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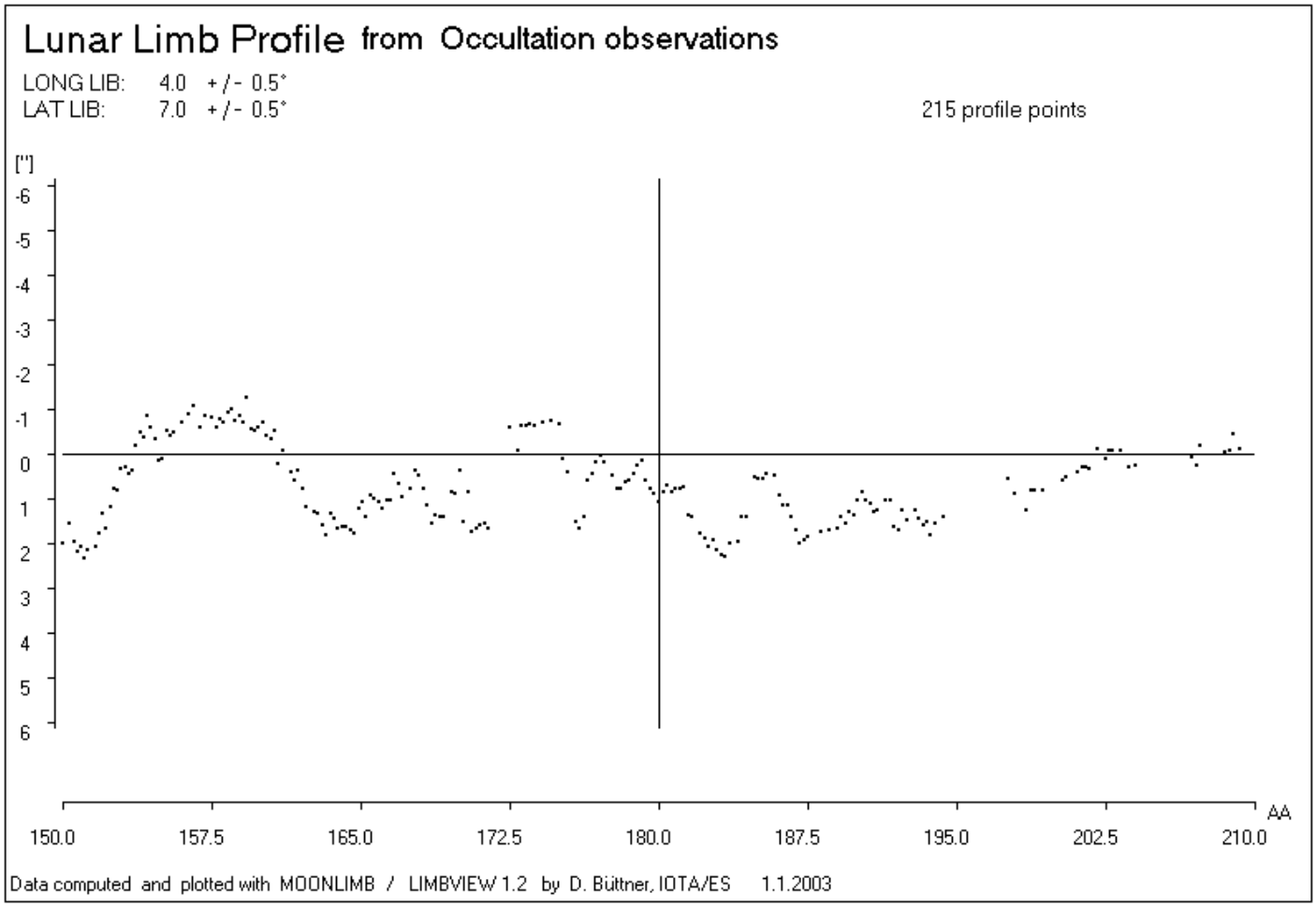

Sample MOONLIMB Profile Plot

In this Issue

ON THE COVER:

The picture is a sample of a MOONLIMB profile plot. For more details on MOONLIMB visit

www.iota-es.de/moon.html

Graphic courtesy of Dietmar Buettner, IOTA/ES

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The next issue, Volume 10, Number 3 will be published in January. Please send submissions for that issue to Editor_ON@straight2you.net no later than 15 January 2004.

