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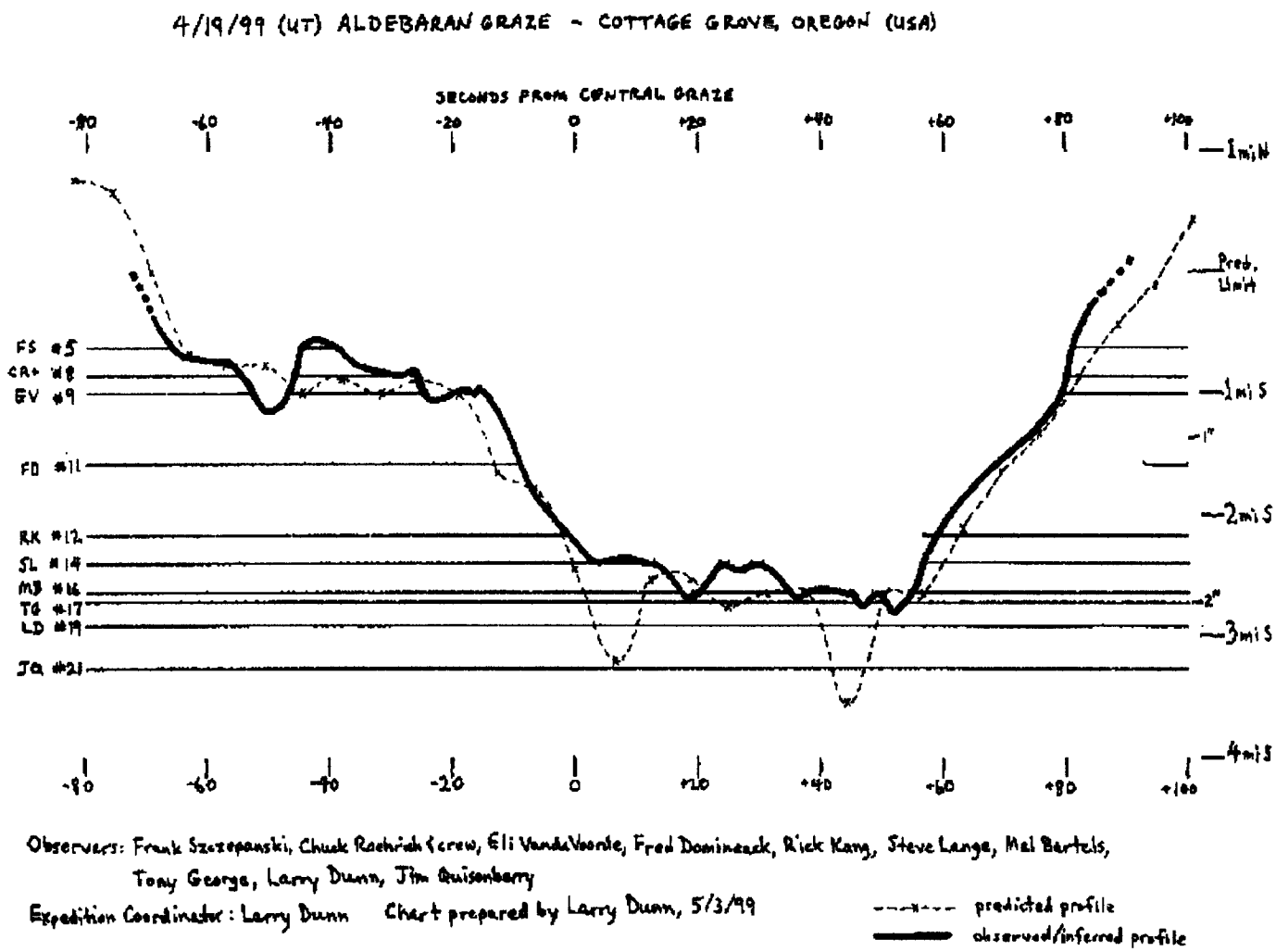

Observers: Frank Szczepanski, Chuck Rachrish & crew, Eli VandeVoorde, Fred Dominczak, Rick Kang, Steve Lange, Mal Bartels, Tony George, Larry Dunn, Jim Quisenberry

Expedition Coordinator: Larry Dunn Chart prepared by Larry Dunn, 5/3/99

predicted profile

observed/inferred profile

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For subscription purposes, this is the third issue of 1998.

