Christ in America
As Witnessed at the Newark Earthworks in Ohio

The 5-Year Prophecy of
Samuel, the Lamanite

The Sign For The Birth Of Christ

The Day when Christ Appeared
At the Temple in the Land of Bountiful

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Artistic Rendition of Newark Earthworks

Photo Taken From Inside The Visitor Center

Executive Summary

The Newark Earthworks are the largest set of geometric earthen enclosures in the world. Because of their sheer size the descendants of Europeans over two centuries have not been able to destroy these ancient artifacts. Certainly over the years farms, railroads, militia encampments, golf courses and houses have had their impact. Nevertheless, main features of the monuments remain as a witness to a people who lived there more than 2,000 years ago.

Astronomers and archaeologists are in agreement that the design and the orientation of the 200-acre Octagon / Great Circle in Newark, Ohio precisely differentiate the effects that a slight tilt of the moon's axis has on its movements around the earth. The effects of this tilt cause the positions of the rising moon to vary over a cycle of 18.6 years. Two thousand years ago the maximum northern position of the moon at its rising was an important event for the people who built and maintained these monumental structures. With the use of modern computers and with Newton's laws of motion it is possible to define within a tolerance of a few minutes the movements of the moon in the sky over Newark, Ohio.

The Book of Mormon is an ancient record of a people who lived in America. These people kept the Law of Moses with its required feasts. The biblical feasts are directly tied to a calendar which counts the days of full lunar months. As needed the calendar adds an extra month to the year to keep the reckoning of time within the cycles of the four seasons.

The Book of Mormon declares that after His ascension Jesus Christ appeared in America. This study confirms that in the evening of 3 October 33 AD there was for the ancient people at the Newark Earthworks an important lunar event – the maximum northern moonrise alignment along the central line between the Great Circle and the Octagon. At that same time the last day of the Feast of Tabernacles began and on the following morning the Children of Israel according to the Law of Moses presented themselves before the Lord at the Temple. On that day there was a great multitude at the Temple in the Land of Bountiful. The Book of Mormon testifies that the Lord Jesus Christ descended and appeared to the believers at the Temple in the Land of Bountiful.

Introduction

Forty years ago I began a lifelong interest in how the ancient world kept time. My first efforts resulted in 1980 with the publication of *April Sixth* by Deseret Book. This book examined how the chronological accounts of the New Testament for the death of Christ are in harmony with the chronology which the Book of Mormon gives for the birth and death of Christ. In writing this book I became familiar with the calendars of the Jews and then with the intense interest which ancient Americans had in keeping of time. Every historic account has a time line and every time line fixes

the interrelation of events. Once a historical account is fixed in time it has a context which is the subject of rigorous numerical analysis. My approach today, as it was when I wrote my first book, is to concentrate on the counting of days which are connected to the birth of Christ and to the visit of Christ at the Temple in the Land of Bountiful. I am looking for the numerical harmony of events which ancient people witnessed in America. The events in the time line of more than 2,000 years ago rely on 7 primary sources: (1) the movements of the earth around its axis; (2) the movements of the earth around the sun; (3) the movements of the moon around the earth; (4) the physical presence of the world's largest geometric earthen complex in Newark, Ohio; (5) the 5-year prophecy for the coming of Christ by Samuel, the Lamanite; (6) the eyewitness testimony of the fulfilment of that prophecy by Nephi, the Son of Nephi; and (7) the details which Mormon wrote concerning the day when the resurrected Christ appeared to the Nephites and the Lamanites at the Temple in the Land of Bountiful in America.

In the last year I have examined several studies which astronomers and mathematicians have made with respect to the astronomical alignments of the earthen mounds in Newark, Ohio. The earthworks are large and are carefully designed to keep track of time. The operation of the earthworks gives an insight into the time line and the setting for the Book of Mormon. I started this analysis with the thought that a detailed examination of how the earthen mounds worked in the first century would make a connection to the chronology which the Book of Mormon gives relating to the birth of Christ and to His appearance in America after His ascension into heaven from the Mount of Olives.

There are two questions which are the focus of my study. (1) How do the Newark Earthworks connect to the prophecy of Samuel, the Lamanite, concerning the birth of Christ? (2) Is there any point in time which the Newark Earthworks uniquely identifies which connects to the appearance of Christ in America? My study has a time line. This time line requires a listing of days. These days begin five years before the birth of Christ. All of the days are expressed within the framework of the Julian Calendar and each day has a Julian Day Number. This means that each day in the time line is easily connected to the present. The cycles of the moon play an important role in the timing of Christ's birth and death. The cycles and motions of the moon are critical elements for the functioning of the Newark Earthworks. There are hundreds of lunar events in the time line. The tying together of lunar events in the early spring of 6 BC, 1 BC and for all of the days found in AD 33 are found in tables at the end of the study. The volume of data in these tables may seem overwhelming but the rigor of the time line as it relates to the exact movements of the moon allows for the important connections of time and of place to those people in America who were looking for the sign of the birth of Christ and who were waiting for Him to visit them. My study is completely dependent on the correctness of the time line. It is tied to the exactness of the moon's movements and to the precision of the alignments found in the large earthen monuments of Newark, Ohio.

The Virginia University Press published in April 2016 a collection of essays dealing with the earthen mounds in Newark. The essays are entitled *The Newark Earthworks: Enduring Monuments, Contested Meanings*. I have selected 12 quotes from that book to let the reader get a sense of what contemporary scholarship has to say about this remarkable site. I offer these quotes with full accreditations to their authors and sources. My purpose in doing this is to let the authority of modern scholars set the stage for this little study -- a study which tries to find connections between the moon and the keeping of time at the Newark Earthworks to the detailed accounts from Samuel, the Lamanite, and from Nephi, the Son of Nephi -- a study of the events which the Book of Mormon gives concerning the knowledge which the ancient people of America had with regard to the exactness of Christ's birth -- a study which identifies the time for Christ in America. These quotes are from experts who have carefully studied the Newark Earthworks. I suppose that none of these experts have any interest or desire to connect the Newark Earthworks to the accounts found in the Book of Mormon. That is a job which I am happy to try to do.

Citations from Leading Experts

I Had No Idea! Competing Claims to Distinction at the Newark Earthworks (pp. 1-20), LINDSAY JONES

Renowned by historians and archaeologists as one of the wonders of the ancient world, the Earthworks of Newark, Ohio, nonetheless remain, for the broader public, lamentably little known. Among the largest, most geometrically precise and best-preserved earthen architecture ever constructed, these built forms have, as we'll learn in this volume, astronomical alignments no less sophisticated than those at Stonehenge and a scale no less enormous than the Peruvian geoglyphs at Nazca. And yet obscurity is also among their foremost attributes ... Indeed, incongruities abound. A two-thousand-year-old testament to another era, another civilization, and another set of socio-religious priorities, this pre-Columbian complex,...

The Newark Earthworks Past and Present (pp. 23-38), RICHARD D. SHIELS

The largest and most precise complex of geometric earthworks in the world was built in what are today the adjoining cities of Newark and Heath, Ohio, roughly two thousand years ago. Two huge features remain. The Newark Earthworks are today among a small number of sites that the US Department of the Interior is considering nominating for inscription on the UNESCO World Heritage List. Built by ancestors of today's American Indians, the site has been preserved by several generations of Newark residents... The original complex covered four and a half square miles and included four huge geometric enclosures...

The Newark Earthworks: A Monumental Engine of World Renewal (pp. 41-61), BRADLEY T. LEPPER

> The Newark Earthworks represent the pièce de résistance of the florescence of monumental architecture that is an important part of what archaeologists have referred to as the Hopewell culture. I make this claim not simply because it is the largest complex of geometric earthworks in the Hopewellian world but because it is an integrated combination of functionally discrete architectural elements incorporating astronomical and geometrical knowledge with uncanny precision and on a scale that is overwhelming to on-the-ground observers. Elsewhere I have compared the Newark Earthworks to "a North American Kaaba, Sistine Chapel, and Principiaall rolled into one," but in...

The Newark Earthworks: A Grand Unification of Earth, Sky, and Mind (pp. 62-94), RAY HIVELY and ROBERT HORN

> Romeo invokes "yonder blessed moon" to seal his pledge of love for Juliet, and Juliet reminds him that the blessed moon is also fickle, a poor sponsor for a constant love. Today it is difficult to fathom either Romeo's awe or Juliet's doubt ...The famous NASA image of the Apollo 11 moon landing that depicts a half-Earth visible in the background as the lunar module lifts off from the moon to rendezvous with the Apollo command module on July 21, 1969, is an appropriate place to begin thinking about the blessed but inconstant moon and its place in the story...

Hopewell and Chaco: The Consequences of Rituality (pp. 111-128), STEPHEN H. LEKSON

> Interpretations and understandings of Hopewell culture invariably focus on ceremony, religion, and ritual. There seems to be no political or economic model that "explains" Hopewell's astonishing monuments, built by hunter-gatherers who may or may not have had fixed villages. This is disturbing; states, not hunter-gatherers, build big monuments. Is Hopewell impossible? No, there is another example of just such an entity in the southwestern United States: Chaco Canyon, the great eleventh-century Pueblo Indian regional center, was arituality... The idea of a Chacoan "rituality" was first applied to Chaco by Norman Yoffee. Yoffee insisted on the primacy of ritual...

The Newark Earthworks as "Works" of Architecture (pp. 153-163), JOHN E. HANCOCK

> The cultural tradition responsible for building ancient Newark mastered three major types of earthworks (as opposed to "mounds," which for me as an architect is an important distinction): first, geometric enclosures, of which there are many variations, and of which Newark is probably the greatest; second, hilltop enclosures, most spectacularly Fort Ancient and Fort Hill, though there are also many of these, generally a bit better preserved today; and third, complex or figural earthworks, including those at Tremper, Stubbs, Turner, Newark's Eagle, the Tarlton Cross, and certain crescents as at Fort Ancient. Although this volume is about the Newark Earthworks,...

The Newark Earthworks as a Liminal Place: A Comparative Analysis of Hopewell-Period Burial Rituals and Mounds with a Particular Emphasis on House Symbolism (pp. 164-179), THOMAS BARRIE

> This essay discusses house symbolism in Hopewell funerary practices with the goal of providing broadened perspectives regarding the Newark Earthworks and Hopewell culture burial mounds. Even though much has been written about the Hopewells' social structures, ritual practices, and material artifacts, relatively little attention has been directed to their domestic architecture and, in particular, its appropriation and application in the funerary practices that were central to their culture. This essay argues that even though Hopewell sacred sites such as Newark materialized a range of symbolic agendas, they were primarily positioned as liminal places believed to provide physical and metaphysical connections...

The Modern Religiosity of the Newark Earthworks (pp. 198-212), THOMAS S. BREMER

> Fascination with ancient earthworks in Ohio goes back at least to the time that Euro-American explorers and settlers first entered the Ohio valley. English colonists in America knew of Indian burial mounds, and the cultural elites of the new American nation following the Revolution found evidence in these mysterious structures of a glorious antiquity and premonitions of future greatness for their civic
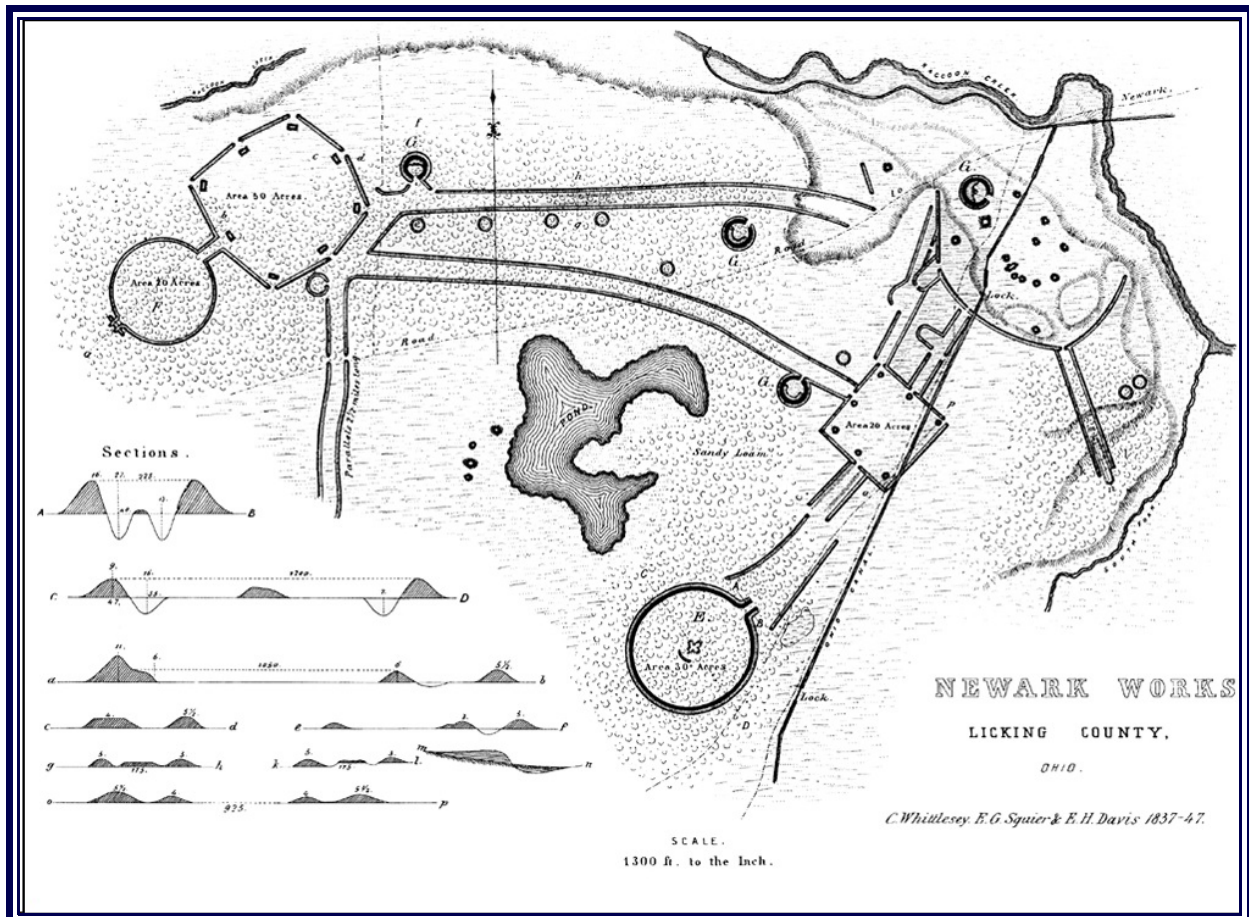
ambitions. Indeed, fantasies of cultural greatness danced atop these silent mounds. But Ohio's ancient earthworks also recall a history of loss and longing. Disappeared and entirely forgotten were not only the people and cultures who had produced these...