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Local Circumstances for Appulses of Solar System Objects with Stars predictions US$1.00
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Papers explaining the use of the above predictions US$2.50
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All other areas-Jan Manek; (see address at left)

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A Brief History Of Occultation And Eclipse Observations

Hal Povenmire

Man has always been fascinated with the sky. When two celestial objects appear to be near in the sky, it is especially attractive. This is especially true when one object covers another. Many of the ancient civilizations would record these events in their literature. Some of these recorded events have been reconstructed through the use of the computer. Astronomers are still trying to determine if the Star of Bethlehem had an astronomical origin.

In early China, about 2159 – 1948 B. C. there is a legend that two of the Emperors' court astronomers, Hsi and Ho were drunk and failed to predict a solar eclipse. For this mistake, they were executed. This taught them a lesson and they never made that mistake again.

On February 14, 69 B. C. there was an observed occultation of Mars by the Moon.

Of particular interest was the March 20, 6 B. C. occultation of Jupiter by the Moon. Another event was the occultation of Jupiter by Venus on June 17, 2 B. C. It is not known whether anyone observed and recorded this event. This event falls near the Christmas Star phenomena and might have been associated with it.

Many Biblical events have been pinpointed by their reference to eclipses and other celestial events. King Herod died very shortly after a lunar eclipse. There was a partial lunar eclipse on March 12-13, 4 B. C. A more likely candidate was a total lunar eclipse which could have been seen from Jerusalem. This occurred on January 9 –10, 1 B. C.

On February 15, 345 A. D. the Moon occulted the Pleiades. This is the first recorded stellar occultation.

On July 30, 358 A. D. Venus occults Mars as observed from China. On January 14, 375 A. D. Venus occults Mars again.

On April 14, 573 A.D. Mars occults Eta Cancri, 36 days later, May 20, Venus also occults Eta Cancri.

One of the earliest known observations was a naked eye occultation of Aldebaran on March 4, 640 A. D. observed in Japan. This established that the Moon was closer to the Earth than a star.

On November 23, 755 A. D. Jupiter Reappeared from behind the Moon during a total lunar eclipse.

On September 12, 1170 A. D. Mars transited Jupiter under favorable conditions as seen from England to China.

On February 5, 1570 there was an occultation of Mars by Venus. There is no record that this event was observed.

On November 30, 1609, Galileo makes the first telescopic observation in history.

On January 4, 1613, Jupiter occulted Neptune. Galileo did not observe this event but did make a notation near this time of a field star near Jupiter which seemed to have moved. This was the first known observation of Neptune some two hundred years before its official discovery.

On May 28, 1737, Venus occulted Mercury. This event was observed by John Bevis at the Royal Greenwich Observatory.

July 31, 1798, a near grazing occultation of Mars by the Moon is observed by J. F. Schroter from Bremen, Germany.

On January 3, 1818, Venus transited Jupiter.

One of the first grazes where some data was obtained was a chance observation of lunar grazing occultation by J. M. Gilliss from near Santiago, Chile. He was timing total occultations for the purpose of improving the measurement of longitude. The star was Z.C. 946 or Eta

Geminorum (SAO 078135). The date was January 6, 1852. Gilliss observed the star to be occulted near the southern limb. About 2.5 minutes later, the star reappeared and then dissappeared 36.9 seconds later. About 120 years later this observation was reduced by Ron Ablieah at the U. S. Naval Observatory.

On June 30, 1857, Saturn occulted mag. +3.5 Delta Geminorum. This was only 9° from the Sun and therefore invisible.

The first grazing occultation reported was 27 Tauri on December 8, 1859 from the Royal Greenwich Observatory.

On April 6, 1933, a grazing occultation of Regulus was predicted to cross England. The northern limit was computed by J. T. Foxell of the British Astronomical Association. Twelve members of the BAA observing team met at the White Horse Inn in Bridge and traveled to near Barham and Elhanm along the Canterbury-Dover Rd. The observers were equiped with a telescope and stopwatch to record the duration of the occultation. It was clouded out at all stations! One observation was made by J. D. McNeile from a nearby area.

