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Abstract Review of *Angular Chronology: The Precolumbian Dating of Ancient America* (1994), by Michael M. Hobby, June M. Hobby, and Troy J. Smith.

Michael M. Hobby, June M. Hobby, and Troy J. Smith. *Angular Chronology: The Precolumbian Dating of Ancient America*. Coto Laurel, Puerto Rico: Zarahemla Foundation, 1994. 81 pp. \$6.95

Reviewed by V. Garth Norman

This publication by the Zarahemla Foundation (ZF, not to be confused with the Zarahemla Research Foundation), with Michael M. Hobby as director and principal author, purports to enlighten Book of Mormon students by revealing startling discoveries on the realities of Book of Mormon geography and history. ZF has adopted the theory that Panama correlates with the "narrow neck of land" as the foundation of its research. Unfortunately, this bias results in erroneous assumptions and conclusions as ZF attempts to recast southern Mesoamerica as the Jaredite land northward, although most researchers see southern Mesoamerica as the probable land southward.

The introduction sets forth a claimed "new discovery," termed *angular chronology*, as a breakthrough in pre-Columbian dating. Angular chronology is based upon the discovery of a change in the cardinal directions that supposedly occurred during the period in which such ancient American civilizations as the Hopewell mound builders of North America and the Preclassic Maya of Mesoamerica were at their zenith. It divides all of pre-Columbian time into two highly resolved chronological periods, separated by a great discontinuity.

It is not necessary to argue whether the cardinal-shift hypothesis is plausible. One must rely on archaeological and archaeoastronomical studies to determine if the Mesoamerican site-planning shift actually occurred. The underlying drive of this study is to find a southern Mesoamerican chronology that would fit a Jaredite land northward, north of Panama, in Central America. The authors claim "a profusion of evidence for which the skeptic will have great difficulty providing alternative explanations" (front matter), and, acting as devil's advocates, they could find none.

They claim that professors and colleagues (unnamed) who were invited to review their work were without exception overwhelmed by the weight of evidence supporting it. This claim is surprising, and without any references to actual Mesoamerican anthropologists, is not to be taken seriously in light of the fact that the claimed discoveries counter well-known facts within Mesoamerican anthropology.

The authors presume (1) that Mesoamerican sites were planned according to the cardinal directions and (2) that a widespread cardinal shift in Preclassic Mesoamerican sites occurred at around 1000–600 B.C. Presumed catastrophic forces from the shift supposedly altered the Carbon 14 deterioration rate, throwing the C14 readings forward. Therefore, the temple center of Izapa would have been built prior to 700 B.C, rather than around 300–200 B.C. But the authors' biased collection of data to prove a pre-conceived notion is fallacious.

One basic problem with the cardinal-shift hypothesis is that the site orientations are *not* identical. They vary over a range of about six degrees. If sites had been aligned to the cardinal directions based upon the Polaris hub or the equinoxes, they should all be the same, although we might allow for a few degrees of error. However, the only solid test of the cardinal-shift hypothesis is to look at the site-planning data.

The ruins of Teotihuacan and Izapa are cited as primary evidence for a cardinal shift with a central axis skewed about twenty degrees east of north. Had the authors examined the paper "Izapa: An Introduction,"¹ they would have known about a primary winter solstice sunrise orientation of the Izapa site plan. They would also have been introduced to my master's thesis, "Astronomical Orientations of Izapa Sculptures."²

In my thesis, I show Izapa to be a carefully constructed, Late Preclassic, temple astronomical observatory. The temple site was originally located where it would align directly on the Tajumulco

¹ Gareth W. Lowe, Thomas A. Lee, and Eduardo Martinez Espinosa, "Izapa: An Introduction to the Ruins and Monuments," Papers of the New World Archaeological Foundation, No. 31. (Provo, UT: Brigham Young University Press, 1982).