On the cover: The profile of the 1999 April 19 Aldebaran Graze. See the article on page 4.

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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
- IOTA Observer's Manual US$5.00

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- **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 back cover)
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- **All other areas**-Jan Manek; (see address at left)

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Aldebaran Graze in Oregon—Graphic Results

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On the cover is a chart of the results of the 1999 April 19 Aldebaran graze observations from Cottage Grove, Oregon, USA. I will be sending detailed result files (76-column format unless some other form is requested) after I get confirmation of exact locations of a few observers and clarification of a few ambiguous callouts and comments on the recordings.

As reported earlier in my same-day summary, the two extreme isolated "peaklets" on the predicted profile appear to not actually exist, but the rest of the predicted profile fits our observations fairly well. (Better than just about any other graze I've done!) Mitsuru has looked at the records of the observation which defined at least one of the two "peaklets" and found it to be somewhat suspect; in fact, ILOC records and French records of the same observation are not consistent.

At this chart size and graphic resolution I am unable to show 0.1-second precision in the timings. Of course, the official report of graze events will have that detail. But if you'd like a graphic chart which shows more detail than this one, I also have a version without the two profiles overlaid. I can send you a .GIF of that chart with twice the resolution of this one (yet only twice the file size at 21 KB), which may look huge on the screen or printout but which shows several short sections of reported dimming.

We are really kicking ourselves that three efforts at videotaping this event didn't come through. One person who intended to get video decided not to drive the 10 hours from Sacramento due to the discouraging weather forecast. I also intended to get video but didn't have time to set up my equipment. (The expedition leader always has the most complicated equipment and the shortest amount of time to set it up . . . I had intended to set it up ahead of time, but I was frantically preparing materials for the other observers and didn't get to the rendezvous location until the last minute.) Turns out it didn't matter, since the site I had assigned to myself (because it offered the opportunity for early setup) ended up being a miss. In fact, I was so pressed for time that when I had last-second problems with my scope I needed up observing this graze through the 8 x 50 finder! The family whose lawn I borrowed watched it through my spare 6" scope. Finally, observer Mel Bartels at site 16 was all set up with a 20" scope and a digital video camcorder, but his 40-minute battery pack gave out after 25 minutes, about three minutes before the graze. He ended up voice recording a complex series of 16 events, including several step-wise dimmings. His observations of dimmings are difficult to explain, and it would have been so-o-o-o-o nice to have them on video. (More about the dimmings when I submit my formal results.)

This chart does not include a single station about 100 miles to the east, as the profile would be slightly different for that observer (Lynn Carroll of Bend, Oregon, observing from Fort Rock). He was positioned at exactly -2.0 miles, in the middle of the "boring" zone (at my suggestion, to eliminate the possibility of a miss, I'm sorry to say), and observed a single 76-second disappearance, consistent with the predicted profile and the Cottage Grove results. (He too was planning to obtain video but the video camera he ordered arrived too late to replace it when it turned out to be defective.) I will submit Lynn's results as a separate "expedition" at the same time as the Cottage Grove results. ι