On May 29, 1952, asteroid (3) Juno occulted a star under favorable conditions. On April 6, 1954, asteroid (2) Pallas occulted star BD +5 2171 over central United States.

During the early 1950's, both United States and Russia were developing Intercontinental ballistic missiles (ICBM"s). One of the serious problems was that the distance from the United States to Russia was not accurately known. In a well publicized experiment, this distance was attempted to be measured using the total solar eclipse of June 30, 1954. The goal was to photograph and time the second and third contacts as observed along the eclipse path. This path ran from Minnesota to central Europe. One station was in the United States, another in Greenland and two others in Europe. Three out of four of the stations were clouded and the expedition was a fiasco. This effort had serious flaws because the limb or edge of the Sun is not sharp which led to an inherent error even if the skies had been clear.

Shortly after, John A. O'Keefe of the U.S. Army Map Service used a different technique. By using high speed photoelectric photometers and twelve inch reflecting telescopes set apart by a long baseline, occultations of stars could be very accurately timed. By comparing the predicted time with the observed time, the distance could be accurately measured. It was found that by observing bright stars during the waxing gibbous phase that the observation could be made at high elevation at both stations. The position angle of the occultation of the Moon had to be the same to correct for lunar limb differences. When the distance was measured from Hawaii to Nevada, an error of approximately 7 miles was found. It quickly became evident that the marginal zone of the Moon had to be measured so that improved accuracy of occultations could be obtained.

Chester Watts of the U.S. Naval Observatory had realized the need for the irregular lunar limb to be measured. Some pictures of the Moon's edge of limb were taken as early as 1940 but the project did not receive the funding which was necessary. The need to measure the distance between continents made this program a crash effort. The data was published in 1963 and greatly increased the value of each accurately timed occultation. This atlas was comprised of 1800 charts giving the elevation of the lunar features around the limb of the Moon.

On July 7, 1959, Venus occulted Spica during daylight hours over the Canary Islands.

On November 20, 1959, Jean Meeus computed and observed a graze of Lambda Geminorum from Kessel – Io, Belgium. The predicted limit went only a few hundred yards from his observatory. The occultation occurred on the bright limb. While the data was not of high quality as regarded by today's standards, it proved that the formulas existed to compute these observations. This was the first grazing occultation predicted and observed.

The next major step was taken by a graduate student, David Dunham of Berkeley, California. He wrote a computer program to predict the limit line for grazing occultations.
There were still many problems connected with this program and many more failure expeditions occurred than successful ones for many years. The northern limit grazes were particularly difficult to predict.

The first success of this program came on September 18, 1962 when Leonard Kalish observed a graze of 5 Tauri. This graze occurred on the bright limb and would not be considered good quality today but did show that the graze program worked. This observation occurred near Castaic Junction, California.

On March 31, 1963, David Dunham observed his first grazing occultation. On October 8, 1963, Hal Povenmire observed his first grazing occultation. This started a new chapter in lunar occultation work.

On October 8, 1963, there was a graze of Zeta Tauri which went near Perkins Observatory just south of Delaware, Ohio. I observed from the Observatory but the occultation shadow passed several hundred yards south of the observatory and I had a Miss. The results of this graze were published in the December 1963 issue of Sky and Telescope.

On August 13, 1964, Robert Sandy of Missouri attempted his first graze. Since that time, he has observed about 120 grazes, over 2200 total occultations and has drawn 230 pictorial reductions of grazes.

On April 28, 1965 Pluto was predicted to occult a +15 magnitude star over southwestern United States. All of the observing stations had a Miss which indicated that the diameter of Pluto was much smaller than predicted.

On June 27, 1965 a partial occultation of Jupiter was predicted over California during daylight hours. This was the first time a partial occultation of a planet was predicted and observed. While it may not have had much scientific value, it proved that these events could be predicted and observed.

In 1966, an advanced amateur astronomer, Robert Chew built a 12.5 inch reflector and began to observe total occultations. He set the incredible record of 432 observations in the year 1966. Predictions were not available then and he plotted out the path of the Moon on a star chart and estimated when they would occult. By chance, he observed several unpredicted grazing occultations.

