13:45	Harrie Rutten	Opening
Session: Software **Session chairman: Adri Gerritsen**			
13:45	14:05	Jan Manek (on behalf of Petr Mudra)	Simple Chronograph ACH 77
14:05	14:25	Andrej Plekhanov	Using OrbFit Linux version to making asteroid orbit updates
14:25	15:00	Eric Limburg	LOW 4.0 - the latest developments
15:00	15:30	Coffee / Tea break	
Session: Future activities and miscelanious **Session chairman: Eberhard Bredner**			
15:30	15:50	Detlef Koschny	The Koschny observatory - A new private observatory in the Netherlands
15:50	16:30	Steve Preston	Asteroid Occultation Prediction Process
16:30	16:45	Jan Manek	Invitation for ESOP XXVI
Board messages			
16:45	16:50	Harrie Rutten	Messages about the excursions

Prof. Dr. Hans-Hellmuth Cuno (D) & Ing. Harrie Rutten (NL)
IOTA-ES and DOA

Optical Time Inserter for Webcams
Electronics for an optical time inserter
The final solution of the problem the unknown latency time of image capture devices is an optical time inserter. The time is displayed on an 8 digit LED display and projected onto the imaging device by means of lenses and mirrors.

The electronic part consists of a GPS-receiver with an attached electronic circuit, which receives the NMEA data stream and displays UT on the 8 digit LED display. The figure height of the display is 4.6 mm. The display can be dimmed, frozen (during exposure) and blanked (for dark fields). Other information can also be displayed as for instance the geographical coordinates.

Optics and mechanics for an optical time inserter
The method will be explained how the projection of the monochrome LED display will be done. Main problem is the space, which is available, in a standard web cam (for instance a Philips ToUcam). Especially the distance from the last lens surface to the CCD chip has to be very long, compared to the focal length of an objective to reach a relative compact design. Therefore a special lens design, called retrofocus objective, was needed. This has been designed by Harrie and is made of standard components from optical suppliers. The characters in the display of 4.5 mm have been reduced optically to a size of 0.2 mm!

General
Hellmuth and Harrie will show the status of this project. At the moment it is not sure a working model can be presented because some optical components which were chosen are not manufactured anymore and we had to make a full opto mechanical restart. But some results of experiments and simulations can be shown.

Thomas Flatres (F)
IOTA-ES

How to manage several consecutive occultations
The use of Watec camera have increased the number of performed occultations during the same night.
The use of prevision by low4 is help full to manage the process By modifying the software of the time inserter we can quickly change the star number, up date the geographic positions form a GPS and keep the time accurately.

By recording the video on DVD We are able to read directly the video on a computer, and keep pictures if needed. Virtualdub in version mpg2 is able to sort true pictures with the two fields on it and if you need it is possible to get a pre determinate number of consecutive pictures from the record (odd fields, even fields or both fields)

Pawel Maksym Msc (PL)

Ary Sternfeld Planetarium and Astronomical Observatory in Lodz Polish Association of Amateur Astronomers Department of Position and Occultations

Faint star grazing occultation registered in Poland

This lecture is a presentation of some results of faint star grazing occultations registered by observers of Department of Position and Occultations of Polis h Association of Amateur Astronomers.