Annular Solar Eclipse Observed in Malaysia

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The Twenty First Ring of Fire Expeditions solar eclipse adventure of the Johnson Space Center Astronomical Society and IOTA to observe the annular eclipse of the sun was attempted from two sites in Malaysia. Though I knew the weather prospects were not too promising, our primary task was to try to ensure that observations would be made at both eclipse limits in our continuing project to determine corrects to the solar radius. Two members (Derald and Denise Nye) flew to Vanuatu (our original destination) to observe from the north limit of the eclipse path. But, because no one else was planning to cover the south limit at the time, I changed our plans a couple of months earlier to complete the project goal. Lynn Palmer and I flew United Airlines to Singapore on August 18. After 20 hours and 4 flights on United Airlines we arrived at 1:00 AM on August 20 to spend the next week at the Marriott Hotel in the middle of downtown Singapore. That afternoon I gave an invited lecture at the National Junior College on the eclipse process to about 40 students and teachers. The next morning we were ready to head for the eclipse site. We were picked up by our host, Lee Wee Kiong, who runs a small scientific store in town. I had been in constant communication with him and others in preparation for the eclipse. We then collected Richard Nugent who had flown in the previous afternoon, and traveled in two cars along with several other Singaporeans to a small 'resort' near the eastern side of Malaysia not far from the town of Kota Tinggi. We passed through customs unimpeded. The first thing we did was to conduct an impromptu site survey. I found that the sites previously surveyed by Lee on an earlier expedition using a Trimble GeoExplorer GPS receiver were too far north. The sites also had horizon problems due to the expected low elevation of the sun during the eclipse. Problems with my GPS receiver resulted in two of three battery modes failing to work. However, after hooking it to a cigarette lighter plug, positional readings and navigation features kicked in properly. It took about 4 hours before backup sites which were more satisfactory could be located.

On August 21 Friday evening we spent the night at the small Mutiara Motor Lodge in little cabins on the beach which had primitive toilets, mosquitoes, and not much else. You know things are a bit strange when the receipt from the motel states clearly that it used to be a welding and spraying shop! August is normally a dry month, but this year the opposite was the case. It had rained every day, in some cases, the entire day in the two

weeks preceding the eclipse. It was then eclipse day, August 22, where we awoke to a thunderstorm off to our west and cloudy skies everywhere else. We took off in a small convoy, having been joined by 5 observers from the Malaysian Nature Society overnight. About 6:15 AM we arrived at our two sites, located at what was believed to be 0.0 and 0.4 km south of the southern edge of the eclipse path. We had two separate video sites planned. Richard deployed his Meade 2045D telescope and video and I set up a Celestron 90 and video. As the sun rose, the horizon was partially blocked by foliage but gradually we could see the sun through minor breaks in the clouds. The maximum eclipse was predicted to occur at 8:22 AM with the sun 18.8 degrees above the east north east.

All equipment functioned normally, except that with the clouds, I decided to remove the ND5 filters protecting the TV camera. I had discovered this little trick in Gabon in March 1987 during the 1-second annular total eclipse and it worked quite well this time. As long as there was filtration by cloud, the TV could define the sun/moon easily. But as the time of central eclipse drew closer, the clouds were more in front of the sun than away from it. I expected to spot Baily's Beads, the elusive points of light poking out between lunar mountains as early as 10 minutes before central eclipse. But clouds were too thick. Then at 8:22 AM (central eclipse time) the clouds parted and the eclipse was observed for about a minute, the C90 tracking well on a Takahashi Space Boy mount. There were only two lunar mountain peaks that appeared to touch the edge of the solar disc. A near complete annulus was recorded. This was a signal that our site was located too far from the edge. Richard was clouded out at the critical time.

The air temperature had definitely dropped during the eclipse process and 40 minutes later, the sky really cleared up and the temperature climbed rapidly. Because of the cloud situation we did not record temperatures and did not attempt to spot Venus. Our sites were located along a busy two lane road and trucks, cars slowed to watch us observe the eclipse. Vibrations from passing vehicles did not affect our observations nor were we bothered by insects. Lee had brought a small folding table and a Celestron 5 to which I had attached a 35mm camera. The C5 was borrowed from a another email contact, K. K. Looi who had trucked it down to Singapore from Malaysia's capital (and home to the world's tallest building), Kuala Lumpur. Though the eclipse was somewhat disappointing, everyone posed for group photos anyway. At one point we had about 12 people at our site. I bought a Malaysian flag at a petrol station to fly at the site because 1) we couldn't find a Singaporean flag, 2) I had left the Texas flag at home, and 3) we were told it was politically incorrect to fly the Singaporean flag due to recent disputes over water between the two countries.