Native (Re)Investments in Ohio: Evictions, Earthworks Preservation, and Tribal Stewardship (pp. 215-229), MARTI L. CHAATSMITH

Two thousand years ago, ancestors of contemporary American Indians created the Newark Earthworks amid bountiful woodlands surrounded by rushing creeks and wetlands. The natural landscape provided the inspiration for people to plan and build a massive complex on the scale of the physical world around them. From this act of community and ritual emerged a map reflecting their spiritual and social world. When completed, maintained, and landscaped as the architects envisioned, the Newark Earthworks complex was surely experienced as a wonderful place: a place of anticipation, mystery, medicine, magic, and grandeur, perhaps especially during the three years around lunar standstills....

Whose Earthworks? Newark and Indigenous Peoples (pp. 230-242), MARY N. Mac DONALD

Monuments erected long ago in Ohio, including earthworks located in Newark and Heath in Licking County, claim the attention of a worldwide audience and at the same time have particular significance for indigenous communities. While we all recognize the earthworks as monuments of a culture that flourished prior to European incursion into the Americas, they may well have greater significance for contemporary Native American cultures than for settlers and the descendants of settlers who now make their homes in Ohio. Since there is considerable interest in having the earthworks at Newark (along with a couple others in Ohio), designated as...

The Peoples Belong to the Land: Contemporary Stewards for the Newark Earthworks (pp. 245-261), DUANE CHAMPAGNE and CAROLE GOLDBERG

How do indigenous peoples understand, relate to, and interpret ancient places such as the Earthworks at Newark? While it is difficult to survey the views of hundreds of tribal communities, many tribal nations have taken actions and expressed their viewpoints on the physical remains of ancestors, funerary materials, and specific places that are significant in their tribal teachings and traditions. Tribal efforts to protect sacred places are found in the movements to gain legislative and federal administrative protections in the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act, the National Historic Preservation Act, presidential executive...

Imagining "Law-Stuff" at the Newark Earthworks (pp. 279-288), WINNIFRED FALLERS SULLIVAN

For those who primarily study the earthbound works of people living today or in the relatively recent past through their written words, the Newark Earthworks initially presents an undeniably awesome but frustratingly silent landscape. Who were these workers of the earth who looked to the skies? How might we conjure their lives?

How might we, like our nineteenth-century spiritualist ancestors, make the dead speak and tell us their secrets? What does it mean for our work when all of the words are supplied by us, not by them? Who can speak for them?

Azimuths of Moonrises Over 18.6 Solar Years
In the Octagon of Newark Earthworks
GPS Coordinates 40.041108, -82.4310214
Altitude 880 Feet - Horizonal Elevation 0° 30' 0"
From 6 BC to AD 14

Focus on Light Filled Night of Passover Full Moon
Tuesday/Wednesday, April 6th-7th, 1 BC

Azimuth Degrees East of True North

6 BC   14 AD

1 BC
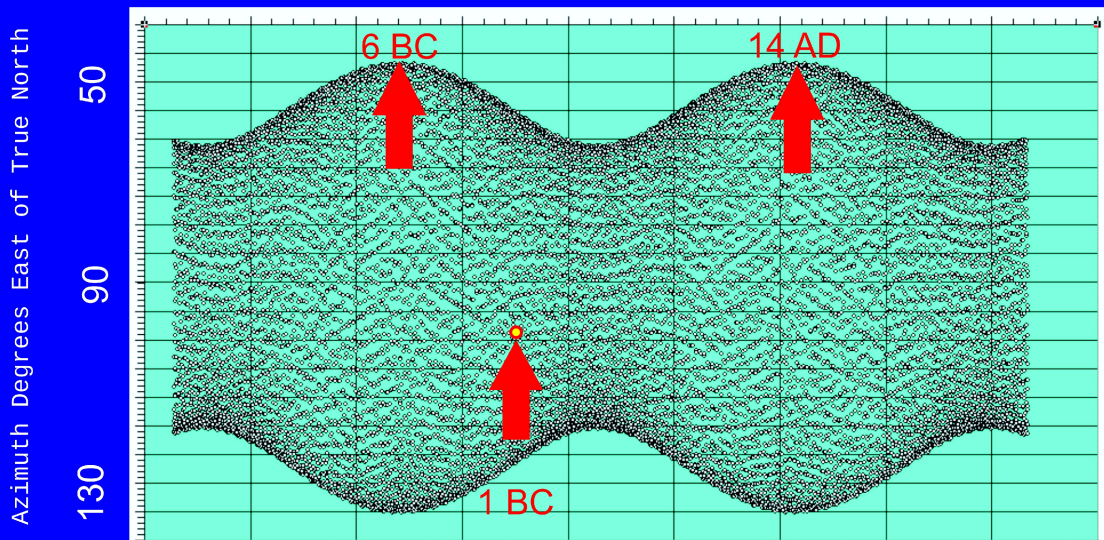
• Moonrise Before Birth of Christ
6:29 p.m., Tuesday, April 6th, 1 BC
Azimuth 101 Degrees

Truth shall spring out of the earth;
and righteousness shall look down from heaven.

Psalms 8:11

Ancient people in North America built hundreds of large earth mounds. No other place in the world has as many ancient mounds as the river valleys of Ohio and Illinois. Indeed the world's largest earthen geometric complex is in Newark, Ohio where large mounds cover an area of about 3,000 acres – about the same size as the area that is occupied by the pyramid complex in Giza. The Newark Earthworks span an area which is 50 times larger than Stonehenge.

For ten years, from 1837 to 1847, Ephraim George Squier and Edwin Hamilton Davis made onsite surveys of ancient mounds in America. In 1848 they finished the writing of the first scientific report ever published under the auspices of the Smithsonian Institute. The book was entitled *Ancient Monuments of the Mississippi Valley: Comprising the Results of Extensive Original Surveys and Explorations.* Surveys and drawings of the Newark Earthworks were included in the book. It became a best seller and was an important landmark for research on the ancient people of America. The publishing of this book made an important contribution to the development of archaeology as a separate scholarly discipline. Since the early 19th century the site at the Newark Earthworks has attracted the attention of hundreds of scientists.

 In recent decades with the aid of computer tools and modern astronomical analysis scholars finally discovered that the main structures at the Newark Earthworks were designed to delineate the "standstill" azimuths for moonrises and moonsets over a cycle of 18.6 solar years. The most important mounds are in an area of 200 acres where the ancient people carefully observed and accurately measured the effects of a slight tilt in the axis of the moon as it is rises on the horizon. Many cultures have shown an interest in the phases of the moon within a familiar cycle of 29 or 30 days. Some cultures have determined that the phases of the moon have regular patterns over cycles of 5 or 19 solar years. Only a few cultures have noticed that the moon every 18.6 years seems to stand still when the range of the azimuths for moonrises and moonsets reach a maximum. As a result, viewed from middle latitudes, the moon's altitude appears to change in just two weeks – from high in the sky to low over the horizon. Similarly, its azimuth at moonrise changes from northeast to southeast and at moonset from northwest to southwest. This time had special significance for some Bronze Age societies who built megalithic monuments in Britain and Ireland. The alignments to the moonrise or moonset on the days of lunar standstills are found in other ancient American sites such as in Chimney Rock, Colorado. But when it comes to the measuring of lunar standstills no other site in the world comes close to the size and significance of the Newark Earthworks in Ohio. The construction and maintenance of this monument required an advanced understanding of the patterns of the movements of the moon around the earth and of the movements of the earth around the sun.

After years of study Joseph M. Knapp offered an account of how the Newark Earthworks measured the standstill phases of the moon. He wrote.[1]

> Sinusoidal functions by their nature exhibit "standstill" behavior near their extremes, where the function changes slowly. Since the variation of the moon's rising point is a combination of two near sinusoidal functions, there will be two types of "standstills" – one associated with the lunar draconitic month of 27.21222 days, where the moon at its extremes will tend to rise in nearly the same direction for two or three successive nights, contrasting to successive rises in between the extremes, where the rising azimuth changes by up to 5º each day. Thus, the moon cooperates with observers trying to pinpoint the monthly extremes, by conveniently lingering in the area of the maxima for a few days. The other "standstill" is associated with the 18.6-year variation, where the extreme rising points will change very little from month to month in the years where the azimuth range is greatest. In fact, moonrises in "lunar maximum" years, those we are concerned with in the main Octagon alignment, may be observed over a span of two years before the moon is again carried sufficiently away from the alignment. Typically moonrises will reoccur along the axis in the 18th year after the last one, followed by several more in the 19th year, befitting an 18.6-year cycle.

James A. Marshall was a civil engineer who spent a lifetime studying more than 200 earthworks in Ohio. He found that there were 12 right triangles which ancient people used in surveying and constructing their earthen monuments. These triangles are illustrated in the above figure. To demonstrate the exactness of these designs, Marshall impressively showed, based on his surveys, that the centers of the Newark Octagon, Square and Great Circle were laid out with the simplest triangles, being the 3-4-5, 1-2, and 1-1. Moreover, the orientation and size of the Octagon was found to follow from a standard golden triangle construction based on the 1-2 triangle.

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[1]See http://www.copperas.com/octagon/oindex.html; Hively R. and R. Horn, 1982: Geometry and Astronomy in Prehistoric Ohio, *Archaeoastronomy* 4:S1-S20; 1984: Hopewellian Geometry and Astronomy at High Bank, *Archaeoastronomy* 7:S85-S100; Lepper, B. T. 1994: *The Great Hopewell Road: a Middle Woodland Sacra Via Across Central Ohio*, Paper presented at the joint meeting of the Midwest Archaeological Conference and the Southeast Archaeological Conference, Lexington, Kentucky; Lepper, B. T., "The Newark Earthworks and the Geometrical Enclosures of the Scioto Valley: Connections and Conjectures", printed in *A View from the Core: A Synthesis of Ohio Hopewell Archaeology*, edited by Paul J. Pacheco (Ohio Archaeological Council, 1996); and *The Ley Hunter Journal,* No. 130, Summer 1998, p. 6.

Map of Ohio showing distribution of earthworks.

5 · 3 · 4 | 2 · 1 · 1 | 1 · 1 | 2 · 1 | 5 · 8
2 · 5 | 3 · 4 | 7 · 1 | 13 · 3 | 17 · 4
5 · 8 | 0.618+ · 1 · 0.786+

12 Triangles
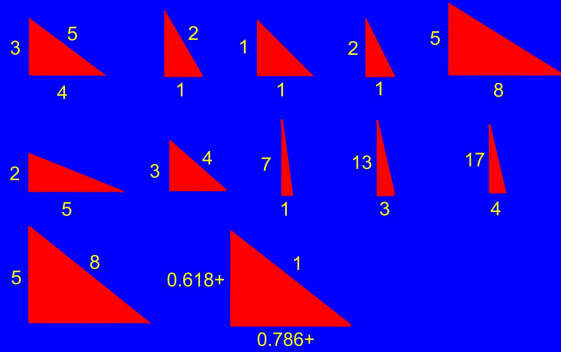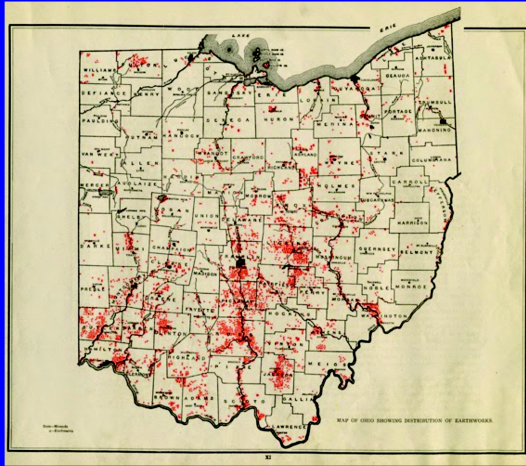
William C. Mills in 1914 published the *Archaeological Atlas of Ohio*. In this comprehensive work, the culmination of two decades of archaeological survey by the Ohio State Museum, Mills documented the location of 5,396 prehistoric sites including hundreds of earthen monuments.

Writing about the ancient structures in Newark Marshall said[2] .. that they were able to determine true north by the North Star. They also attained a precision and regularity in measuring angles and lengths and extending straight lines over distances of a mile or more that is impossible to attain by pacing and approximating right angles or other angles in the field. Such precision and regularity is indicated by the octagons and circles they built. They could not have laid out this or other works in the field unless they also had a unit of measure and a considerable knowledge of land surveying and geometry. We should note that geometry in its ancient Old World Greek origin meant earth-measure.

As the earth orbits around the sun a shadow from a perpendicular stick on the surface of the earth creates a pattern from which it is possible to count the number of days for the length of a solar year. By observing the shadows from a stick and with two rocks to mark the outer limits of the shadow's movements it is relatively easy for any culture to count the number of days in a solar year. On the other hand, the moon moves around the earth in its own orbit and quickly becomes a very complicated pattern of cycles. Nevertheless, the earth's movement around the sun and the moon's movement around the earth give us cycles by which we exactly define the meaning

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[2] Marshall, James A., *An Atlas of American Indian Geometry*, appearing in *Ohio Archaeologist*, 37(2), 1987.

of time. The sun rules the day. The moon rules the night. In our day with proper mathematical equations and with the power of modern computers it is possible to know the positions of the sun and of the moon for all points in time and in space. Given this background, let's examine the 5-year prophecy of Samuel, the Lamanite, concerning the birth of Christ and how that prophecy related to the intense energy which the ancient people put into constructing and maintaining the Newark Earthworks.