² V. Garth Norman, "Astronomical Orientations of Izapa Sculptures" (master's thesis, Brigham Young University, 1980).

volcanic peak with the summer solstice sunrise, as observed from the mountain peak. When viewed from Izapa, the sunrise angle projects from directly below the peak on a horizontal azimuth. This is so precise that Izapa must have been located for this astronomical alignment by the original settlers at Izapa in the fourteenth century B.C. Architectural structures and monuments built at Izapa around the third century B.C align with horizon sunrises for the solstices, equinox, zenith, and also Venus and moon cyclic extremes to create a grand observatory site plan. The three major northern mounds have an astronomical alignment scheme shown to be identical to a monuments plaza scheme (see fig.), which confirms that the astronomical plan in the original construction period of the mounds preceded or was at least contemporary with the monuments plan.

I observe in my thesis that the twenty-degree shift at Izapa accommodates an alignment system for the full range of visible astronomical cyclic standstills on the eastern horizon within the rectangular plaza structure. Thus this astronomical basis is a logical explanation for the origin of the widespread shift in the site-planning tradition throughout Mesoamerica. Izapa's astronomical site-plan orientations, from at least 1300 B.C to the major constructions around 300-200 B.C. that are still visible, refute the cardinal-shift hypothesis.

Teotihuacan provided the original "inspiration" for the ZF cardinal-shift hypothesis. The authors are unaware, however, that Teotihuacan's skewed axis is also astronomically fixed. During personal archaeoastronomy field work at Teotihuacan in the late 1970s, I witnessed that the Pyramid of the Moon on the north end of the central axis was positioned for calendar ritual function where the summer solstice sunset could be observed over a prominent mountain peak to the northwest. I also found that the diagonal azimuths of the pyramids align with the solstices.

The pyramid of Cholula, dating to the Late Preclassic in its inner structure, is oriented on its central axis to the summer solstice sunset over the Ixtacciuatl mountain peak.

Many major Preclassic sites were ignored by the authors in testing their cardinal-shift hypothesis. They seem unaware that some sites in the early period of Mesoamerican civilization, which