On Sunday, Lee took us on an impromptu tour of Singapore's Chinatown market which is a terrific experience if you want to see food of every description. This includes watching big frogs getting their heads bashed in as one of the features, and a sumo wrestler vendor with the words "Be Patient" tattooed on his back. After this we wandered through one of the big high tech shopping malls, drove up to Mt. Faber (where we encountered plenty of rain), and passed through Little India in a vain attempt to find a specific restaurant. We also picked up newspaper accounts of the eclipse in Chinese. Lee had already developed his photos and had scanned one of his eclipse video images as well as made an MPEG movie on a floppy disc. That evening Lynn and I set out on the modern Metro Rail system to find a 'wayang' – a Chinese opera that was to be staged in various locations throughout Singapore commemorating the start of the Festival of Hungry Ghosts. This was coincident with eclipse day. We had earlier purchased some fake money from the Bank of Hell, which is supposed to be burned during this festival. However, we could not find a place to burn it because of the strict laws in the country; e.g. throwing trash, buying chewing gum, spitting, and numerous other offenses such as attempting to view the moon through the objective end of the telescope immediately will get you a $500 fine. Being caught with drugs in Malaysia, by the way, results in the death penalty (no options).

The following day (Monday) it rained a lot but we managed to circulate around to various shopping malls and restaurants. Although I had been to Singapore in 1983 on the way to observe the total solar eclipse in Indonesia that June, I was amazed to see how the country had changed. Singapore is like one giant city of modern malls. Everywhere you go there is a building with many, many stores. There are sometimes two McDonalds restaurants in the same city block. Food is very cheap and one of the great joys of this remarkable city is the cleanliness and first rate look of buildings, streets and parks. There are so many varieties of restaurants it is unbelievable. Our meals seldom exceeded US$3.50 for both of us combined even though hotel prices are comparable with the US and rental cars are the most expensive of any country I have been to. For great vegetarian food Lynn and I recommend Komalas Villas. Singapore suffered a 20% devaluation recently in the local Singapore Dollar. Our trip across to Malaysia found the local currency (the Ringitt) had depreciated to 3.8 Ringitt to the US dollar—a 40% devaluation from earlier months. Because the price of gasoline is half that in Singapore, a law requires that any driver going from Singapore to Malaysia must have ¾ of a tank of gas already in his car in order for Singapore to collect as much gas tax as possible.

Monday night saw the rain stop and we were the only tourists to take the "Zoo Plus" bus out to the Night Safari – a first rate zoo park with wonderful night tours of nocturnal creatures. My Sony camcorder was put into action and took excellent video of fruit bats, hyenas, axis deer, tigers and many other kinds of creatures. We read that this particular brand of camcorder had been ordered modified by Sony because it was learned that the infrared 'night shot' feature could be used to see through women's clothing. I bought it because it can pick up stars to ^{4} magnitude; it has performed so well as a replacement for my 4-year old Sony Watchman VCR that I have used in the past for eclipse video that I now use it as a standard for all of my observational activity. I left the Watchman at the repair shop graveyard and have no plans to ever use it again. The active LCD matrix is the main reason for the new camcorder's effectiveness even during the daytime.

I scan the local new for information on eclipse goings on and this time there was a bizarre local eclipse experiment featuring eggs that were found to stand upright only during the eclipse. A photo made the paper, but there was no discussion on the scientific basis for the claim. I now will view eggs in a whole

new way the next time I see them at the supermarket.