Samuel, the Lamanite, and His 5-Year Prophecy

What is known about Samuel, the Lamanite? When it comes to the keeping of time there are 5 statements which relate to this man. (1) He was active in his role as an ancient American prophet before the start of the first century. (2) He strictly kept the law of Moses and observed all the feasts which Moses had given to the Children of Israel. Samuel's observance of holy days required a careful following of the phases of the moon. He was particularly careful to observe the time of the full moon after the spring equinox. Samuel needed to know this so he could keep the Passover at the

Newark Earthworks Ohio

Displayed Area 200 Acres
Largest Geometric Earthen Complex in the World
About 3,000 Acres in Extent

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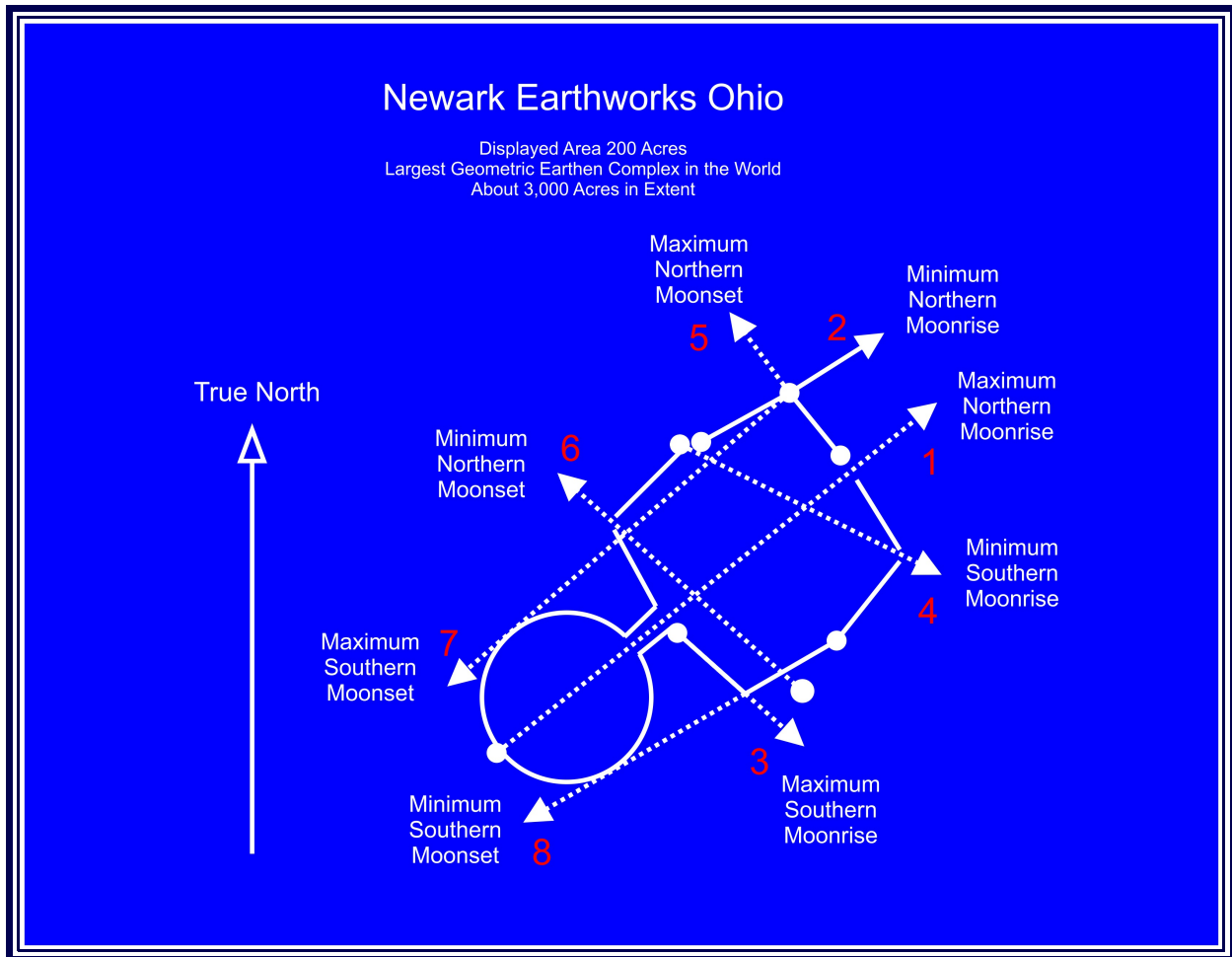
exact time given by the Lord to Moses. (3) He was a member of a society which had an incredible knowledge of the movements of the moon around the earth and the movements of the earth around the sun. The astronomical knowledge of Samuel's people was clearly reflected in the construction and in the operation of history's largest geometric earthen complex. (4) At the time of Samuel his people spent time and energy to measure with exactness the azimuths of moonrises and of moonsets in a cycle of 18.6 solar years to determine lunar standstills.[3] (5) Samuel, the Lamanite, prophesied on the day of the lunar feast of Passover and gave the framework of 5 years for the coming of Christ.[4]

Time and Place

Nephites and Lamanites kept the law of Moses. The keeping of the law included the timing of feasts which were determined by the exact movements of the sun and of the moon as observed in the skies of America. This included the celebration of Passover, "a type of his coming", which was observed on the night of the first full moon after the spring equinox. After all, Moses in the Law commanded --

> Let the children of Israel also keep the passover at his appointed
> season. In the fourteenth day of this month, at even, ye shall keep it
> in his appointed season: according to all the rites of it, and according
> to all the ceremonies thereof, shall ye keep it. And Moses spake unto
> the children of Israel, that they should keep the passover. – Numbers
> 9:2-4

There are 35 verses in the Book of Mormon where the keeping of the law of Moses is emphasized. Here are some examples.

> Yea, and they did keep the law of Moses; for it was expedient that
> they should keep the law of Moses as yet, for it was not all fulfilled.
> But notwithstanding the law of Moses, they did look forward to the
> coming of Christ, considering that the law of Moses was a type of his
> coming, and believing that they must keep those outward
> performances until the time that he should be revealed unto them. –

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[3]These same standstills were also important for Bronze Age societies in Britain and Ireland. They built their megalithic monuments according to the same astronomical events and alignments as the people of America. Again, the same measurements of moonrises and moonsets on the days of lunar standstills were important for people living in Chimney Rock, Colorado. Evidence suggests that the Great House Pueblo was first built there in AD 1076 during a lunar standstill and then expanded and finished in AD 1093 during another lunar standstill.

[4]Before the Christian era and even before the Roman Empire the Celts in Continental Europe used a 5-year calendar count. The counting of days within the framework of 5 solar years and 62 lunar months seemed common in the first century to the Celts and to the ancient people of America.

Alma 25:15

Yea, and the people did observe to keep the commandments of the Lord; and they were strict in observing the ordinances of God, according to the law of Moses; for they were taught to keep the law of Moses until it should be fulfilled. – Alma 30:3

And they also took of the firstlings of their flocks, that they might offer sacrifice and burnt offerings according to the law of Moses; – Mosiah 2:3

Samuel, the Lamanite, gave his prophecy about the coming of Christ in 6 BC. The period was significant for the people of ancient America because of lunar standstills which had already marked the beginning of a major cycle for the next 18.6 years.[5]

There was a partial lunar eclipse at mid-night on Sunday, 4 April 6 BC, which was seen across America.[6] A lunar eclipse can only occur on the night of a full moon. Lunar eclipses are certainly more common than solar eclipses. Each year the shadow of the earth passes over the surface of the moon from two to four times. Only a person who is under a night sky can see the lunar eclipse when it occurs. This means that from one place on the earth's surface it is possible for one person to see one or two lunar eclipses in a year. The eclipse of the Passover moon in 6 BC is noteworthy. The fact that the Nephites were in the middle of their Passover celebrations was more important for the account of Samuel's 5-year prophecy. Crowds had gathered together in Zarahemla for the feast. When Samuel climbed onto the city's wall to give the message which he had received from the angel there were many people who were there to hear what he had to say. Samuel's sign was indeed an important part of his prophecy. I do not have any thoughts of what could have caused the light in the night sky between the two days. That event was certainly not ordinary. I think that this was the only time in history when it occurred.

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[5] For the years between 500 BC and AD 500 Joseph M. Knapp identified 54 lunar standstill periods at the Newark Earthworks. It is interesting to observe that periods of lunar standstills occurred one season before Passover of 6 BC and one season before Passover of AD 33, the time of Christ's crucifixion. See details on this website at http://www.copperas.com/octagon/oindex.html.

[6]Technical description for this astronomical event as seen from the Newark Earthworks, GPS Coordinates 40.041108, -82.4310214, is as follows: Lunar eclipse begins Saturday, 3 April 6 BC, at 22h38m31s ET-UT1 = 177.13m, angle = 162.5°, vertex = 190.5°, altitude = 38.5°, azimuth = 142.3° SE, sun altitude = -38.2° 23h56m07s ET-UT1=177.13m. At greatest eclipse Saros-Number: 51, magnitude = 0.586, position angle = 208.9°, vertex = 218.9°, brightness = -9.7 mag, diameter = 33.45', duration partial phase = 155.3 minutes, duration penumbral phase = 290.1 minutes, ET-UT = 10627.9 sec, altitude = 44.5°, azimuth = 166.4° SSE, sun altitude = -44.6°. Lunar eclipse ends on Sunday, 4 April 6 BC, 1h13m48s ET-UT1 = 177.13m angle = 255.4°, vertex = 244.4°, altitude = 44.1°, azimuth = 192.9° SSW, Sun altitude = -44.4°.

We are getting ahead of the story. Here then is the text from the Book of Mormon for Samuel's prophecy concerning the timing of Christ's birth.

Helaman 14:

1 And now it came to pass that Samuel, the Lamanite, did prophesy a great many more things which cannot be written.

2 And behold, he said unto them: Behold, I give unto you a sign; for five years more cometh, and behold, then cometh the Son of God to redeem all those who shall believe on his name.

3 And behold, this will I give unto you for a sign at the time of his coming; for behold, there shall be great lights in heaven, insomuch that in the night before he cometh there shall be no darkness, insomuch that it shall appear unto man as if it was day.

4 Therefore, there shall be one day and a night and a day, as if it were one day and there were no night; and this shall be unto you for a sign; for ye shall know of the rising of the sun and also of its setting; therefore they shall know of a surety that there shall be two days and a night; nevertheless the night shall not be darkened; and it shall be the night before he is born.

5 And behold, there shall a new star arise, such an one as ye never have beheld; and this also shall be a sign unto you.

6 And behold this is not all, there shall be many signs and wonders in heaven.

7 And it shall come to pass that ye shall all be amazed, and wonder, insomuch that ye shall fall to the earth.

8 And it shall come to pass that whosoever shall believe on the Son of God, the same shall have everlasting life.

9 And behold, thus hath the Lord commanded me, by his angel, that I should come and tell this thing unto you; yea, he hath commanded that I should prophesy these things unto you; yea, he hath said unto me: Cry unto this people, repent and prepare the way of the Lord.

10 And now, because I am a Lamanite, and have spoken unto you the words which the Lord hath commanded me, and because it was hard against you, ye are angry with me and do seek to destroy me, and have cast me out from among you.

11 And ye shall hear my words, for, for this intent have I come up upon the walls of this city, that ye might hear and know of the judgments of God which do await you because of your iniquities, and also that ye might know the conditions of repentance;

12 And also that ye might know of the coming of Jesus Christ, the Son of God, the Father of heaven and of earth, the Creator of all things from the beginning; and that ye might know of the signs of his coming, to the intent that ye might believe on his name.

13 And if ye believe on his name ye will repent of all your sins, that thereby ye may have a remission of them through his merits.

Because Samuel's prophecy was given on Passover both believers and unbelievers had a common point from which to count days. There seems to have been two ways for them to count the days for measuring 5 years. One was after the manner of the Celts within a known lunar structure of 5 years and another was after the manner of the Egyptians with a straight 365-day count for each year. In the Book of Mormon the exact day for the fulfillment of Samuel's 5-year prophecy became a point of contention. The measuring of time for these people was serious. So serious that it became a matter of life and death for the believers. It was not a question of their inability to count days. It was a question of how to count the days for 5 years. It seems that it became a question of whether the fulfilment of the prophecy would be with a simple count of 365-days x 5 years or a complex count of 62 lunar cycles for 5 years. If someone were to say on Easter Sunday that after 5 years something important would happen we could measure the passage of the 5 years in two ways – one with the calendar which the Romans introduced before Christ or another with the calendar which the Christian fathers introduced after Christ. Even though Easter Sunday is not a fixed day in the modern calendar -- it is dependent on the cycles of the sun, of the moon and of the week -- it is still possible to determine when Easter will occur after 5 years.

The Fulfillment of Samuel's 5-Year Prophecy

The fulfillment of Samuel's 5-year prophecy is an important event in the time line of the Book of Mormon. On the very day of its fulfillment the ancient people of America started a new calendar count. In early spring 1 BC Nephi, the Son of Nephi, witnessed and recorded these very events. In his account the conflict between the unbelievers and the believers over the exact day for the prophecy's fulfillment was a matter of life and death. Nothing could have been more serious. The conflict underscores how important these people considered the keeping of time. This conflict in the first century validates the fact why the people in ancient Ohio were willing to expend so much time and material for the construction and maintenance of the Newark Earthworks. The measurement of time was an important part of their religion and of their social structure.

The account of the Book of Mormon allows us to reconstruct from the astronomical cycles of the moon and of the sun those events which occurred at this precious moment in the sky above the earthworks of Newark, Ohio. At 6:29 p.m., Tuesday, April 6th, 1 BC the full moon was rising on the horizon in the east and the sun was setting on the horizon in the west. There was a perfect balance in nature. At the very next moment, after the setting of the sun, Samuel's prophecy was fulfilled. Lights

appeared in the sky saving the believers from certain death and "the people began to be astonished because there was no darkness when the night came"[7].

The details of this wonderful account as witnessed by Nephi, the son of Nephi, are as follows.

3 Nephi 1:

> 4 And it came to pass that in the commencement of the ninety and second year, behold, the prophecies of the prophets began to be fulfilled more fully; for there began to be greater signs and greater miracles wrought among the people.
> 5 But there were some who began to say that the time was past for the words to be fulfilled, which were spoken by Samuel, the Lamanite.
> 6 And they began to rejoice over their brethren, saying: Behold the time is past, and the words of Samuel are not fulfilled; therefore, your joy and your faith concerning this thing hath been vain.[8]
> 7 And it came to pass that they did make a great uproar throughout the land; and the people who believed began to be very sorrowful, lest by any means those things which had been spoken might not come to pass.
> 8 But behold, they did watch steadfastly for that day and that night and that day which should be as one day as if there were no night, that they might know that their faith had not been vain.
> 9 Now it came to pass that there was a day set apart by the unbelievers[9], that all those who believed in those traditions should be put to death except the sign should come to pass, which had been given by Samuel the prophet.
> 10 Now it came to pass that when Nephi, the son of Nephi, saw this

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[7] 3 Nephi 1:15.

[8] These people were counting after the manner of the Egyptians with a straight 365-day count for each year. The 5-year count was 5 x 365 = 1825 days. The counting of days in this manner was used by the people of the Book of Mormon for the measuring of time from the day of the birth of Christ to the day of the death of Christ. See 3 Nephi 8:5 which states that "it came to pass in the thirty and fourth year, in the first month, on the fourth day of the month, there arose a great storm, such an one as never had been known in all the land". From birth to death there are 33 years x 365 days + 4 days = 12049 days or 12049 / 29.5306 days = 408.0176 lunar cycles or from full moon of Passover 1 BC (Birth of Chirst) to full moon of Passover AD 33 (Death of Christ).

[9] In setting this day apart the unbelievers used the 5-year lunar calendar count after the manner of the Celts. This 5-year count was 62 lunar months or 1829 days. It was also a calendar count which would have gone from the Passover of 6 BC to the Passover of 1 BC. There is more about this calendar in the next section. Note the difference of 4 days between these two calendar counts. This explains why some thought one day and others thought another day.

wickedness of his people, his heart was exceedingly sorrowful.