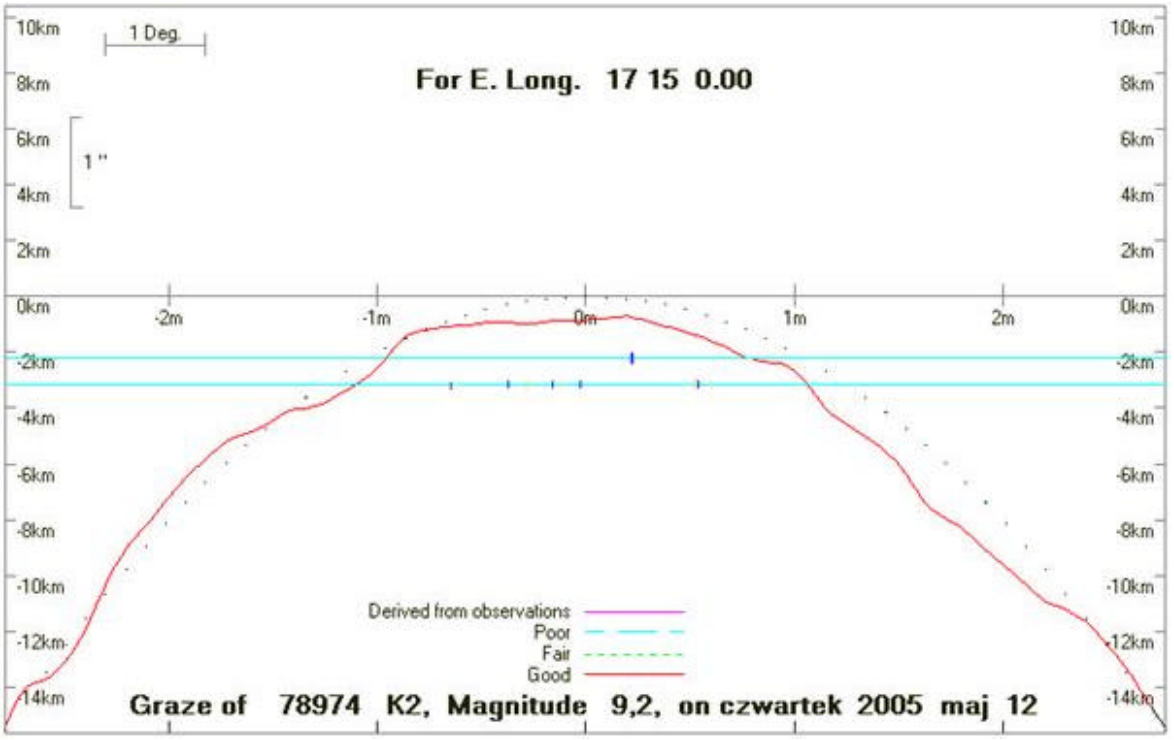


Fig. 1: Example of profile of faint graze observed by Poles

Naturally in case of this kind of observations we have to ask about a need and sense of it. There is also a problem of amount of observers which are able to registration of grazes with low magnitude stars. One think is certain - when we are able to registration of faint stars grazes, total quantity of observable events is incredibly high.

Steve Preston (USA)
IOTA

Asteroid Occultation Prediction Process

Many people across the world collaborate in the process of predicting the path of asteroid occultations.As a first step we identify asteroid occultations that are good candidates for observers.Then we refine the path prediction using new astrometry of the asteroid or the star.And, finally, we distribute the path predictions to potential observers (typically via website or email). In this talk I will identify the primary sources of the events posted to this website and describe the methodology I follow to generate path predictions for these events.More specifically, I will describe my approach for fitting an asteroid orbit, computing a star position from catalog data, and generating the actual path prediction for an event.

Steve Presten (USA)
IOTA

Extracting Quantitative Data from Video Recordings

The falling cost of very sensitive video cameras has encouraged many observers to record occultations with video equipment. Video recording is an excellent methodology because it provides an accurate record of the events free from fatigue and other problems that affect visual observations.
Video recording also provides very accurate timing if coupled with a good time signal. For many recording setups the observer can determine event times by simply stepping through the video frames and noting the times of events. However, dim stars and events with small magnitude drops can be difficult to measure with this simple visual review. Kazuhisa Miyashita of Japan has developed a program, LiMovie, which can measure the intensity of a star in a video recording. With LiMovie the observer can generate quantitative plots of intensity versus time. The resulting intensity plot is very useful for determining accurate times for video recorded occultations. In this talk I will provide a demonstration of using LiMovie to determine times for an asteroid occultation.

Ing. Vaclav Priban (CZ)
PLANETARIUM Praha

Using of the Occultation Technique for Measuring of the Sun Chromosphere Thickness

This contribution describes technical solution for measuringof the thickness of the Sun chromosphere by only one telescope equipped with two TV cameras. Solution is based on using of a binocular adapter, solar filters and a special electronic circuit which fused both TV signals into one with some additions. It uses time inserter and evaluation reminds Venus transit.