Tuesday was our last full day in the country, and the weather cooperated to allow us to spend much of the day at the Singapore Zoo which is equivalent to the San Diego Zoo. It is a really excellent park with open settings for all kinds of animal habitats. We departed Wednesday with another 20 hour, 4 flight series through Tokyo, Los Angeles and Denver before getting back home at midnight. During that lengthy trip the only delay we ever encountered was when we got stuck driving home from Houston's Intercontinental airport at 11:30 PM where a major traffic accident caused a jam up on Interstate 45.

In spite of the lackluster science results, Richard, Lynn and I had a great time and enjoyed the region and its people. I would like to extend my appreciation to the following for their kind assistance during our expedition: Lee Wee Kiong, K. K. Look, Y K Chia.

Postscript: Upon returning to work on August 27, I found an email sent to me the day we had departed for Singapore recommending that our eclipse site be shifted 1 to 3 km to the south for best Baily's Beads viewing. As noted above, our sites were at 0.0 and 0.4 km south. ι

Peraga Occultation Observed in Pennsylvania and Massachusetts

David Dunham, Dunham@erols.com

1999 October 3

John Holtz: I observed both events from near Uniontown, Pennsylvania. No events with Peraga; I was probably too far south from the description.

David Dunham: Yes, you were. Guy Nason called my car phone, which made it easy to rendezvous. We decided that he would take the northernmost station, at I-79 exit 30 near Slippery Rock, where he successfully timed the Peraga occultation—duration 6.9 seconds. His son was with him and needed to get back to Toronto in the early afternoon, so they drove home from there, not able to try the ZC 888 graze with us.

Gary Seronik observed the occultation from Belmont, Massachusetts, I think a little south of our sites relative to the updated path. Misses were seen at probably close distances north of the path (Derald Nye, southeast. of Tucson, Arizona, and Bruce Thompson, Ithaca, New York) and south of it (Phil Dombrowski, Glastonbury, Connecticut). The updated prediction was quite accurate in both path and time.

John Holtz: I hope Dunham's expedition had time (only 2 hours available) to observe Peraga, break down, travel to the graze location, find suitable sites, set up again, and observe the graze.

David Dunham: Yes we did. It was certainly a scramble. The three of us from Maryland were in my van. For Peraga, first Wayne Warren up near our meeting place at I-79 exit 25 west of Mars. Then I took Alin Tolea to exit 26, and I drove to exit 28; each of us were within less than a mile of the actual exit so that we could more quickly travel south after the Peraga occultation, which we successfully observed. By the time we got Wayne packed up and all headed south from exit 25, it was just after 5:00 AM. We raced down I-79, driving in the high 70's most of the time; I think the distance from exit 25 to Waynesburg was about 70 miles, maybe a little more. Anyway, we arrived there with just 30 minutes to the start of the graze. We went right to the preplanned sites, although I was confused at the time because the street names were all different from those I got from Street Atlas USA; at least the streets seemed to be in the right places (confirmed so afterwards) so I figured we must be in the graze zone. I let Wayne out first at the northern site; he had time to set up his video. We set up Alin (who was using my C-5, while I used a C-8) and tried to set up video, there, but my camcorder's battery was too low, almost dead. So he observed visually. I went a few tenths of a mile south of him, now with very little time left. Once I got going, visual observation, I got at first the Moon's south cusp in view, thought about it for a couple of seconds and realized it was wrong, then moved to the n. cusp, now well within the observing period. I saw the star, and 2 seconds later it Disappeared! Then it was out for quite awhile, and I only had 1 Reappearance. Of course, I might have missed something before I observed the north cusp. Alin timed 3 Disappearances and 3 Reappearances. Wayne had several events and will need to review his tape to see how many. But I think even he had a fairly long event at the center, probably indicating a north shift.

John Holtz: Since I was the only person in my expedition, I took the safe location of being somewhat far into the shadow. I has 3 quick events at first contact but only the reappearance at last contact.