11 And it came to pass that he went out and bowed himself down upon the earth, and cried mightily to his God in behalf of his people, yea, those who were about to be destroyed because of their faith in the tradition of their fathers.

12 And it came to pass that he cried mightily unto the Lord all that day; and behold, the voice of the Lord came unto him, saying:

13 Lift up your head and be of good cheer; for behold, the time is at hand, and on this night shall the sign be given, and on the morrow come I into the world, to show unto the world that I will fulfil all that which I have caused to be spoken by the mouth of my holy prophets.

14 Behold, I come unto my own, to fulfil all things which I have made known unto the children of men from the foundation of the world, and to do the will, both of the Father and of the Son—of the Father because of me, and of the Son because of my flesh. And behold, the time is at hand, and this night shall the sign be given.

15 And it came to pass that the words which came unto Nephi were fulfilled, according as they had been spoken; for behold, at the going down of the sun there was no darkness; and the people began to be astonished because there was no darkness when the night came.

16 And there were many, who had not believed the words of the prophets, who fell to the earth and became as if they were dead, for they knew that the great plan of destruction which they had laid for those who believed in the words of the prophets had been frustrated; for the sign which had been given was already at hand.

17 And they began to know that the Son of God must shortly appear; yea, in fine, all the people upon the face of the whole earth from the west to the east, both in the land north and in the land south, were so exceedingly astonished that they fell to the earth.

18 For they knew that the prophets had testified of these things for many years, and that the sign which had been given was already at hand; and they began to fear because of their iniquity and their unbelief.

19 And it came to pass that there was no darkness in all that night, but it was as light as though it was mid-day. And it came to pass that the sun did rise in the morning again, according to its proper order; and they knew that it was the day that the Lord should be born, because of the sign which had been given.

20 And it had come to pass, yea, all things, every whit, according to the words of the prophets.

21 And it came to pass also that a new star did appear, according to the word.

Time Difference
Between Judea and Ohio

And it came to pass, as the angels were gone away from them into heaven, the shepherds said one to another, Let us now go even unto Bethlehem, and see this thing which is come to pass, which the Lord hath made known unto us. And they came with haste, and found Mary, and Joseph, and the babe lying in a manger.

Lift up your head and be of good cheer; for behold, the time is at hand, and on this night shall the sign be given, and on the morrow come I into the world, to show unto the world that I will fulfil all that which I have caused to be spoken by the mouth of my holy prophets.

Judea

Ohio

a.m.

a.m.

p.m.

Tue
6 April
1 BC

p.m.

a.m.

a.m.

a.m.

p.m.

Birth of Christ

Tue
6 April
1 BC

**The Sign of
The Birth of Christ**

a.m.

a.m.

Wed
7 April
1 BC

p.m.

p.m.

p.m.

a.m.

a.m.

a.m.

a.m.

Wed
7 April
1 BC

p.m.

Thu
8 April
1 BC

p.m.

p.m.

a.m.

p.m.

a.m.

Thu
8 April
1 BC

a.m.

p.m.

p.m.

The Bible and the Book of Mormon are in perfect harmony with respect to the timing of the birth of Christ. Luke wrote that the birth of Christ in Judea was during the night when shepherds were "keeping watch over their flocks". The sign was seen in America at the setting of the sun when Christ told Nephi, the Son of Nephi, that "on the morrow come I into the world". There is a time difference of seven hours between Judea and Ohio. The following illustration shows the difference between these times in these two places. The sign was given when the sun was setting in the new world on Tuesday night. Christ was born in the old world during Wednesday night. There was a difference of as many as twenty-four hours from the time when the sign was given in America to the time of His birth in Judea.

Before the introduction of the Roman calendar by Julius Caesar and before the calendar reforms of the Christian church there were many calendars which measured time by observing the movements of the sun and the moon. One of these calendar systems was developed by the Celts. This system of time keeping is interesting because of its 5-year structure with 62 lunar cycles. The structure of this calendar system seems to fit perfectly into the 5-year prophecy of Samuel, the Lamanite.

After decades of study scholars have reconstructed this Continental Celtic Calendar from broken pieces of metal which were discovered in the late 19th century. The reconstruction of the calendar was possible because of the exactness by which the sun and the moon move making it possible to synchronize solar years with lunar months. In many essential ways the Celtic / Coligny Calendar compares to the Jewish calendar. The common lunar year contains 12 months with a total of 354 or 355 days. There are two intercalations of a 13th lunar month in two of the years of the 5-year count. The above table illustrates how the days and months fit into a 5-year count. The ancient calendar was found in 1897 in France[10], in Coligny, Ain (46°23'N 5°21'E, near Lyon), along with the head of a bronze statue of a youthful male figure. It is now held at the Gallo-Roman Museum of Lyon-Fourvière. It was engraved on a bronze tablet, preserved in 73 fragments, that was originally 1.48 meters (4' 10") wide by 0.9 meters (2' 11") tall. Based on the style of lettering and the accompanying objects, it probably dates to the end of the second century.[11] A similar calendar found nearby at Villards d'Heria (46°25'N 5°44'E) is preserved in only eight small fragments. It is now found in the Musée d'Archéologie du Jura at Lons-le-Saunier.[12]

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[10]http://www.ancient-origins.net/artifacts-other-artifacts/
coligny-calendar-1800-year-old-lunisolar-calendar-banned-romans-002429

[11] Duval, P.M. and Pinault, G., Recueil des inscriptions gauloises, Tome 3: Les Calendriers (Coligny, Villards d'Heria), CNRS, Paris, 1986, pp. 35-37 and Lambert, Pierre-Yves, La langue gauloise, Editions Errance, 2nd edition, Paris, 2003, p.111

[12]http://www.musees-franchecomte.com/index.php?p=208

2nd Century Celtic / Coligny Calendar
5 Solar Years and 62 Moon Cycles
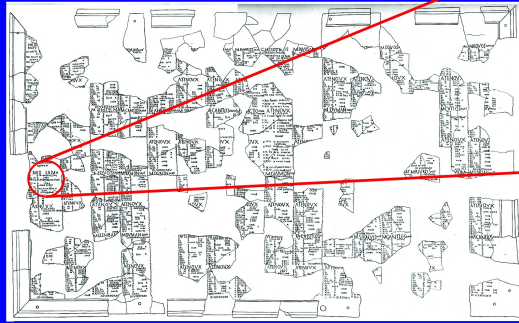
Magnified Image of Text

Table Size 4' 10" x 2' 11"
73 Broken Fragments of Copper Alloy
Discovered in 1897 in Coligny, France and
Reconstructed in a Drawing by Seymour de Ricci in 1926

5-Year Lunar/Solar Celtic or Coligny Calendar					
Month Name	Year 1	Year 2	Year 3	Year 4	Year 5
Quimonios	30	-	-	-	-
1 Samonios	30	30	30	30	30
2 Dumannios	29	29	29	29	29
3 Riuros	30	30	30	30	30
4 Anagantio	29	29	29	29	29
5 Ogronnios	30	30	30	30	30
6 Qutios	30	30	30	30	30
Rantaranos	-	-	30	-	-
7 Giamonios	29	29	29	29	29
8 Semiuisonns	30	30	30	30	30
9 Equos	30	28	30	28/29	30
10 Elembiuios	29	29	29	29	29
11 Aedrinios	30	30	30	30	30
12 Cantlos	29	29	29	29	29
Year Length	385	353	385	353 or 354	355

THE PROPHECY OF SAMUEL, THE LAMANITE
5 Solar Years -- 62 Moon Cycles -- 1829 Days

Spring			Summer			Fall			Winter				Intercalations, Moons and Days	
1	2	3	4	5	6	7	8	9	10	11	12	13	Moons	Days
●	●	●	●	●	●	●	●	●	●	●	●		12	354
●	●	●	●	●	●	●	●	●	●	●	●	●	13	383
●	●	●	●	●	●	●	●	●	●	●	●		12	354
●	●	●	●	●	●	●	●	●	●	●	●	●	13	384
●	●	●	●	●	●	●	●	●	●	●	●		12	354
Number of Moon Cycles and Days in 5 Solar Years from Passover 6BC to Passover 1BC													62	1829

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DETAILS FOR START DATE, END DATE AND NUMBER OF DAYS IN THE 5-YEAR PROPHECY

A. Start Date, Heartland America, Full Moon After Spring Equinox --
      Saturday Evening, 4 April 6 BC, Passover.
      Julian Day Number: JD1719325.
      Event: Samuel the Lamanite gives 5-year prophecy on the city wall of
      Zarahemla.

B. End Date, Heartland America, Full Moon After Spring Equinox --
      Tuesday Evening, 6 April 1 BC, Passover.
      Julian Day Number: JD1721154.
      Event:  Fulfillment of prophecy.  Sun sets in its regular order.  Light
      fills the night sky.

C. Calculation for Number of Days and Years --
      JD1721154 - JD1719325 = 1829 Days / 365.2422 Days = 5.005 Solar Years.
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This above illustration shows the moon cycles of Samuel's 5-year prophecy. Three years have 12 moon cycles with 354 days each. Two years have 13 moon cycles with 383 and 384 days. The object of a lunisolar calendar is to use moon cycles for the marking of the days within months which are meant to be within a larger framework of solar years. The synchronization of these two cycles is challenging because a moon cycle averages about 29.5306 days and a solar cycle averages about 365.2422 days. In the illustration there is a calculation which shows that there are five solar years from the eve of the Passover of 6 B.C. to the eve of the Passover of 1 BC for a total of 1829 days. This calculation shows the exactness of Samuel's prophecy. In the words of scripture, the sign given for the birth of Christ was "every whit, according to the words of the prophets". The sign was given for exactly the right time and for exactly the right place.

Moonrise Times
As Seen at Newark Earthworks Ohio USA

From 1 March 1 BC to 10 April 1 BC
Yellow Area Sun Shinning
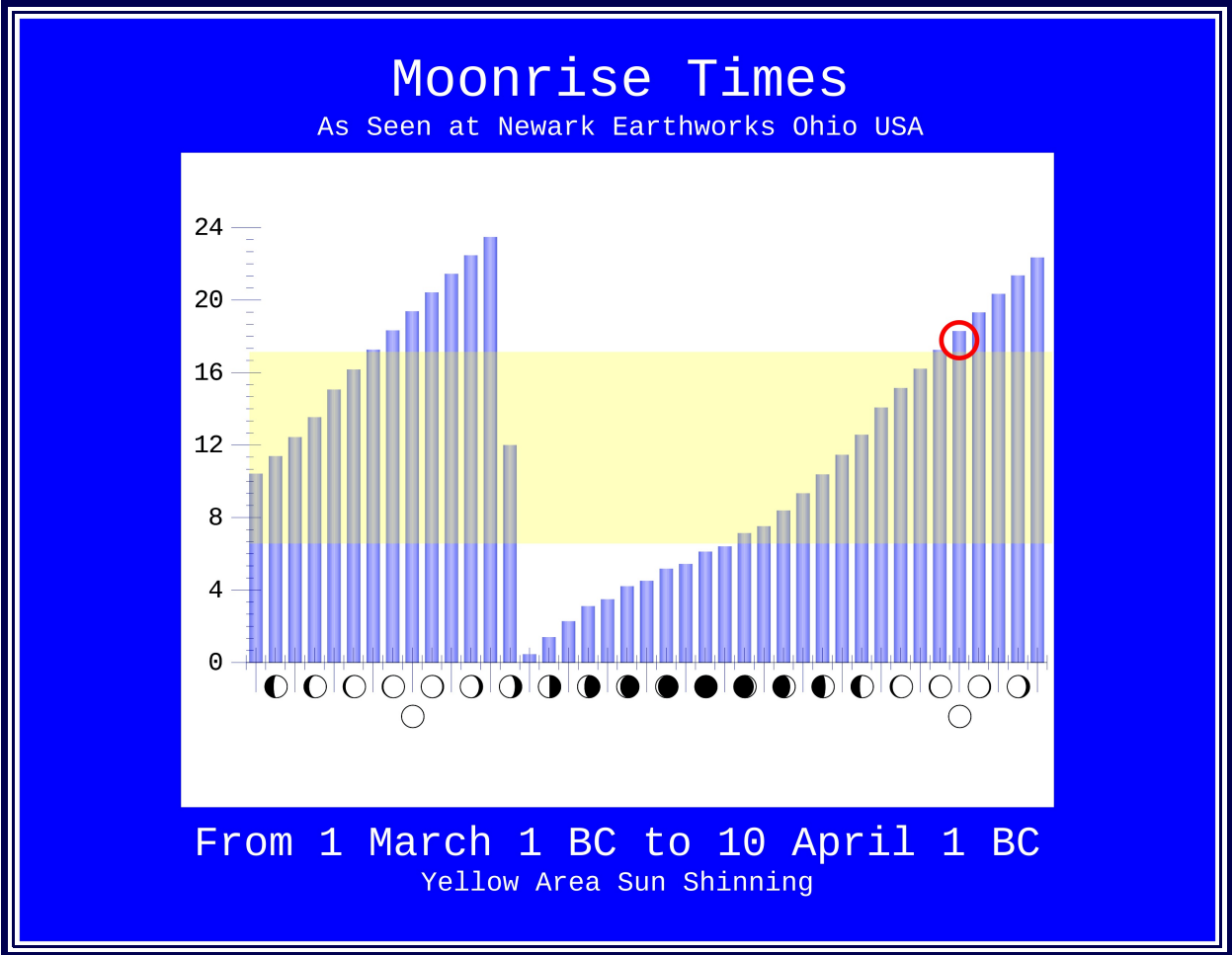
This chart shows the times at which the moon is rising at the Newark Earthworks above the eastern horizon from 1 March 1 B.C. to 10 April 1 B.C. Many of these moonrises were at a time when the sun was shining. This, of course, would have meant that the moon was not visible at its rising. There is one day which stands out. That day is marked with a red circle. The day is April 6th, 1 B.C. The moon is rising in the east at the very time the sun is setting in the west. From the x-axis we see that on that day the moon is full. Beauty, grace and truth are always present when God is doing His work. At this moment in time the whole world is in balance. The full faces of the sun and of the moon in the sky overhead in central Ohio are turned towards each other. There is a moment of transition as the day is ending and the night is beginning. In this moment the sign for the coming of Christ is given as promised to the people of America in the Heartland of America and "at the going down of the sun there was no darkness; and the people began to be astonished because there was no darkness when the night came".