In December 1966, I was a member of the Sacramento Valley Astronomical Society. A member, Bill Fisher, was an active graze observer. On December 18, 1966, I observed a graze with him. My recording equipment failed but I was able to successfully observe this event. Two nights later, there was another graze. I spent those two days learning how to use the predictions. We observed this graze and while the data was still marginal, it was successful. The next months were spent chasing maraginal grazes with little success.

On September 30, 1967, a favorable graze of ZC 1436 was predicted to go over central California. The San Jose Astronomical Society mounted a large expedition to observe it near Mendota, California. A cable was used and this northern limit graze was successfully observed. There was a large south shift and most of the northern stations had a Miss. A secondary discovery was made that this star was a previously undiscovered binary. In spite of all the problems, this graze was the tenth most successful graze ever observed and this record held for three weeks until the Santa Barbara group pushed this record into 11th place.

On November 12, 1967, a favorable grazing occultation of Saturn was widely observed near Kansas City.

The first spectacular graze observed was Antares on January 25, 1968 from near Fairmont, West Virginia. It was on that graze I met David Dunham. The dimming events of the red super giant star were first observed on this graze. It was not surprising that dimming events were observed but no one expected them to last up to ten seconds.

On April 7, 1968, Neptune occulted a magnitude +7.8 star BD-17 4388 from Japan and Australia. This allowed the diameter of Neptune to be determined by occultation.

On July 29, 1968 a graze of SAO 138613 was predicted over southwestern Ohio. A large team assembled outside of Cincinnati to observe it. All the stations, even the ones which were quite deep into the Moon had a clean Miss. This event was forgotten but not for too long. On November 16, 1968, this same star had a southern limit graze over southern Florida. Several observers drove all night through the rain and observed it in cleared skies just before dawn. Shortly after the star was occulted, a faint companion was observed. This was the probable explanation as to why the star position was so bad.

The Canaveral Area Graze Observers began observations in the summer of 1968. Since that time, they have observed over 400 grazes.

After the launch of Apollo 11 on July 16, 1969, this observer went to the U.S. Naval Observatory to work for a month in the Nautical Almanac Office. During the first week there, while reducing the northern limit grazes, an error was found in the Watts charts which helped correct some of the problems with the northern limit grazes. Shortly thereafter, a spectacular Pleiades passage was predicted for central United States. I drove to Kansas City and joined another graze team. This led to the discovery of the westernmost star in the Pleiades, Taygeta to be a binary. Approximately 99 times were obtained by this team.

On April 16, 1970 a grazing occultation of Venus was observed from near Yonthe, Mexico. Observers included the Astronomical Society of Mexico and many observers from Florida. Cloudy skies destroyed the beauty of this event, but some data was obtained.

On December 4, 1970, a favorable grazing occultation of Iota Capricorni occurred over central Florida. A major expedition from near the Cape Canaveral area spent months preparing for it. The graze predictions were very accurate and a total of 235 timings were made making this the most successful grazing occultation observed up to this time.

On May 14, 1971 Jupiter occulted the wide binary star, Beta Scorpi over Florida. The companion star was occulted by the Jupiter moon, Io, over Eleuthera in the Bahamas.

On May 16, 1971, a favorable grazing occultation of Mars was observed over Mexico and Eleuthera in the Bahamas. About 40 stations from Florida observed this event. It was also observed from Mexico.

On June 7, 1972 Jupiter's moon Ganymede occulted magnitude +8 star SAO 186800.

On February 10, 1973, a graze of Merope was observed from Texas to the Florida Keys. A great number of timings were obtained from two teams.

On October 12, 1974, a graze of SAO 118338 was predicted near Hollywood, Florida. A little earlier, the asteroid (129) Antigone was predicted to occult the star ZC 1281 over the same region. A team went down early and set up to observe the asteroid event. A short occultation of .7 second was observed. This was probably the first observed occultation of a star by a minor satellite although it was not recognized at the time.

On January 24, 1975, an occultation of Kappa Geminorium by asteroid (433) Eros occurred over New England. The final astrometry and predictions were not completed until hours before the event. It was successfully observed.

In 1975, the International Occultation Timing Association was founded in Texas. It has about 300 members. The Occultation Newsletter is their primary means of communication.

In late 1975, the first edition of the Graze Observes Handbook was published.