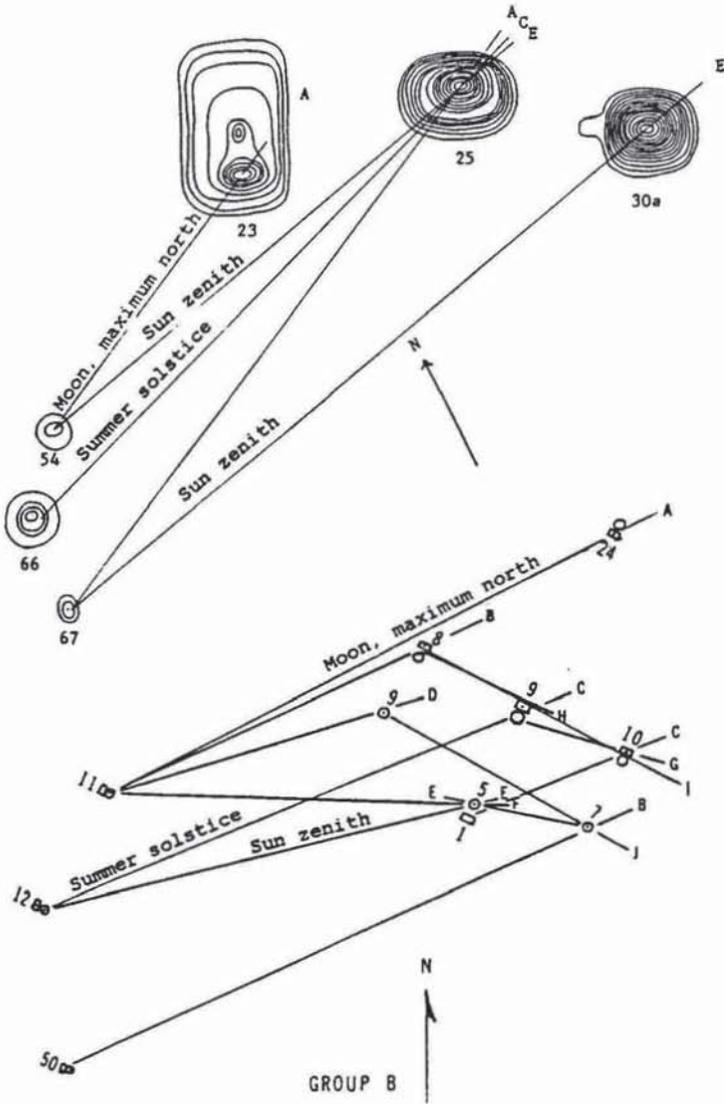


Figure. Astronomical alignments at Izapa Temple Center, Mexico.
 Top: Three western mounds to three northern mounds of central complex.
 Bottom: Group B monuments.
 Adapted from Norman, "Astronomical Orientations of Izapa Sculptures."

definitely would have been affected by the cardinal-shift hypothesis, are oriented to the cardinal directions. The central axis of the famous site of Monte Alban is due north. While the visible site is Classic period architecture that fits the shift argument, inner structures on the same axis date back to the Preclassic. The central axis of a well-known major Preclassic Olmec (Jaredite period) site on the Gulf Coast at San Lorenzo also aligns to the cardinal directions. It is not necessary to cite more archaeoastronomy data. The alleged cardinal shift did not occur as the authors claim.

The presumed catastrophic-shift effect that might have altered C14 dates backward by about 500 years did not happen either. Cross-dating tree-ring testing of C14 dates, in which the tree grows a new ring every year, has been extended back to about 6000 B.C. with the bristlecone pine.

The date-shift idea is also difficult to reconcile with Mesoamerican calendar dates. Astronomical testing of the Goodman-Thompson-Martinez correlation of the Maya calendar has in recent years confirmed that lunar conjunction dates engraved on many Maya monuments conform to the actual events. The Maya calendar was eventually deciphered by correlating calendar glyphs recorded by Maya priests after Spanish contact with the Gregorian calendar, and then reading backwards to find the correct period of the 400-year *bactun* cycles in the early Maya inscription dates.

A few cycle 7 *bactun* dates on Izapan style sculptures in southern Mesoamerica go back to the Late Preclassic B.C. I have deciphered one Calendar Round date of 1 Imix 4 Pop on Izapa Stela 12, through its calendar position plaza orientation to the autumn equinox, as September 20, 176 B.C. The date is in the Maya Calendar Round, based upon cross-dating from the Izapa excavation that includes C14 dates. This date is attached to a distance or base date number—a common part of Maya inscriptions—that is located in the Stela 12 base panel and goes back 421 years to the presumed start of the Izapa dynasty in 597 B.C. The exact base date depends on whether the Maya Vague Year of 365 days without leap-year adjustment was intended, or whether the actual tropical year from equinox to equinox was used.³

³ V. Garth Norman, unpublished manuscript.

My point in sharing this calendar data is to illustrate that Mesoamerican history is being pushed back by means of dated sculpture that is consistent with the Maya calendar. If any historic Book of Mormon connections are to be found in Mesoamerica, they will emerge from accumulating hard data through established Mesoamerican scholarly disciplines, not by taking wild leaps that wrench Mesoamerican civilization completely out of its sockets in order to reconcile it with a particular Book of Mormon geographical scheme.⁴

An irony in this study is that the facts demonstrate the opposite of what the authors had intended—that southern Mesoamerica, not South America as the authors believe, is the probable land southward of the Book of Mormon. Any Book of Mormon student who clings to the notion that Panama is the “narrow neck of land” must also reconcile that notion with the Prophet Joseph Smith’s search for Book of Mormon lands in Central America that led him finally to conclude, in a series of editorials in the *Times and Seasons* in 1842, that the Nephite capital of Zarahemla was located in Central America, not South America. That conclusion did not jive with earlier or later statements of Church leaders, not because the Prophet was wrong, or because he was not responsible for the statements, but because no evidence of direct revelation on the subject exists. Joseph Smith was apparently searching for the truth in history like every other “inspired” individual should do, by diligent study and by faith (D&C 88:78–79; 109:7).

⁴ For additional discussion on the calendar problem, see Bruce W. Warren’s review of *Angular Chronology* in this issue, pages 118–21.