Moonrise Azimuths
As Seen at Newark Earthworks Ohio in 6 BC and 1 BC
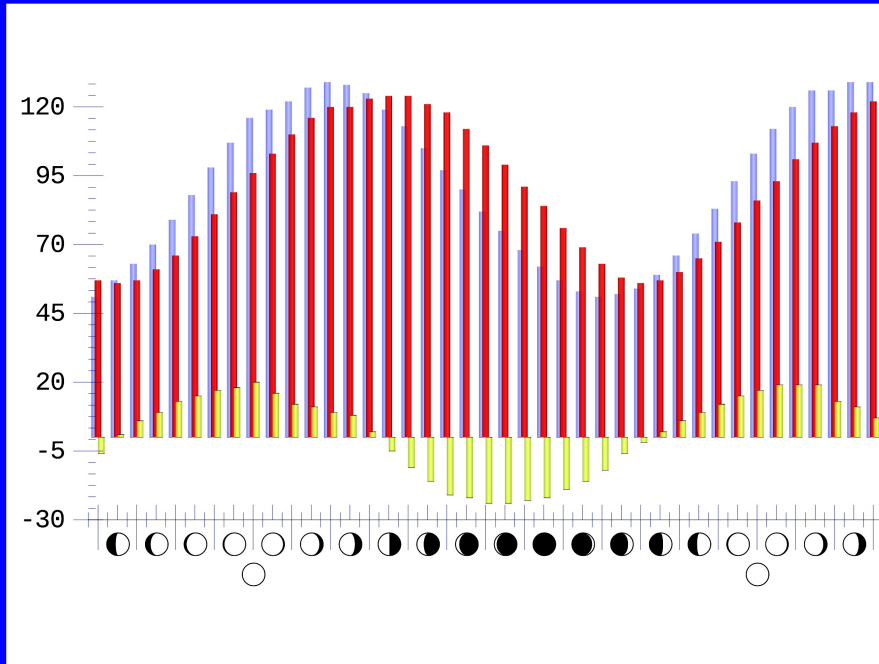
Red Bars: Daily Moonrise Azimuths From 1 March 6 BC to 10 April 6 BC
Blue Bars: Daily Moorise Azimuths From 1 March 1 BC to 10 April 1 BC
Yellow Bars: Differences Between Blue and Red Bars

This chart shows three sets of data over similar days in the early springs of 6 BC and 1 BC for the Newark Earthworks. The chart shows how the azimuths of the rising moon vary over the course of the moon cycle. The azimuths of moonrises in one month have as much of a fluctuation on the horizon as the azimuths of sunrises have in one year. The variation of these azimuths over time expresses itself in beautiful sine curves. The differences of the daily moonrise azimuths from 6 BC as compared to moonrise azimuths of 1 BC also express themselves in beautiful sine curves.

Summary for the Time of Christ's Birth

Words like 'before', 'now', and 'after' are common for everyone's language. People live their lives within the limits of time and space. A time 'before' mortal life began. The flitting moment of 'now'. A time 'after' mortal life ends. It is within these limits that mortal life has its meaning. Then, of course, there is the dimension of space. To understand the significance of any record one must have the coordinates of time and space. The definition of time across cultures is a matter of movements. How long is a day? It is exactly one full spin of the earth on its axis. How long is a week? It is exactly seven spins of the earth on its axis. How long is a year? It is generally

accepted as one revolution of the earth in its orbit around the sun. How long is the month? Well, that depends on what calendar a society is using. Since ancient times the moon has had an important role in defining the meaning of a month. Indeed, the English word "month" comes from an older English word "moon". Calendar and calculator come from the same origin. Anyone organizing the days of calendars into sequences of months and years must make serious calculations. Exact time only has significance as measured by the movements of the earth around its axis, the movements of the earth around the sun and the movements of the moon around the earth. Because these are precise movements, it is possible to have as much confidence in the definition of a point in time two thousand years ago as it is in defining the time for 12 noon today.

Let's now put the history of the time line into a summary. Ancient Americans built large earthworks in Newark, Ohio. Archaeologists and astronomers confirm that the earthworks were fully operational in the first century. The earthworks tracked the complicated movements of the moon's cycles. The earth monuments were designed to measure exact time and this exactness gave great meaning to the ancient people who spent so much time and energy in the construction and maintenance of the place.

The Book of Mormon has much to say about time and place. The people of the Book of Mormon were living at the same time and in the same place as when the large structures were measuring time. In the Book of Mormon we read that Samuel, the Lamanite, in 6 BC came to the people of Nephi and gave a very specific prophecy concerning the coming of Christ. He said that in five years Christ would come into the world and that the people in America "from the west to the east, both in the land north and in the land south" would know of His coming because on that night before His birth there would be light in the night sky as though it were mid-day. The account of this event is a central message of the Book of Mormon. The event has two specific elements which can be measured. There is time -- five years after the day of the prophecy. That is measurable. There is place -- ancient America. That too is measurable.

The following tables offer hundreds of lunar events which are calculated for the specific GPS Coordinates of the Newark Earthworks for the early spring of 6 BC and of 1 BC. The first set of data relates to the time when Samuel, the Lamanite, gave his 5-year prophecy. The second set of data relates to the time when the prophecy was fulfilled.

I can say with absolute confidence that the full moon of Passover was rising on the eastern horizon and that the sun of the meridian of time was setting on the western horizon in Newark, Ohio at 6:29 p.m., Tuesday, April 6th, 1 BC. That is the moment

when the sign was given. On the next day Jesus Christ was born of Mary in Bethlehem of Judea. On the day of His birth the people of ancient America started a new calendar count. On that day the world would never again be the same. It was the day long foretold by ancient prophets. It was a day chosen by God before the foundations of the world. It is a day for us to remember and to celebrate.

Newton Identifies the Date of the Crucifixion

Sir Isaac Newton had one of the great minds in history. He developed the principles of modern physics, including the laws of motion. Late in his life he devoted much of his attention to biblical chronology and calculated the time for the Crucifixion of the Lord Jesus Christ. He used this line of reasoning:

(1) from AD 26 to AD 36 Pontius Pilate was governor of Judea; (2) the equinox is the moment when the rays of the sun are perpendicular to the equator of the earth; (3) the Jewish Passover is the time of the full moon after the spring equinox; and (4) Christ died on Friday, the 6th day of the 7-day week cycle.

Before his death in March 1727 Newton identified the time for the death of Christ as 3 p.m., Friday, 03 April, AD 33. His study was published in 1733. It became the first point in time which was established by using the mathematics of modern science to establish a specific date which is associated with the Messiah who lived in the meridian of time.
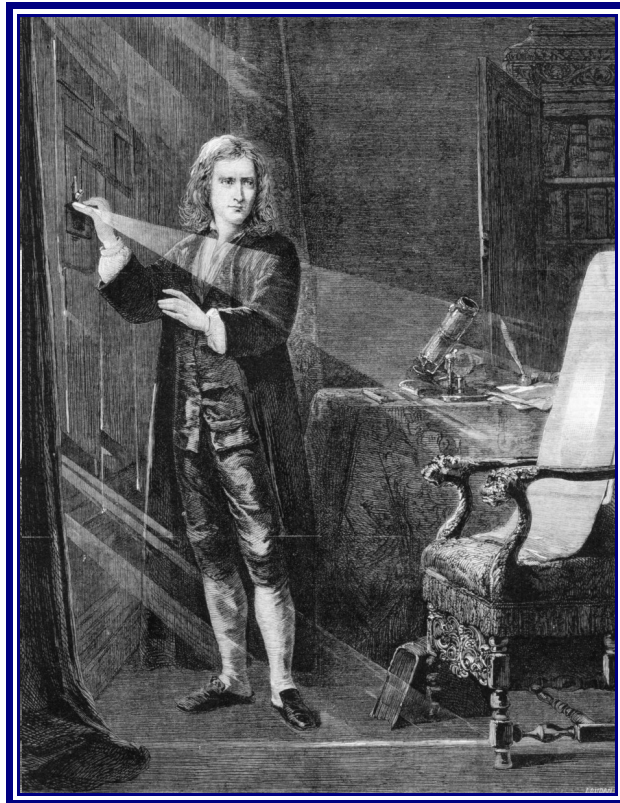
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<th>Moonset</th>
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<td>Sun</td>
<td>1719291</td>
<td>12h40m (az= 51°)</td>
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<td>20h46m (h=78.2° k= 75.6% waxing</td>
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<td>Mon</td>
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<td>16h00m (az= 63°)</td>
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<td>23h29m (h=68.8° k= 96.5% waxing</td>
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<td>--h--m (h=--.-° k= 96.6% waxing</td>
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<td>1h10m (h=56.2° k= 99.7% waning</td>
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<td>12h59m (az=233°)</td>
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<td>1719305</td>
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<td>14h09m (az=237°)</td>
<td>9h29m (h=24.1° k= 18.6% waning</td>
</tr>
<tr>
<td>x</td>
<td>16 Mar 6 BC</td>
<td>Mon</td>
<td>1719306</td>
<td>5h31m (az=119°)</td>
<td>15h19m (az=243°)</td>
<td>10h21m (h=28.2° k= 10.9% waning</td>
</tr>
<tr>
<td>y</td>
<td>17 Mar 6 BC</td>
<td>Tue</td>
<td>1719307</td>
<td>6h00m (az=113°)</td>
<td>16h27m (az=251°)</td>
<td>11h09m (h=33.3° k= 5.1% waning</td>
</tr>
<tr>
<td>z</td>
<td>18 Mar 6 BC</td>
<td>Wed</td>
<td>1719308</td>
<td>6h24m (az=105°)</td>
<td>17h33m (az=258°)</td>
<td>11h54m (h=39.0° k= 1.5% waning</td>
</tr>
<tr>
<td></td>
<td>19 Mar 6 BC</td>
<td>Thu</td>
<td>1719309</td>
<td>6h46m (az= 97°)</td>
<td>18h36m (az=266°)</td>
<td>12h36m (h=45.1° k= 0.1% waning</td>
</tr>
<tr>
<td>a</td>
<td>20 Mar 6 BC</td>
<td>Fri</td>
<td>1719310</td>
<td>7h05m (az= 90°)</td>
<td>19h37m (az=274°)</td>
<td>13h16m (h=51.3° k= 0.7% waxing</td>
</tr>
<tr>
<td>a</td>
<td>21 Mar 6 BC</td>
<td>Sat</td>
<td>1719311</td>
<td>7h25m (az= 82°)</td>
<td>20h38m (az=282°)</td>
<td>13h56m (h=57.3° k= 3.4% waxing</td>
</tr>
<tr>
<td>a</td>
<td>22 Mar 6 BC</td>
<td>Sun</td>
<td>1719312</td>
<td>7h46m (az= 75°)</td>
<td>21h40m (az=289°)</td>
<td>14h37m (h=62.9° k= 7.9% waxing</td>
</tr>
</tbody>
</table>

Lunar Events for Early Spring 6 BC
Newark Earthworks Ohio
GPS Coordinates 40.041108, -82.4310214
United States Eastern Standard Time
-5 Hours Universal Time

b	23 Mar 6 BC	Mon	1719313	8h08m (az= 68°)	22h42m (az=296°)	15h19m (h=68.0° k= 13.9% waxing
c	24 Mar 6 BC	Tue	1719314	8h34m (az= 62°)	23h45m (az=302°)	16h04m (h=72.3° k= 21.3% waxing
d	25 Mar 6 BC	Wed	1719315	9h05m (az= 57°)	--h--m (az=---°)	16h52m (h=75.6° k= 29.9% waxing
e	26 Mar 6 BC	Thu	1719316	9h43m (az= 53°)	0h47m (az=306°)	17h42m (h=77.8° k= 39.3% waxing
f	27 Mar 6 BC	Fri	1719317	10h29m (az= 51°)	1h47m (az=308°)	18h35m (h=78.5° k= 49.2% waxing
g	28 Mar 6 BC	Sat	1719318	11h24m (az= 52°)	2h41m (az=309°)	19h29m (h=77.7° k= 59.5% waxing
h	29 Mar 6 BC	Sun	1719319	12h28m (az= 54°)	3h29m (az=307°)	20h23m (h=75.3° k= 69.6% waxing
i	30 Mar 6 BC	Mon	1719320	13h37m (az= 59°)	4h09m (az=303°)	21h16m (h=71.3° k= 79.1% waxing
j	31 Mar 6 BC	Tue	1719321	14h49m (az= 66°)	4h43m (az=297°)	22h07m (h=66.1° k= 87.5% waxing
k	1 Apr 6 BC	Wed	1719322	16h03m (az= 74°)	5h12m (az=289°)	22h57m (h=59.7° k= 94.2% waxing
l	2 Apr 6 BC	Thu	1719323	17h17m (az= 83°)	5h38m (az=281°)	23h46m (h=52.6° k= 98.5% waxing
O	3 Apr 6 BC	Fri	1719324	18h32m (az= 93°)	6h02m (az=272°)	--h--m (h=---.-° k= 98.6% waxing
O	4 Apr 6 BC	Sat	1719325	19h50m (az=103°)	6h27m (az=262°)	0h36m (h=45.1° k=100.0% waning
o	5 Apr 6 BC	Sun	1719326	21h09m (az=112°)	6h54m (az=253°)	1h27m (h=37.8° k= 98.3% waning
n	6 Apr 6 BC	Mon	1719327	22h30m (az=120°)	7h25m (az=245°)	2h22m (h=31.2° k= 93.5% waning
o	7 Apr 6 BC	Tue	1719328	23h50m (az=126°)	8h02m (az=238°)	3h20m (h=25.8° k= 86.0% waning
p	8 Apr 6 BC	Wed	1719329	--h--m (az=---°)	8h48m (az=233°)	4h21m (h=22.1° k= 76.4% waning
r	9 Apr 6 BC	Thu	1719330	1h03m (az=129°)	9h44m (az=231°)	5h24m (h=20.4° k= 65.4% waning
s	10 Apr 6 BC	Fri	1719331	2h05m (az=129°)	10h50m (az=232°)	6h26m (h=20.8° k= 53.9% waning