David Dunham: It will be interesting to see where you were relative to our stations (distance from the limit), whether you were north or south of my site. ι

Video Set Up Tips

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Here are a couple of tidbits on my Topica video setup:

1. Adirondack Video Astronomy (http://ourworld.CompuServe.com/homepages/AVAastro/) sells a very well made adapter ("C" thread to 1.25", $35 ($3 shipping and handling)) that fits like a glove to the Topica camera. I have finally been able to use prime focus on my 8" F6 (fl 1220 mm) with the mirror at its visual focus position.

2. This is a trouble shooting tip that may help someone starting out. I was showing my setup to our club members and could not get a picture. I fell flat on my face with this outing. At home I set up again and notice that the monitor raster was about half size and very unstable. I assumed the worst (we all know what assuming does), that the monitor was bad. I plugged it into the ac adapter and everything worked great. The bottom line was that my battery had enough charge to turn everything on and give a visual impression that all was well, but not enough juice to produce an image. After a battery charging all works fine. I would recommend using a marine battery instead of a car unit as they are designed to deliver amps to a lower charge level of the battery. ι

The Current Value of Lunar Occultation Observations

Watts' lunar profile data are currently still being used for lunar occultation analyses, and they have large enough errors so that occultations timed carefully visually till have value, even with the improved stellar data from Hipparcos. An analysis of the Clementine lunar orbiter laser altimeter data should be helpful in refining the Watts' data by removing systematic errors. But the Clementine altimeter data are too sparse to replace Watts' data. Nevertheless, when all the analyses are complete, visual timings of total occultations may become less useful than photoelectric and video timings. Video timing accuracies are smaller than the Clementine aser altimeter errors, and it is for that reason that I am strongly encouraging them; with easy-to-use sensitive video cameras now available for less than $90, many more observers can time occultations to an accuracy of 0.03 s. The Clementine laser did not probe the lunar polar regions, so visual grazing occultation observations, inherently more accurate in any case due to the grazing geometry (their accuracy depends more on a good knowledge of the geographical position of the observer than on the event timings), will continue to be valuable in the foreseeable future.

Dr. Mitsuru Sôma, Japanese National Observatory, further explained the current value of lunar occultation observations in a message that he wrote on 1977 November 3:

> Concerning the value of total occultation observations, I agree with David Dunham that they are still useful in refining the limb corrections. In addition to that, I think occultations can be used to analyze the errors of the Hipparcos proper motion system. The Hipparcos team claims that the Hipparcos reference frame is linked to the ICRS (International Celestial Reference System, the VLBI reference frame based on the extragalactic radio sources) with the accuracy of 0.25 mas/year. But the direct comparison of the proper motions between Hipparcos and FK5 gave inconsistent results with the precession error of -3 mas/year of the FK5, which had been independently obtained from VLBI, Lunar laser ranging, and proper motion analyses (Based on the preliminary results of the differences of Hipparcos - FK5 by F. Mignard of CERGA in France, I pointed out this fact in a letter addressed to him, and he admitted it at the IAU General Assembly held in Kyoto this August). Now that the lunar positions in the latest JPL planetary and lunar ephemeris DE405/LE405 have the mas level accuracy with respect to the ICRS, I think the problem can be resolved by analyzing lunar occultations using the DE405/LE405 ephemeris and the Hipparcos catalog. [Since this was written, Dr. Soma's analyses of Aldebaran grazes observed in 1979-1980, compared with those observed a Saros cycle later in 1997-1998 in the same part of the lunar profile, have confirmed that the FK5 proper motion of this star is more accurate than the Hipparcos ICRS proper motion.]