On April 8, 1976, Mars occults the bright star, Epsilon Geminorum over the United States.

On August 29, 1976, a favorable grazing occultation of Spica occurred over central Florida. An eight mile long observing team near Wabasso Beach, Florida obtained over 100 times and clearly confirmed the duplicity of this star.

On March 10, 1977, asteroid 6 Hebe occulted magnitude +3.6 Gamma Ceti over Mexico City. An interesting secondary occultation occurred over Victoria, Texas. This may have been due to a minor satellite of Hebe.

On March 10, 1977, the rings of Uranus were discovered by the occultation method from the Kuiper Airborne Observatory.

On March 14, 1977 a graze of Rho Sagt occurred over South Daytona Beach, Florida. During this graze Rho Sagt was discovered to be a binary.

On September 22, 1978 a spectacular grazing occultation of Aldebaran occurred over central Florida. About 90 times were obtained from near Tampa, Florida. Very interesting dimming phenomena was observed which were probably caused by the large diameter of the star.

On December 26, 1978, the most spectacular grazing occultation of Venus ever predicted occurred over central and southern United States. This was observed near Dothan, Alabama.

In 1979, the second edition of the Graze Observers Handbook was published.

On June 18, 1980, a very favorable grazing occultation of Regulus occurred over the Everglades in southern Florida. Over 100 timings were obtained on this event.

On November 17, 1981 Venus occulted Nunki-Sigma Sagt, an attempt was made to record the central flash. It was not observed.

On May 29, 1983, the asteroid 2 Pallas occulted the star 1 Vulpeculae across the southern United States. Several hundred timings were obtained and an accurate diameter was obtained.

On September 14, 1983, the asteroid 51 Nemausa occulted the bright star 14 Piscium over the southeastern United States.

On May 11, 1984, a transit of Earth could have been observed from Mars. Six hours later, the Moon would have transited as observed from Syrtis Major.

On November 14, 1984, Asteroid 1 Ceres occulted the star, BD +8 471 over Florida and the Keys. This was observed photoelectrically over No Name Key and Melbourne, Florida.

On July 3, 1989, Saturn occulted magnitude +5.8 28 Sagt over the United States. This widely observed occultation was the most important Saturn even other than the Voyagers and Pioneer 11 Missions.

On August 18, 1990, a spectacular grazing occultation of Jupiter and its moons was observed from El Indio and Crystal City, Texas.

On Jaunuary 4, 1991, the most favorable stellar occultation of a star by asteroid 4 Vesta occurred from South Carolina to eastern Canada. In spite of a mostly cloudy occultation path, about 15 chords were observed allowing a fairly good diameter to be measured.

On September 16, 1991 a routine graze of ZC 2524 near Jacksonville, Florida revealed that it had a magnitude +8.5 companion. This was quickly confirmed by the Center for High Angular Resolution Astronomy (CHARA) at Georgia State University in Atlanta using speckel interferometry.

On November 7, 1993, Asteroid-Comet (2060) Chiron occulted a magnitude 14.3 star.

On November 29, 1993, the first double graze was observed during a total lunar eclipse near Pope, Mississippi.

In early 1999, the third edition of the Graze Observers Handbook was published in Italian.

On August 12, 1999, a total solar eclipse path ran from England to Turkey. A northern limb timing was made from Germany and a southern limit timing from Turkey allowing the diameter of the Sun to be accurately computed.

On February 16, 2001 asteroid 83 Beatrix occulted a magnitude +9.0 star over central Florida. Three chords were observed and the diameter of the asteroid was improved.

On September 8, 2001 Titania, a moon of Uranus occulted Zodiacal Catalog 3167 over South America.

On January 14, 2002, a favorable asteroidal occultation of (516) Amherstia was observed across Ireland and north Florida.

On May 14, 2002, during a gathering of the planets, the waxing crescent Moon occulted Saturn, Mars and Venus in less than 16 hours.

On July 1, 2002, Pluto occulted an 11.7 magnitude star.

On July 20, 2002, Pluto occulted a much brighter star.

On January 3-4, 2003 Saturn occulted the Crab Nebula, M1.

On July 17, 2003, a very favorable grazing occultation of Mars and the Moon occurred and was well recorded in Florida.