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                      Lunar Events for Early Spring 1 BC
                              Newark Earthworks Ohio
                     GPS Coordinates 40.041108, -82.4310214
                         United States Eastern Standard Time
                              -5 Hours Universal Time
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	Date	Day	JD	Moonrise	Moonset	Transit
g	1 Mar 1 BC	Mon	1721118	10h42m (az= 57°)	1h16m (az=302°)	18h31m (h=74.9° k= 50.3% waxing Gem colon= 0°)
h	2 Mar 1 BC	Tue	1721119	11h39m (az= 56°)	2h23m (az=304°)	19h32m (h=75.1° k= 62.2% waxing Gem colon= 13°)
j	3 Mar 1 BC	Wed	1721120	12h44m (az= 57°)	3h23m (az=304°)	20h32m (h=73.6° k= 73.2% waxing Cnc colon= 26°)
j	4 Mar 1 BC	Thu	1721121	13h54m (az= 61°)	4h13m (az=301°)	21h30m (h=70.5° k= 82.9% waxing Leo colon= 38°)
k	5 Mar 1 BC	Fri	1721122	15h06m (az= 66°)	4h55m (az=296°)	22h24m (h=66.1° k= 90.7% waxing Leo colon= 51°)
l	6 Mar 1 BC	Sat	1721123	16h17m (az= 73°)	5h30m (az=290°)	23h14m (h=60.8° k= 96.2% waxing Leo colon= 64°)
l	7 Mar 1 BC	Sun	1721124	17h26m (az= 81°)	6h00m (az=283°)	--h--m (h=--.-° k= 96.3% waxing Leo colon= 64°)
o	8 Mar 1 BC	Mon	1721125	18h33m (az= 89°)	6h27m (az=275°)	0h02m (h=55.0° k= 99.2% waxing Vir colon= 76°)
0	9 Mar 1 BC	Tue	1721126	19h38m (az= 96°)	6h52m (az=268°)	0h47m (h=49.1° k= 99.8% waning Vir colon= 89°)
n	10 Mar 1 BC	Wed	1721127	20h42m (az=103°)	7h17m (az=260°)	1h32m (h=43.3° k= 98.0% waning Vir colon=101°)
o	11 Mar 1 BC	Thu	1721128	21h45m (az=110°)	7h43m (az=254°)	2h16m (h=37.9° k= 94.0% waning Lib colon=114°)
p	12 Mar 1 BC	Fri	1721129	22h47m (az=116°)	8h11m (az=248°)	3h01m (h=33.2° k= 88.3% waning Lib colon=126°)
q	13 Mar 1 BC	Sat	1721130	23h48m (az=120°)	8h43m (az=243°)	3h48m (h=29.2° k= 81.2% waning Sco colon=139°)
r	14 Mar 1 BC	Sun	1721131	--h--m (az=---°)	9h19m (az=239°)	4h35m (h=26.3° k= 72.9% waning Oph colon=151°)
s	15 Mar 1 BC	Mon	1721132	0h46m (az=123°)	10h01m (az=236°)	5h24m (h=24.4° k= 63.8% waning Sgr colon=164°)
t	16 Mar 1 BC	Tue	1721133	1h40m (az=124°)	10h49m (az=236°)	6h14m (h=23.7° k= 54.2% waning Sgr colon=177°)
u	17 Mar 1 BC	Wed	1721134	2h28m (az=124°)	11h43m (az=237°)	7h05m (h=24.3° k= 44.4% waning Cap colon=189°)
v	18 Mar 1 BC	Thu	1721135	3h11m (az=121°)	12h42m (az=240°)	7h55m (h=26.2° k= 34.7% waning Cap colon=202°)
w	19 Mar 1 BC	Fri	1721136	3h49m (az=118°)	13h44m (az=244°)	8h43m (h=29.1° k= 25.4% waning Cap colon=215°)
x	20 Mar 1 BC	Sat	1721137	4h21m (az=112°)	14h49m (az=250°)	9h31m (h=33.2° k= 17.0% waning Aqr colon=227°)
y	21 Mar 1 BC	Sun	1721138	4h51m (az=106°)	15h55m (az=257°)	10h18m (h=38.1° k= 9.8% waning Psc colon=240°)

z	22 Mar 1 BC	Mon	1721139	5h18m (az= 99°)	17h02m (az=265°)	11h05m (h=43.8° k= 4.3% waning Psc colon=252°)
	23 Mar 1 BC	Tue	1721140	5h44m (az= 91°)	18h11m (az=273°)	11h52m (h=49.8° k= 1.0% waning Psc colon=265°)
a	24 Mar 1 BC	Wed	1721141	6h12m (az= 84°)	19h21m (az=281°)	12h41m (h=56.1° k= 0.3% waxing Ari colon=278°)
b	25 Mar 1 BC	Thu	1721142	6h41m (az= 76°)	20h35m (az=288°)	13h32m (h=62.0° k= 2.4% waxing Ari colon=290°)
c	26 Mar 1 BC	Fri	1721143	7h14m (az= 69°)	21h50m (az=295°)	14h26m (h=67.3° k= 7.4% waxing Tau colon=303°)
d	27 Mar 1 BC	Sat	1721144	7h52m (az= 63°)	23h04m (az=300°)	15h24m (h=71.5° k= 14.9% waxing Tau colon=316°)
e	28 Mar 1 BC	Sun	1721145	8h39m (az= 58°)	--h--m (az=---°)	16h24m (h=74.2° k= 24.6% waxing Gem colon=329°)
f	29 Mar 1 BC	Mon	1721146	9h34m (az= 56°)	0h14m (az=303°)	17h26m (h=75.0° k= 35.7% waxing Gem colon=341°)
g	30 Mar 1 BC	Tue	1721147	10h38m (az= 57°)	1h17m (az=304°)	18h27m (h=74.0° k= 47.4% waxing Cnc colon=354°)
h	31 Mar 1 BC	Wed	1721148	11h46m (az= 60°)	2h11m (az=301°)	19h25m (h=71.4° k= 59.2% waxing Cnc colon= 7°)
i	1 Apr 1 BC	Thu	1721149	12h57m (az= 65°)	2h55m (az=297°)	20h19m (h=67.4° k= 70.2% waxing Leo colon= 19°)
j	2 Apr 1 BC	Fri	1721150	14h07m (az= 71°)	3h31m (az=292°)	21h10m (h=62.5° k= 79.9% waxing Leo colon= 32°)
k	3 Apr 1 BC	Sat	1721151	15h15m (az= 78°)	4h02m (az=285°)	21h57m (h=57.0° k= 88.0% waxing Vir colon= 45°)
l	4 Apr 1 BC	Sun	1721152	16h21m (az= 86°)	4h29m (az=278°)	22h43m (h=51.2° k= 94.1% waxing Vir colon= 57°)
m	5 Apr 1 BC	Mon	1721153	17h25m (az= 93°)	4h55m (az=270°)	23h27m (h=45.5° k= 98.0% waxing Vir colon= 70°)
0	6 Apr 1 BC	Tue	1721154	18h29m (az=101°)	5h20m (az=263°)	--h--m (h=--.-° k= 98.1% waxing Vir colon= 70°)
0	7 Apr 1 BC	Wed	1721155	19h32m (az=107°)	5h45m (az=256°)	0h11m (h=40.0° k= 99.7% waxing Vir colon= 82°)
n	8 Apr 1 BC	Thu	1721156	20h34m (az=113°)	6h12m (az=250°)	0h56m (h=35.1° k= 99.3% waning Lib colon= 95°)
o	9 Apr 1 BC	Fri	1721157	21h36m (az=118°)	6h43m (az=245°)	1h41m (h=30.8° k= 96.8% waning Sco colon=107°)
p	10 Apr 1 BC	Sat	1721158	22h35m (az=122°)	7h17m (az=240°)	2h29m (h=27.5° k= 92.5% waning Oph colon=120°)

Notes: (1) Azimuth direction (az) for moonrises and moonsets are in degrees counting from geographic north
(0°) clockwise to the east direction. East is 90°, South 180°, West 270°. (2) Transit is the moment when

the moon crosses the north meridian i.e., it stands exactly in north direction. There the moon reaches its
highest point on its diurnal journey. Times are listed only if they fall within the chosen interval,
starting at the start time. Missing values indicate that the event does not take place at the underlying
interval. (3) The moon phase ratio (k) is the illuminated fraction of the lunar disk to its entire area. (4)
The moon is within the border of the given constellation of stars. The borders of the actual constellations
have been defined by the International Astronomical Union (IAU).

Christ Appears in the Land of Bountiful to the Nephites and the Lamanites

3 Nephi 10:18

> And it came to pass that in the ending of the thirty and fourth year, behold,
> I will show unto you that the people of Nephi who were spared, and also
> those who had been called Lamanites, who had been spared, did have great
> favors shown unto them, and great blessings poured out upon their heads,
> insomuch that soon after the ascension of Christ into heaven he did truly
> manifest himself unto them —

In this verse there are two references to time for the sequence of events in America during
AD 33 -- (1) "in the ending of the thirty and fourth year" and (2) "soon after the ascension
of Christ into heaven". I will now explain how these points fit the lunar standstill of 9:56
p.m., Saturday, 3 October AD 33, and the Mosaic Law which required the Children of Israel
to present themselves at the Temple on the last day of Tabernacles in the morning of
Sunday, 4 October AD 33.

Let's look at these events in chronological order and take point (2) first. Christ's resurrection
was on 16 Nisan [Sunday morning, 5 April AD 33]. Forty days after His resurrection His
ascension occurred on the Mount of Olives on 11 Iyar [Thursday, 14 May AD 33]. Mormon
recorded in 3 Nephi 10:18 that Christ came to America "soon after" His ascension.

Point (1) is a little more complicated. In the Hebrew calendar Tishri marks the end of the
harvest and the start of an administrative year. Tishri is like the ending of an accounting
year which allows for a time of reflection, introspection and renewal. Nevertheless,
according to the Old Testament Tishri is the seventh month of the year and Nisan, the month
of Passover, is the first month of the year.

It is interesting to note that in Exodus 23:16 the Bible uses a "end of the year" phrase to
describe the Feast of Tabernacles. The Old Testament says the "feast of ingathering
[Tabernacles], which is *in the end of the year*". Mormon wrote in 3 Nephi 10:18 that "*in
the ending of* the thirty and fourth year*" Christ appeared to the Nephites and the Lamanites.
Mormon was simply using the Biblical reference where Tabernacles is identified as being
"in the end of the year", even though Tabernacles is in Tishri, the seventh month of the year.
I think that the Bible uses the term "*the end of the year*" for the timing of Tabernacles from
the fact that the people have gathered the harvest and as such it is the end of their growing
year. They are then commanded to present themselves before the Lord at the Temple on the
last day of Tabernacles, the ending of the year.

Tishri is a month of harvests and of feasts. In Tishri the growing season comes to an end "*... in the ending of the thirty and fourth year ...*". The month of Tishri was a time to bring in the harvest and to gather believers so they could enjoy good fellowship and fresh food.

There are three holidays in this month: (a) 1 Tishri -- *Rosh Hashanah* [New Year], (b) 10 Tishri -- *Yom Kippur* [The Day of Atonement] and (b) 15-21 Tishri -- *Sukkot* [Feast of Tabernacles].

According to the Law of Moses, the last day of the Feast of Tabernacles is the third and the last time in the year AD 33 when believers are commanded to gather together at the Temple. This is an event about which Mormon writes in 3 Nephi 11:1. The last day of Tabernacles in AD 33 starts as the sun sets in Newark, Ohio and as the moon rises at its highest standstill at 9:56 p.m. on Saturday, 3 October AD 33. On the morning of 21 Tishri [Sunday, 4 October AD 33] Christ appeared when the Nephites and the Lamanites were assembled in the Land of Bountiful keeping the Law of Moses by observing the last day of Tabernacles at the Temple. At the rising of the moon the central axis of the Newark Earthworks was in perfect alignment with the rays of the moon. At that time the Newark Earthworks fulfilled the full measure of its design and marked the 51.7° maximum moonrise azimuth from true north. At that moment in Newark, Ohio sunlight covered 60% of the surface of the waning moon. The moon rose on the horizon at its maximum northern position in the standstill cycle of 18.6 years. In AD 33 on the last day of Tabernacles the calibration and the orientation of the Newark Earthworks exactly identified the starting point for the day when Christ would appear in America at the Temple in the Land of Bountiful.

3 Nephi 11:1

> And now it came to pass that there were a great multitude gathered together, of the people of Nephi, round about the temple which was in the land Bountiful; and they were marveling and wondering one with another, and were showing one to another the great and marvelous change which had taken place.

This chart identifies three moonrises which are in perfect or near perfect alignment with the central axis of the Octagon and Great Circle at the Newark Earthworks from 16 September AD 32 to 3 October AD 33. The lunar events illustrated in the above figure are associated with the moon standstills of the 18.6-year lunar cycle as observed from the GPS coordinates for the Great Circle. Scholars are in agreement that the ancient people who maintained the Newark Earthworks in AD 32 and AD 33 identified these specific lunar events as being significant. Many native people would see this set of standstill moonrises only once in their adult lives. The blue line identified in the figure is set at the 51.8 degree azimuth which is an alignment to the central axis of the geometric structures in Newark, Ohio. This moonrise azimuth was fixed within the design of earthen structures which required the ancient people to employ millions of man hours and to move millions of cubic feet of dirt for their creation. It would take Europeans more than a hundred and fifty years before they could understand the relationship of the site's central azimuth to the complex cycles of the moon. The azimuth was precisely fixed to the location of the geometric structures so people could observe moon standstills. The azimuth exactly accounts for effects which the 5.1° tilt of the moon's axis in relation to the axis of the earth has on the moon's movements as seen from Newark, Ohio. Modern science can certainly measure the preciseness of this alignment. It is a wonder how the ancient people in Ohio were able to do this without the mathematics of Newton's calculus and without the use of modern computers.

Moonrise Alignment to Central Axis of Newark Earthworks
AD 32 to AD 33

	Julian Date (UT)	Week Day	Julian Day Number	Moonrise Time UT-5	Moonrise Azimuth°	Moon Phase	Sun Elev°
A	16 Sep 32 AD	Tue	1733004.68	11:23:43 PM	51.9	0.45	-44.28
B	06 Sep 33 AD	Sun	1733359.71	12:04:13 AM	51.8	0.43	-42.23
C	03 Oct 33 AD	Sat	1733386.62	09:56:09 PM	51.7	0.60	-40.85
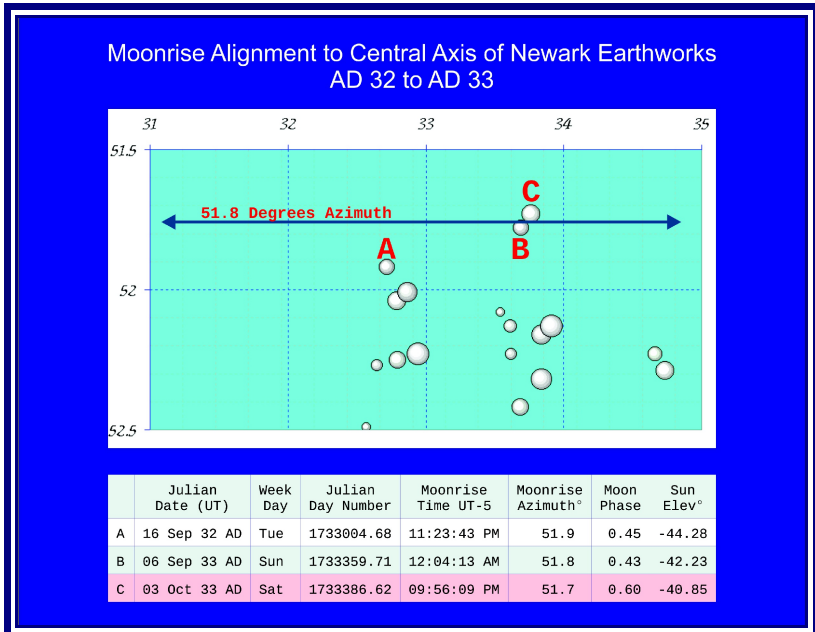
Why is any of this important to the time line of the Book of Mormon? The Book of Mormon testifies that the resurrected Christ visited America. His visit had a profound effect on the lives of the people. After His visit they lived in peace and harmony for 200 years. A central thesis of this study is that the timing of Christ's visit to America was in perfect alignment with the lunar event which the Newark Earthworks was designed to identify. This lunar event in AD 33 is marked in the chart as point "C" and it is the starting point for the last day of the Feast of Tabernacles when Moses commanded the Children of Israel that they should present themselves before the Lord at the Temple. On this very day the Nephites and the Lamanites were at the Temple in the Land of Bountiful. On this very day the Lord Jesus

Christ appeared to the Nephites and the Lamanites. During His visit He ministered to these people and He gave them power to administer His saving ordinances.