Some publications about lunar occultations (by Dr. Soma, 1998 August)

Concerning Warren's question about occultation papers, recent papers on occultations in professional journals deal more with physical quality of stars, such as the detection of binary stars (e.g. Astronomy and Astrophysics [A&A] Vol. 322, p.202, 1997), the angular sizes and circumstellar dust shell of giant stars (e.g. Monthly Notices of the Royal Astronomical Society, Vol. 287, p.681, 1997; A&A Vol. 319, p.260, 1997), using professional lunar occultation observations, and it's true that there are very few papers dealing with amateur occultation observations recently, but it is because there are very few professional astronomers who are analyzing occultations made by amateurs, and it does not mean that doing occultation observations is a waste of time. [Note that the International Lunar Occultation Centre is collecting all of the lunar occultation observations, total and grazing, made worldwide and is putting them into a standard computer-readable form. This database has been supplied to Dr. Soma and to other occultation investigators around the world. Dr. Soma has delayed his comprehensive analysis (and therefore publication) of lunar occultation observations until the Hipparcos stellar data could be incorporated into the star catalogs that he uses for the occultation reductions. That catalog was completed early in 1999, so that the analyses are now in progress, and publication of them will follow].

Until a few decades ago, lunar occultation observations were used to investigate the lunar motion, the Earth's rotation (difference between Ephemeris Time and Universal Time), and positions of isolated islands, but now they can be obtained much more precisely from modern technique (lunar laser ranging, satellite laser ranging, VLBI, atomic clocks, etc.). I analyzed lunar occultations to mainly investigate the acceleration term in the lunar longitude and errors in the stars' reference system FK5, and published the results in 1985 (Celestial Mechanics Vol. 35, p.45). After that, I wanted to reanalyze them using more modern astrometric catalogs to derive lunar limb profiles and errors of star catalogs. The new astrometric catalog PPM was released in 1989 (north) and 1992 (south), but then the Hipparcos astrometric satellite was in orbit and we knew that the Hipparcos catalog, which is much more precise and almost free from systematic errors, would soon become available. So we waited for it, and finally we got the Hipparcos catalog last year. I analyzed the past grazes using it to derive the lunar limb profiles, and they are being used for this year's graze predictions. David Dunham is planning to analyze solar eclipses using the limb data derived from occultations to detect small variations of the solar diameter, and I am planning to reanalyze lunar occultations in order to derive errors in the Hipparcos proper motion system (see the article of David Dunham in the 1997 December issue of

Occultation Newsletter for the value of lunar occultations; a possible error in the Hipparcos proper motion system was discussed there). In order to do the analyses correctly and systematically (the present version of the zodiacal catalog XZ94E or XZ94F has many mis-identifications and many positional errors especially for double stars), I am now compiling the new zodiacal catalog using the Hipparcos catalog and the ACT catalog in the Hipparcos system. After completing it, I will analyze lunar occultations using the new catalog and will publish the results in a professional journal. As for the Clementine altimeter data, the data points are so sparse that it is very hard to get limb profiles from them, but there is still hope that we can compare them with Watts and occultation data at some large basins located on the lunar limb. I will also analyze them soon.

Dr. Soma writing about visual timing accuracies:

"Warren Offutt wrote to Bob Sandy: 'I applaud anyone who can get 0.2 or 0.3 seconds precision from a commercial battery powered tape recorder over a span a few or several minutes when both temperature and battery condition is subject to real world circumstances.'"

It's true that observers are often overly optimistic about their achieved precision, but I think achieving the 0.2 or 0.3 second precision is not so difficult for a careful observer on the condition that a time signal is recorded continuously during the events, even if the tape speeds vary machine to machine or with battery condition and temperature. Three occultation observers at Shimosato station of Japanese Hydrographic Department made experiments in around 1980 imitating an occultation observation of a magnitude 7 star at a dark limb of a moon with the age of 8 or 9 through a 30 cm reflector, and got the following results:

Personal equations measured by an oscillograph

		Voice recorded			Key-tapping		
	Phen	n	m/sec	s/sec	Phen	n	m/sec	s/sec
Observer A	D	20	0.36	0.03	D	18	0.32	0.03
	R	18	0.36	0.04	R	19	0.32	0.05
Observer B	D	18	0.34	0.05	D	18	0.33	0.04
	R	20	0.31	0.03	R	18	0.30	0.03
Observer C	D	19	0.33	0.04	D	20	0.30	0.04
	R	19	0.32	0.05	R	20	0.31	0.04

where n is the number of experiments, m is the mean value, and s is the standard deviation. They also got the times by hearing the recorded tapes with an accuracy of 0.1 sec or 0.05 sec, and the differences (the time they got by hearing the tape minus the time from the oscillograph) are as follows:

	Phen	n	m/sec	s/sec
Observer A	D	20	-0.01	0.05
	R	20	-0.02	0.06
Observer B	D	20	+0.01	0.07
	R	20	+0.02	0.05
Observer C	D	20	+0.01	0.05
	R	20	-0.02	0.04

Therefore if one can estimate his personal equation appropriately, I do not think achieving the 0.2 or 0.3 second precision is very difficult. ι

Radios--a Better Regulus Timing Method for Those Without WWV?

David Dunham, Dunham@erols.com

AM or FM radio stations might provide a better way for many observers, including the large majority of amateur astronomers without WWV or CHU receivers as well as the general public, to precisely time Friday night's Regulus occultation. But some help from a selected radio station in your area would be needed for this to work; you might contact some in your area to see if they might be willing to help with this. Use of a portable or car radio for a time base would be much easier for everyone in your area to make the observations if this can be arranged.

The timing intermediary we have been encouraging, scene changes in local TV broadcasts, is passive (that is, needs no help from the station), but is a little cumbersome, especially considering that our timing equipment actually is designed to trigger from an audio signal, the 1 kHz minute tones of the National Bureau of Standard's short-wave station WWV in Ft. Collins, CO. (2.5, 5, 10, and 15 MHz). I had an idea where radio stations might be used instead, which would simplify the procedures for observers as well as streamline our analysis. If several radio stations around the country, preferably AM for better coverage, could broadcast a short 1000-Hertz tone (for just half a second, about five times at 5-minute intervals), it could be used by the general public for timing their camcorder records without the need to use TV stations. Perhaps simplest would be to rebroadcast the WWV minute tone at the beginning of selected minutes, but a 1000-Hertz tone could be broadcast at any time (best would be to use 2 seconds; in the first second, just say "time tone" or "time 11:21", the next half-second silent, then the last half-second has the tone) and members of IOTA could calibrate them. If you contact a local radio station, stress that any help would be greatly appreciated and that IOTA is a federally tax-exempt scientific research and educational organization according to sections 501(c)(3) and 509(a)(2) of the U.S. Tax Code; thus, this should qualify as a valid public service. IOTA is incorporated in the State of Texas and its federal tax number is 36-3254326.

Point out that for most parts of the U.S.A., this is the last naked-eye occultation of a star until 2005. Note that a press release and detailed information about the occultation is on IOTA's Web site at http://www.lunar-occultations.com/iota; late last week, Reuters distributed a press release about it based on my information. WCKG (FM 105.9) in Chicago plans to cover the occultation in their news. I have asked them if they might be able broadcast a 1000-Hertz tone, and they thought it would be possible, but haven't yet gotten back to me on implementing it. ABC news radio also interviewed me for the occultation, and I have submitted a request to their management to see if some of their stations might be able to help with this. If I get a response, I'll let you know. ι

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 Service (IOTA/ES)

Observers from Europe and the British Isles should join IOTA/ES, sending a Eurocheck for DM 40,00 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. 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 the 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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International Occultation Timing Association, Inc. (IOTA)

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.

IOTA's Telephone Network

The Occultation Information Line at 301-474-4945 is maintained by David and Joan Dunham. Messages may also be left at that number. When updates become available for asteroidal occultations in the central USA, the information can also be obtained from either 708-259-2376 (Chicago, IL).