On September 20, 2003, a spectacular graze of Z.C. 1088, 47 Gem, was observed over Homestead, Florida. This observation confirmed the star as a binary as suspected from another graze of Z.C. 1088 on April 13, 1970.

On March 28, 2004, there will be a triple transit of Jupiter.

On August 17, 2017, there will be a two minute Total Solar Eclipse over South Carolina.

On April 8, 2024, a four minute Total Solar Eclipse over Illinois.

In October 2044, Venus occults Regulus.

On August 12, 2045, a six minute Total Solar Eclipse from California to Florida.

On November 22, 2065 Venus will occult Jupiter.

On November 10, 2084, Earth transits Mars.

On September 14, 2123 Venus transits Jupiter.

On December 2, 2223 Mars transits Jupiter.

In 620 million years, there will no longer be any Total Solar Eclipses on the Earth. The Moon will have moved too far away.

Bibliography

1. Povenmire, H. (1975) Graze Observers Handbook Vantage Press, New York.

2. Povenmire, H. (1979) Graze Observers Handbook 2nd Ed. JSB Enterprises Indian Harbour Beach, Florida.

3. Robertson, James (1940) Catalog of 3539 Zodiacal Stars for Equinox 1950 Nautical Almanac Office USNO Vol. 10 Part 2. Washington D.C. 2nd Ed. (1963).

4. Watts, Chester B. (1963) The Marginal Zone of the Moon American Ephemeris and Nautical Almanac Astronomical Papers No. 17 U.S. Naval Observatory Washington D.C.

5. Bell, Trudy, E. (1971) One Bright Star Within The NetherTip: The History of the Lunar Occultation Observations University of California-Santa Cruz Senior Thesis (Unpublished).

6. Wilds, Richard (1992) The Marginal Zone of the Moon International Occultation Timing Association.

7. Sato, Isao (1986) Catalog of 3539 Zodiacal Stars of Equinox J2000.0 Lunar Occultation Observers Group (Revised Zodiacal Catalog – Japan).

8. Sinnott, Roger (1992) A Medieval Mutual Planetary Occultation Sky and Telescope August pp, 207-208.

9. Scientific American (1980) Galileo Observes Neptune Dec. p. 74.

10. Sinnott, Roger (1986) John Bevis and a Rare Occultation (Venus occults Mercury) Sky and Telescope Sept. p. 220.

11. Sinnott, Roger (1986) Computing the Star of Bethlehem (Venus and Jupiter) Sky and Telescope Dec. p. 632.

12. DeYoung, J.A. and Hilton (1987) Letters – Star of Bethlehem Sky and Telescope April p. 357.

13. Albers, Steven (1979) Mutual Occultations of Planets 1557 – 2230 Sky and Telescope March p. 220-223.

14. Meeus, Jean (1970) Mutual Planetary Occultations British Astronomical Association Vol. 80 p. 282.

15. O'Leary, Brian (1974) Occultations of Stars by Planetary Satellites and Asteroids Sky and Telescope August 1974 pp. 91-93.

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Another Plea for Submissions
John A. Graves, Editor

I am as committed as ever to returning O.N. to a regular publication schedule and this is an achievable goal, but lately submissions have nearly stopped.

I realize that some of you have been discouraged from submitting articles due to the somewhat erratic publication schedule of the *Occultation Newsletter* for a number of years, but real progress toward this goal has been made. For example, during the three year period between November 1998 when Volume 7, No. 3 was published and October 2001, only four issues were published. In the two years and one month following, no less than seven issues have been published.

With your help, I can have the *Occultation Newsletter* back on a quarterly schedule, and more importantly, an *on-time* schedule no later than summer 2004. With your submissions of articles and/or images (or graphics) for the cover, the July 2004 issue will actually be published in July 2004. Imagine that!

Please consider writing up an article for publication, or submitting a photograph/graphic for the cover. While electronic formats are preferred for either type of submission, I will take material in any form and I'll be most grateful to receive it and I'm sure your fellow IOTA members will be most happy to read it.

Please send submissions to:

Via email:

Editor_ON@straight2you.net

Via postal mail:

John A. Graves,
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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 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 708-259-2376 (Chicago, IL).