Three Feasts in the Year at the Temple

Moses revealed he times for three major festivals which required pilgrimages to the Temple in Jerusalem — Passover (*Pesach*), Weeks or Pentecost (*Shavuot*), and Tabernacles (*Sukkot*). When the ancient Israelites went to the Temple they would participate in festivities and ritual worship in conjunction with the services of the priests (*kohanim*) at the Temple. We read from the Bible the commandments for the Children of Israel to appear before the Lord at the Temple.

Exodus 23:

> 14 Three times thou shalt keep a feast unto me in the year.
> 15 Thou shalt keep the feast of unleavened bread: (thou shalt eat unleavened bread seven days, as I commanded thee, in the time appointed of the month Abib; for in it thou camest out from Egypt: and none shall appear before me empty:)
> 16 And the feast of harvest, the firstfruits of thy labours, which thou hast sown in the field: and the feast of ingathering, which is in the end of the year, when thou hast gathered in thy labours out of the field.
> 17 Three times in the year all thy males shall appear before the Lord God.

Jewish Feasts (Red)
When Law Commands Believers to be at the Temple

Year 3793 - 3794 — Year AD 33

Jewish	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Julian
(10) Tebet					10	11	12						1	2	3	January
	13	14	15	16	17	18	19	4	5	6	7	8	9	10	
	20	21	22	23	24	25	26	11	12	13	14	15	16	17	
	27	28	29	1	2	3	4	18	19	20	21	22	23	24	
(11) Shebet	5	6	7	8	9	10	11	25	26	27	28	29	30	31	
	12	13	14	15	16	17	18	1	2	3	4	5	6	7	February
	19	20	21	22	23	24	25	8	9	10	11	12	13	14	
	26	27	28	29	30	1	2	15	16	17	18	19	20	21	
(12) Adar	3	4	5	6	7	8	9	22	23	24	25	26	27	28	
	10	11	12	13	14	15	16	1	2	3	4	5	6	7	March
	17	18	19	20	21	22	23	8	9	10	11	12	13	14	
	24	25	26	27	28	29	1	15	16	17	18	19	20	21	
(1) Nisan Passover	2	3	4	5	6	7	8	22	23	24	25	26	27	28	
	9	10	11	12	13	14	15	29	30	31	1	2	3	4	April
	16	17	18	19	20	21	22	5	6	7	8	9	10	11	
	23	24	25	26	27	28	29	12	13	14	15	16	17	18	
	30	1	2	3	4	5	6	19	20	21	22	23	24	25	
(2) Iyar	7	8	9	10	11	12	13	26	27	28	29	30	1	2	May
	14	15	16	17	18	19	20	3	4	5	6	7	8	9	
	21	22	23	24	25	26	27	10	11	12	13	14	15	16	
(3) Sivan Pentecost	28	29	1	2	3	4	5	17	18	19	20	21	22	23	
	6	7	8	9	10	11	12	24	25	26	27	28	29	30	
	13	14	15	16	17	18	19	31	1	2	3	4	5	6	June
	20	21	22	23	24	25	26	7	8	9	10	11	12	13	
	27	28	29	30	1	2	3	14	15	16	17	18	19	20	
(4) Tammuz	4	5	6	7	8	9	10	21	22	23	24	25	26	27	
	11	12	13	14	15	16	17	28	29	30	1	2	3	4	July

Jewish	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Julian
(4) Tammuz	18	19	20	21	22	23	24	5	6	7	8	9	10	11	July
	25	26	27	28	29	1	2	12	13	14	15	16	17	18	
(5) Av	3	4	5	6	7	8	9	19	20	21	22	23	24	25	
	10	11	12	13	14	15	16	26	27	28	29	30	31	1	August
	17	18	19	20	21	22	23	2	3	4	5	6	7	8	
	24	25	26	27	28	29	30	9	10	11	12	13	14	15	
(6) Elul	1	2	3	4	5	6	7	16	17	18	19	20	21	22	
	8	9	10	11	12	13	14	23	24	25	26	27	28	29	
	15	16	17	18	19	20	21	30	31	1	2	3	4	5	September
	22	23	24	25	26	27	28	6	7	8	9	10	11	12	
	29	1	2	3	4	5	6	13	14	15	16	17	18	19	
(7) Tishri Tabernacles Hoshanah Rabbah	7	8	9	10	11	12	13	20	21	22	23	24	25	26	
	14	15	16	17	18	19	20	27	28	29	30	1	2	3	October
	21	22	23	24	25	26	27	4	5	6	7	8	9	10	
	28	29	30	1	2	3	4	11	12	13	14	15	16	17	
(8) Heshvan	5	6	7	8	9	10	11	18	19	20	21	22	23	24	
	12	13	14	15	16	17	18	25	26	27	28	29	30	31	
	19	20	21	22	23	24	25	1	2	3	4	5	6	7	November
	26	27	28	29	1	2	3	8	9	10	11	12	13	14	
(9) Kislev	4	5	6	7	8	9	10	15	16	17	18	19	20	21	
	11	12	13	14	15	16	17	22	23	24	25	26	27	28	
	18	19	20	21	22	23	24	29	30	1	2	3	4	5	December
	25	26	27	28	29	1	2	6	7	8	9	10	11	12	
(10) Tebet	3	4	5	6	7	8	9	13	14	15	16	17	18	19	
	10	11	12	13	14	15	16	20	21	22	23	24	25	26	
	17	18	19	20	21			27	28	29	30	31			

Deuteronomy 16:

> 16 Three times in a year shall all thy males appear before the Lord thy God in the place which he shall choose; in the feast of unleavened bread, and in the feast of weeks, and in the feast of tabernacles: and they shall not appear before the Lord empty:
> 17 Every man shall give as he is able, according to the blessing of the Lord thy God which he hath given thee.

Lunar Alignments at Newark Earthworks

The following tables are calculated for: (a) Longitude 82º 27' 2" West, (b) Latitude 40º 3' 4" North, (c) Altitude 880 feet, and (d) Horizon Elevation 0º 30' 0". Moonrise is defined as instant when the moon's disk is on the horizon. These moonrises are significant because they are in perfect or near perfect alignment with the central axis of the Octagon and its associated Great Circle. The 18.6-year cycle is evident from one set of aligned moonrises to the next set. The years in the table are within the time frame of the Book of Mormon. All of the aligned moonrises occurred from late August to mid-November.[13]

The aligned moonrises which are most interesting to this study are (a) 6 BC, the time of Samuel, the Lamanite; and (b) AD 33, the year of Christ's appearance in America. All visible moonrises with azimuths of less than 52º are listed in the following table.. The alignment through the Octagon and the Great Circle is 51.8º. There are 200 aligned moonrises in the table. It is noteworthy that none of the aligned moonrises over a period of 895 years is a full moon. None of these moonrises with a northern azimuth of less than 52° is a full moon. I will let PhD astronomers make their calculations and give their comments on that point. The moon's phases in the table are given as a number where 1.0 = full, 0.5 = half, etc.

Maximum Northern Moonrises in Alignment with the Central Axis of Newark Earthworks at Octagon and Great Circle, Moonrise Azimuth Less Than 52º Within Time Frame for the Book of Mormon from 490 BC to AD 405					
#	Julian Calendar Date and Weekday	Julian Day Number (UT)	Time (UT-5)	Moonrise Azimuth	Moon Phase	Sun Elev Degrees
1	17 Sep 490 BC Tue	1542709.70	23:41:48	51.79	0.46	-43.91
2	14 Oct 490 BC Mon	1542736.61	21:32:42	51.81	0.63	-39.37
3	11 Nov 490 BC Mon	1542764.55	20:16:38	51.94	0.73	-32.82
4	06 Sep 489 BC Sun	1543064.71	00:04:37	51.70	0.43	-40.82
5	03 Oct 489 BC Sat	1543091.62	21:58:19	51.79	0.60	-39.78

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[13]The lunar events are for pre-historic periods. They are calculated by computer programs which are available from Pierre Bretagnon and Jean-Louis Simon, *Planetary Programs and Tables from -4000 to +2800*, Wlliam-Bell, Inc., 1986. Other astronomical programs are available and offer comparable results within the tight limits of time and place as found in this study.

6	17 Sep 471 BC Fri	1549649.70	23:50:33	51.84	0.45	-44.48
7	14 Oct 471 BC Thu	1549676.61	21:42:50	51.67	0.63	-41.15
8	07 Sep 470 BC Wed	1550004.71	23:55:13	51.86	0.41	-40.67
9	17 Sep 452 BC Mon	1556589.69	23:38:29	51.77	0.44	-44.05
10	14 Oct 452 BC Sun	1556616.61	21:31:59	51.72	0.62	-39.51
11	31 Aug 434 BC Sat	1563146.73	00:27:58	51.95	0.34	-38.84
12	25 Oct 434 BC Fri	1563201.59	21:16:04	51.84	0.64	-40.05
13	17 Sep 433 BC Thu	1563529.69	23:30:30	51.81	0.40	-43.73
14	14 Oct 433 BC Wed	1563556.60	21:23:05	51.82	0.59	-38.16
15	31 Aug 415 BC Tue	1570086.73	00:27:23	51.74	0.30	-38.98
16	27 Sep 415 BC Mon	1570113.64	22:16:37	51.90	0.49	-40.12
17	25 Oct 415 BC Mon	1570141.59	21:08:57	51.77	0.61	-38.91
18	21 Nov 415 BC Sun	1570168.50	19:03:56	51.92	0.80	-20.47
19	21 Aug 414 BC Sun	1570441.75	01:03:34	51.94	0.24	-35.04
20	10 Sep 397 BC Sun	1576671.72	00:14:12	51.97	0.32	-42.82
21	07 Oct 397 BC Sat	1576698.63	22:03:06	51.78	0.51	-42.19
22	03 Aug 396 BC Fri	1576998.80	02:09:17	51.89	0.15	-26.56
23	31 Aug 396 BC Fri	1577026.74	00:52:08	51.94	0.26	-38.89
24	27 Sep 396 BC Thu	1577053.65	22:39:05	51.62	0.44	-43.06
25	24 Oct 396 BC Wed	1577080.56	20:32:43	51.87	0.64	-32.17
26	14 Aug 378 BC Wed	1583583.79	01:58:43	51.99	0.17	-30.04
27	10 Sep 378 BC Tue	1583610.70	23:45:38	51.72	0.35	-41.68
28	07 Oct 378 BC Mon	1583637.61	21:36:53	51.97	0.54	-37.97
29	08 Oct 378 BC Tue	1583638.65	22:29:26	51.82	0.46	-45.96
30	04 Nov 378 BC Mon	1583665.56	20:22:10	51.74	0.66	-32.74
31	01 Dec 378 BC Sun	1583692.47	18:18:35	52.00	0.86	-12.83
32	30 Aug 377 BC Sun	1583965.74	00:39:34	51.88	0.31	-38.87
33	26 Sep 377 BC Sat	1583992.65	22:30:03	51.77	0.48	-41.75
34	17 Oct 360 BC Sat	1590222.60	21:27:00	51.88	0.56	-39.89
35	13 Aug 359 BC Fri	1590522.78	01:45:38	51.82	0.24	-30.82
36	09 Sep 359 BC Thu	1590549.69	23:37:57	51.69	0.40	-41.05
37	07 Oct 359 BC Thu	1590577.64	22:20:54	51.73	0.51	-44.61
38	03 Nov 359 BC Wed	1590604.55	20:11:24	51.78	0.69	-30.58

39	19 Sep 341 BC Tue	1597134.69	23:29:04	51.76	0.43	-44.71
40	16 Oct 341 BC Mon	1597161.60	21:19:22	51.75	0.60	-38.41
41	13 Nov 341 BC Mon	1597189.54	20:02:32	51.98	0.71	-30.81
42	12 Aug 340 BC Sun	1597461.77	01:27:36	51.85	0.31	-31.72
43	08 Sep 340 BC Sat	1597488.68	23:22:48	51.93	0.47	-39.87
44	06 Oct 340 BC Sat	1597516.63	22:08:48	51.74	0.57	-42.72
45	23 Aug 322 BC Fri	1604046.76	01:16:24	51.85	0.33	-35.42
46	19 Sep 322 BC Thu	1604073.67	23:10:21	51.64	0.49	-43.06
47	16 Oct 322 BC Wed	1604100.58	21:00:44	51.95	0.66	-34.98
48	17 Oct 322 BC Thu	1604101.62	21:58:21	51.99	0.59	-44.89
49	13 Nov 322 BC Wed	1604128.53	19:43:08	51.85	0.77	-27.01
50	08 Sep 321 BC Tue	1604428.69	23:35:12	51.91	0.47	-40.82
51	29 Sep 304 BC Tue	1610658.67	22:59:25	51.91	0.52	-46.30
52	26 Oct 304 BC Mon	1610685.57	20:47:38	51.87	0.69	-35.64
53	19 Sep 303 BC Sun	1611013.68	23:20:00	51.72	0.49	-43.99
54	16 Oct 303 BC Sat	1611040.59	21:11:46	51.80	0.67	-37.04
55	01 Sep 285 BC Fri	1617570.72	00:09:40	51.94	0.42	-39.66
56	26 Oct 285 BC Thu	1617625.58	20:56:04	51.80	0.69	-37.29
57	19 Sep 284 BC Wed	1617953.67	23:08:28	51.84	0.48	-43.21
58	06 Aug 266 BC Tue	1624483.80	02:11:31	51.99	0.21	-27.20
59	02 Sep 266 BC Mon	1624510.71	23:56:44	51.95	0.39	-39.44
60	30 Sep 266 BC Mon	1624538.66	22:52:18	51.87	0.50	-45.89
61	27 Oct 266 BC Sun	1624565.57	20:45:34	51.81	0.68	-35.47
62	12 Sep 248 BC Sat	1631095.69	23:40:20	51.90	0.41	-42.78
63	06 Aug 247 BC Fri	1631423.80	02:13:13	51.99	0.16	-27.15
64	02 Sep 247 BC Thu	1631450.71	23:55:22	51.84	0.34	-39.53
65	30 Sep 247 BC Thu	1631478.66	22:45:15	51.90	0.46	-45.28
66	27 Oct 247 BC Wed	1631505.57	20:39:20	51.88	0.66	-34.43
67	12 Sep 229 BC Tue	1638035.70	23:41:09	51.70	0.36	-42.97
68	09 Oct 229 BC Mon	1638062.61	21:32:38	51.79	0.56	-38.63
69	02 Sep 228 BC Sun	1638390.72	00:19:29	51.92	0.30	-40.26
70	29 Sep 228 BC Sat	1638417.63	22:08:32	51.90	0.49	-40.42
71	20 Oct 211 BC Sat	1644647.60	21:20:17	51.85	0.58	-39.95