Ing. Harrie Rutten (NL)
DOA

Optical improvement in Cassegrain like telescope systems for observing occultations
A very annoying problem when using cassegrain like telescopes for observing occultations is the internal reflections in the baffle tube. Especially when observing occultations when the Moon is nearly full gives a big loss of the limiting magnitude. Presented is a method to reduce the reflections in the focal surface of the telescope when using small fields
(for instance in using web cams).

Carles Schnabel (ES)
IOTA-ES

Our grazing observation of the annular solar eclipse on 2005 Oct 3rd
Six stations of the Agrupació Astronòmica de Sabadell were established on the northern limit of the eclipse in order to record six different Baily beads sequences. The preliminary results are presented, consisting on the different video files and the resulting

hundred of timings measured. These data combined with others recordings obtained at the same northern limit and also at the southern, are being analyzed with the assistance of specialized members from IOTA/ES.

Adri Gerritsen (NL)
DOA

Computer simulations of the Bailey's Beads
The most recent total solar eclipse visible from The Netherlands, could be witnessed on the 3rd of May1715. Unfortunately, this eclipse ? totality being visible only from the Wadden Islands ? was clouded out.
On the 17th of April 1912, however, the central line of a total-annular (hybrid) solar eclipse crossed the southern part of The Netherlands near Maastricht. In spite of the beautiful weather and the detailed observation reports, there is still a lot of discussion concerning the phenomena that could be seen during this memorable event. Some sources claim the eclipse was total during 0.25 seconds, while others describe it as an annular eclipse lasting for several seconds.

Almost one hundred years later, a computer model of the Bailey's Beads, developed by the Dutch Occultation Association, shows us in detail what actually could be seen on this special occasion. The model is based on the motion theory ELP2000-82B (Moon; Chapront) and VSOP87 (Sun; Francou / Bretagnon). Lunar limb data was taken from the Moonlimb database (Dietmar Büttner; version 1997). The ray-tracing algorithms were developed by the Dutch Occultation Association.

After a brief introduction to the algorithm, the reliability of the model will be examined by analyzing photo's taken during the annular solar eclipse of October 3rd 2005 near the central line (Madrid).

Predictions for the 1912 hybrid solar eclipse, made for 0.1 second intervals, have been merged into a movie that will show us the Bailey's Beads being visible for an observer on the central line near Maastricht.

Additional reports can be read at DOA www.esop2006.nl "Papers & Proceedings".

The Participants at Leiden

IOTA's Mission

The International Occultation Timing Association, Inc. was established to encourage and facilitate the observation of occultations and eclipses. It provides predictions for grazing occultations of stars by the Moon and predictions for occultations of stars by asteroids and planets, information on observing equipment and techniques, and reports to the members of observations made.

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IOTA European Section (IOTA/ES)

Observers from Europe and the British Isles should join IOTA/ES, sending a Eurocheck for EURO 25,00 (bank-transfer-costs included) to the account IOTA/ES; Bartold-Knaust-Strasse 8; D-30459 Hannover, Germany; Postgiro Hannover 555 829-303; bank code number (Bankleitzahl) 250 100 30. Sending EURO 20 EU-members must use the IBAN- and BIC-code as additional bank-address (IBAN: DE97 2501 0030 0555 8293 03, BIC: PBNKDEFF). German members should give IOTA/ES an "authorization for collection" or "Einzugs-Ermaechtigung" to their bank account. Please contact the Secretary for a blank form. Full membership in IOTA/ES includes one supplement for European observers (total and grazing occultations) and minor planet occultation data, including last-minute predictions; when available. The addresses for IOTA/ES are:

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IOTA on the World Wide Web

(IOTA maintains the following web sites for your information and rapid notification of events.)

IOTA Member Site
http://www.occultations.org

This site contains information about the organization known as IOTA and provides information about joining IOTA and IOTA/ES, topics related to the *Occultation Newsletter*, and information about the membership--including the membership directory.

IOTA Lunar Occultations, Eclipses, and Asteroidal and Planetary Occultations Site
http://www.lunar-occultations.com

This site contains information on lunar occultations, eclipses, and asteroidal and planetary occultations and the latest information on upcoming events. It also includes information explaining what occultations are and how to report them.