72	16 Aug 210 BC Fri	1644947.77	01:25:45	51.81	0.21	-33.11
73	12 Sep 210 BC Thu	1644974.68	23:13:52	51.80	0.39	-40.94
74	10 Oct 210 BC Thu	1645002.62	21:57:40	51.72	0.51	-42.70
75	06 Nov 210 BC Wed	1645029.54	19:52:04	51.87	0.70	-27.72
76	22 Sep 192 BC Tue	1651559.67	23:03:42	51.69	0.41	-44.26
77	19 Oct 192 BC Mon	1651586.58	20:55:41	51.84	0.60	-35.44
78	16 Nov 192 BC Mon	1651614.53	19:42:33	51.97	0.73	-27.56
79	15 Aug 191 BC Sun	1651886.76	01:14:40	51.85	0.27	-33.43
80	11 Sep 191 BC Sat	1651913.67	23:07:14	51.95	0.44	-40.15
81	09 Oct 191 BC Sat	1651941.62	21:49:20	51.81	0.55	-41.22
82	30 Oct 174 BC Sat	1658171.57	20:46:48	51.99	0.62	-36.63
83	25 Aug 173 BC Fri	1658471.75	01:05:38	51.88	0.30	-37.12
84	21 Sep 173 BC Thu	1658498.66	22:56:59	51.62	0.46	-43.38
85	18 Oct 173 BC Wed	1658525.57	20:47:52	51.90	0.64	-33.87
86	15 Nov 173 BC Wed	1658553.52	19:30:37	51.92	0.75	-25.21
87	04 Sep 155 BC Tue	1665055.71	00:04:38	51.96	0.39	-40.84
88	02 Oct 155 BC Tue	1665083.66	22:48:47	51.94	0.49	-46.72
89	29 Oct 155 BC Mon	1665110.57	20:37:49	51.82	0.67	-34.82
90	25 Aug 154 BC Sun	1665410.74	00:45:54	51.76	0.37	-37.41
91	21 Sep 154 BC Sat	1665437.65	22:39:43	51.76	0.53	-41.32
92	19 Oct 154 BC Sat	1665465.60	21:26:00	51.91	0.63	-40.69
93	04 Sep 136 BC Fri	1671995.73	00:35:04	51.97	0.39	-41.30
94	01 Oct 136 BC Thu	1672022.64	22:27:27	51.67	0.56	-43.96
95	28 Oct 136 BC Wed	1672049.55	20:15:01	51.94	0.73	-30.42
96	21 Sep 135 BC Tue	1672377.66	22:50:23	51.87	0.53	-42.63
97	07 Aug 117 BC Mon	1678907.78	01:47:04	51.95	0.28	-29.80
98	01 Oct 117 BC Sun	1678962.65	22:35:15	51.83	0.56	-45.08
99	28 Oct 117 BC Sat	1678989.56	20:24:16	51.88	0.73	-32.26
100	14 Sep 099 BC Fri	1685519.68	23:23:50	51.87	0.48	-42.90
101	08 Nov 099 BC Thu	1685574.55	20:08:15	51.98	0.76	-31.39
102	02 Oct 098 BC Wed	1685902.64	22:22:31	51.89	0.54	-43.62
103	18 Aug 080 BC Tue	1692432.77	01:21:50	51.95	0.27	-34.36
104	14 Sep 080 BC Mon	1692459.67	23:09:36	51.83	0.45	-41.95

105	08 Nov 080 BC Sun	1692514.54	19:59:00	51.96	0.75	-29.70
106	25 Sep 062 BC Sat	1699044.66	22:54:00	51.90	0.47	-44.71
107	18 Aug 061 BC Fri	1699372.77	01:25:01	51.97	0.22	-34.33
108	14 Sep 061 BC Thu	1699399.67	23:09:35	51.73	0.41	-42.11
109	25 Sep 043 BC Tue	1705984.66	22:56:33	51.75	0.43	-45.12
110	22 Oct 043 BC Mon	1706011.58	20:49:51	51.78	0.62	-35.51
111	18 Aug 042 BC Sun	1706311.75	00:53:43	51.91	0.25	-35.28
112	15 Sep 042 BC Sun	1706339.69	23:36:42	52.00	0.36	-44.19
113	12 Oct 042 BC Sat	1706366.60	21:27:09	51.90	0.55	-38.97
114	28 Aug 024 BC Fri	1712896.74	00:43:08	51.81	0.28	-39.00
115	24 Sep 024 BC Thu	1712923.65	22:31:51	51.68	0.46	-42.15
116	22 Oct 024 BC Thu	1712951.60	21:17:23	51.95	0.58	-40.53
117	18 Nov 024 BC Wed	1712978.51	19:12:08	51.98	0.77	-22.20
118	07 Sep 006 BC Tue	1719480.69	23:40:38	51.97	0.37	-41.37
119	05 Oct 006 BC Tue	1719508.64	22:22:48	51.81	0.48	-45.05
120	01 Nov 006 BC Mon	1719535.55	20:15:18	51.85	0.67	-31.51
121	27 Aug 005 BC Sun	1719835.73	00:34:10	51.79	0.33	-38.87
122	23 Sep 005 BC Sat	1719862.64	22:25:46	51.78	0.50	-41.17
123	21 Oct 005 BC Sat	1719890.59	21:08:55	51.99	0.61	-38.88
124	10 Aug 014 AD Fri	1726392.78	01:39:26	51.92	0.26	-31.23
125	06 Sep 014 AD Thu	1726419.69	23:33:15	51.91	0.43	-40.73
126	04 Oct 014 AD Thu	1726447.64	22:16:13	51.70	0.53	-43.94
127	31 Oct 014 AD Wed	1726474.55	20:05:52	51.87	0.71	-29.59
128	27 Aug 015 AD Tue	1726774.72	00:16:13	51.93	0.40	-38.55
129	16 Sep 032 AD Tue	1733004.68	23:23:43	51.92	0.45	-44.28
130	06 Sep 033 AD Sun	1733359.71	00:04:13	51.78	0.43	-42.23
131	03 Oct 033 AD Sat	1733386.62	21:56:09	51.73	0.60	-40.85
132	20 Aug 051 AD Fri	1739916.75	01:00:51	51.96	0.36	-35.96
133	16 Sep 051 AD Thu	1739943.66	22:55:35	51.98	0.52	-41.66
134	14 Oct 051 AD Thu	1739971.61	21:43:54	51.82	0.62	-42.61
135	03 Oct 052 AD Tue	1740326.63	22:05:14	51.92	0.60	-42.32
136	20 Aug 070 AD Mon	1746856.75	01:00:35	51.89	0.34	-36.10
137	16 Sep 070 AD Sun	1746883.66	22:54:07	51.87	0.52	-41.67

138	10 Nov 070 AD Sat	1746938.52	19:35:36	52.00	0.79	-25.74
139	26 Sep 088 AD Fri	1753468.65	22:38:16	51.88	0.54	-44.11
140	20 Aug 089 AD Thu	1753796.74	00:49:46	51.90	0.31	-36.49
141	31 Aug 107 AD Tue	1760381.73	00:33:32	51.94	0.33	-40.34
142	27 Sep 107 AD Mon	1760408.64	22:23:41	51.78	0.52	-42.48
143	20 Aug 108 AD Sun	1760736.74	00:52:10	51.98	0.26	-36.57
144	07 Oct 125 AD Sat	1766993.63	22:08:57	51.99	0.54	-44.41
145	03 Aug 126 AD Fri	1767293.79	01:54:30	51.99	0.17	-28.67
146	31 Aug 126 AD Fri	1767321.73	00:38:22	52.00	0.28	-40.45
147	27 Sep 126 AD Thu	1767348.64	22:25:28	51.71	0.47	-42.86
148	24 Oct 126 AD Wed	1767375.56	20:20:36	51.96	0.67	-30.98
149	09 Sep 144 AD Tue	1773905.68	23:26:16	51.92	0.37	-42.03
150	07 Oct 144 AD Tue	1773933.63	22:13:38	51.90	0.50	-45.22
151	03 Nov 144 AD Mon	1773960.55	20:08:10	51.88	0.69	-30.97
152	30 Aug 145 AD Sun	1774260.72	00:10:59	51.81	0.32	-40.09
153	26 Sep 145 AD Sat	1774287.63	22:01:19	51.95	0.50	-39.37
154	13 Aug 163 AD Fri	1780817.76	01:18:48	51.91	0.24	-33.44
155	10 Sep 163 AD Fri	1780845.71	00:01:33	51.93	0.34	-43.90
156	07 Oct 163 AD Thu	1780872.62	21:50:56	51.70	0.52	-41.66
157	03 Nov 163 AD Wed	1780899.53	19:44:58	51.97	0.71	-26.43
158	29 Aug 164 AD Tue	1781199.71	00:03:34	51.97	0.37	-39.69
159	19 Sep 181 AD Tue	1787429.67	22:59:16	51.88	0.43	-43.79
160	12 Aug 182 AD Sun	1787756.76	01:08:53	51.94	0.30	-33.66
161	09 Sep 182 AD Sun	1787784.70	23:54:05	51.87	0.40	-43.41
162	06 Oct 182 AD Sat	1787811.61	21:44:34	51.76	0.57	-40.46
163	22 Aug 200 AD Fri	1794341.75	00:59:17	51.91	0.32	-37.30
164	18 Sep 200 AD Thu	1794368.66	22:51:49	51.77	0.49	-42.81
165	16 Oct 200 AD Thu	1794396.61	21:35:30	51.92	0.59	-42.48
166	12 Nov 200 AD Wed	1794423.52	19:23:48	51.94	0.77	-24.02
167	08 Sep 201 AD Tue	1794723.69	23:34:06	51.86	0.47	-42.21
168	22 Aug 219 AD Sun	1801280.73	00:30:48	51.92	0.39	-37.49
169	19 Sep 219 AD Sun	1801308.68	23:22:23	51.93	0.49	-45.66
170	16 Oct 219 AD Sat	1801335.59	21:11:51	51.80	0.66	-38.26

171	01 Sep 237 AD Fri	1807865.72	00:18:01	51.94	0.42	-41.20
172	28 Sep 237 AD Thu	1807892.63	22:11:16	51.90	0.58	-41.77
173	22 Aug 238 AD Wed	1808220.73	00:30:40	51.94	0.38	-37.63
174	01 Sep 256 AD Mon	1814805.72	00:14:37	51.87	0.41	-41.30
175	28 Sep 256 AD Sun	1814832.63	22:08:18	51.83	0.58	-41.51
176	09 Oct 274 AD Fri	1821417.62	21:52:40	51.97	0.61	-43.00
177	02 Sep 275 AD Thu	1821745.71	00:02:03	51.84	0.37	-41.17
178	29 Sep 275 AD Wed	1821772.62	21:54:32	51.93	0.56	-39.67
179	12 Sep 293 AD Tue	1828330.70	23:46:39	51.99	0.39	-44.72
180	09 Oct 293 AD Mon	1828357.61	21:38:46	51.82	0.58	-40.93
181	02 Sep 294 AD Sun	1828685.71	00:05:56	51.94	0.33	-41.43
182	29 Sep 294 AD Sat	1828712.62	21:55:46	51.94	0.52	-39.99
183	15 Aug 312 AD Fri	1835242.76	01:08:08	51.90	0.23	-35.06
184	09 Oct 312 AD Thu	1835297.61	21:42:50	51.79	0.54	-41.72
185	05 Nov 312 AD Wed	1835324.53	19:38:39	51.97	0.73	-25.97
186	22 Sep 330 AD Tue	1841854.65	22:42:50	51.85	0.44	-43.61
187	12 Sep 331 AD Sun	1842209.69	23:29:19	51.83	0.38	-43.68
188	09 Oct 331 AD Sat	1842236.60	21:20:19	51.87	0.56	-37.82
189	25 Aug 349 AD Fri	1848766.73	00:37:20	51.85	0.30	-39.04
190	21 Sep 349 AD Thu	1848793.64	22:27:31	51.85	0.47	-41.57
191	19 Oct 349 AD Thu	1848821.59	21:10:58	51.86	0.59	-39.42
192	15 Nov 349 AD Wed	1848848.50	19:05:04	51.99	0.78	-20.97
193	11 Sep 350 AD Tue	1849148.68	23:23:03	51.95	0.43	-43.02
194	02 Oct 367 AD Tue	1855378.64	22:18:44	51.93	0.49	-44.46
195	24 Aug 368 AD Sun	1855705.73	00:28:18	51.80	0.36	-38.85
196	20 Sep 368 AD Sat	1855732.64	22:20:48	51.91	0.53	-40.50
197	18 Oct 368 AD Sat	1855760.59	21:03:27	51.87	0.63	-37.92
198	01 Oct 386 AD Thu	1862317.63	22:10:26	51.77	0.55	-43.10
199	21 Sep 387 AD Tue	1862672.66	22:51:50	51.93	0.53	-44.26
200	03 Sep 405 AD Sun	1869229.70	23:47:47	51.81	0.45	-41.59

LiDAR is an acronym for Light Detection and Ranging. In some applications the technology is alternatively referred to as Laser Detection and Ranging. In either case, the concept is the same. Laser light is aimed at a target and used to determine the distance to that target. The distance information is combined with GPS (Global Positioning Satellite) data. The result is a precise set of three-dimensional coordinates for any given point. For GIS applications, LiDAR is typically employed from aircraft. During a fly-over of a selected area, millions of laser pulses are bounced off the ground and anything else on or above the ground. Once properly filtered, the resulting LiDAR data can then be used to create very accurate surface maps using software programs such as ESRI ArcView.

Truth shall spring out of the earth;
and righteousness shall look down from heaven.

Psalms 8:11

Light Detection and Ranging
Newark Earthworks