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Appendix C: The Problem of Directions

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Directions and how they are referred to are cultural products, not givens in nature. Both the conceptual frameworks which define directions and the languages of reference for them differ dramatically from culture to culture and throughout history.

This point seems counter-intuitive to many people who do not have exposure to the literature of astronomy, anthropology or history which makes this clear. It may be thought, for example, that "everybody" knows about "the North Star." Actually even today a large majority of people could not point out Polaris, let alone base their everyday orientation upon its position. Furthermore, between 1500 B.C. and A.D. 1000, due to the astronomical phenomenon of precession, there was no clear-cut north polar star; the possible stars were all significantly off "true north" so as not to recommend themselves "obviously" to human viewers as fixed (see Hollis R. Johnson, "The Pole Star and North," 1977, draft paper accompanying a personal communication from Johnson to David A. Paler, copy in the possession of John Sorenson; or see most astronomy handbooks.)

Or a person may say that "east is obvious," it is "where the sun comes up." But as I write, in Utah in December, the sun is rising in the southeast. In northern winter the sun "comes up" on an observer in, say, Norway or northern Canada only in what we call the south, not the east. Even in the tropics, sunrise is at astronomical "east" on only two mornings per year. On every other day its rising point at the horizon is either to the north or south of astronomical "east," for much of the year by many degrees of arc.

A series of examples may be required to make clear that the labeling of directions is not obvious nor intuitive but really highly cultural, that is, arbitrary and that ultimately we can only determine empirically what the ancients meant by their direction terms.

Some General Ethnographic Models of Directions

Linguist Cecil Brown, asking the general question, where do the names for cardinal points come from in the evolutionary history of language?, concludes that the lexical coding of cardinal directions is a relatively recent development; recognition of local natural features (mountains, winds, river, sun, ocean) is primary, and names for the cardinal points "transparently" derive from natural features that are locally significant. There is no principle such as "where the sun comes up" that is at all general (Cecil H. Brown, *Where Do Cardinal Direction Terms Come from?* *Anthropological Linguistics* 25, 1983, pages 121-161).

Sanderson's historical information fits with Brown's. He says that before the thirteenth century A.D. adoption of the magnetic compass in Europe, the

concept of "north" was quite different from what it is today. The ancient world looked primarily east or west (the obvious directions in the Mediterranean which itself stretches along that axis). "The world appeared different to every group of people in those days, depending upon where they lived. . . . Straight ahead and left and right were much more important to early navigators than north, south, east, and west." For example, "to a Roman in Calabria, Egypt lay ahead (fore-ward), with Arabia and India beyond, while Greece was half left and North Africa right." When a medieval whaler, especially one of the Basque mariners out of the Bay of Biscay, set out on the Atlantic after his quarry (going as far as Newfoundland), he did not set up his chart with "'north' straight ahead; rather, he skews the chart around so that it points to where he wants to go. . . ." (Ivan Sanderson, *Follow the Whale*, Little Brown: Boston, 1956, page xvi).

Kirk and colleagues experimented to see how people distinguish directions in colloquial language, regardless of what technical models might be referred in their cultures. They would put down a cardboard arrow then ask an informant "what direction is that?" Done hundreds of times these results provided statistical information. Samoans, for example, came up with eight different words which sort out into three historical "layers" or "domains": (1) the European ESNW system (learned in school and now used partially or inconsistently in everyday speech), (2) crossing axes based mainly on the sea-inland contrast at a given spot, and (3) a system involving the prevailing winds, which come from three directions. (Incidentally, triangular coordinate systems are known from China and Tibet in the first millennium B.C.) In North Carolina a common answer to their query was "left" or "right," while in California the contrast frequently was "you-me." A proportion of U.S. informants also use a clock-face system with three o'clock to the right. (See Jerome Kirk, P. J. Epling, Paul A. Bick, and John Paul Boyd, *Captain Cook's Problem: An Experiment in Geographical Semantics*, in M. Dale Kindade, Kenneth L. Hale, and Oswald Werner, eds., *Linguistics and Anthropology*. In Honor of C. F. Voegelin, Peter de Ridder Press: Lisse, Belgium, 1975, pages 445-464.)

The "starpath" system of navigation used by Polynesians did not use cardinal points at all but depended on the horizon sighting points of certain rising stars. In this system "there may be no terms at all for north and south, while there is a great proliferation of directions in the quarters, none of which fall comfortably on southeast, northwest, etc." (See Charlotte O. Kursh and Theodora C. Kreps, *Starpaths: Linear Constellations in Tropical Navigation*, *Current Anthropology* 15, September 1974, pages 334-337.)

The everyday system of directions throughout Polynesia is based on the coast-inland contrast, often combined with "fore-back," without giving particular thought to ESNW (see Phil DeVita, *A Partial Investigation of the Spatial Forms of some Tuamotuan Dialects*, *Anthropological Linguistics* 13, 1971, pages 401-420; cf. Adrienne Kaeppler and H. A. Nimmo, *Directions in*

Pacific Traditional Literature: Essays in Honor of Katherine Luomala, B. P. Bishop Museum Special Publication 62, 1972, Honolulu).

Peoples in high latitudes may have some special problems in regard to directions because of the lack of winter sun but their models usually are quite similar to those of other groups. The Eskimo of the Labrador coast use two axes, above-below and "inside-outside" (this distinction is as far from logical as the feminine-masculine distinction in Romance languages). Where they live, down-river (below) happens to be east in our terms, so Bourquin, who wrote a grammar of the language a century ago, put "east" in his lexicon as the meaning for "kanna." But across the narrow sea in western Greenland, the same Eskimo term has to be translated "west" because lower elevation—the sea—there happens to coincide with our west (see Louis-Jacques Dorais, Some Notes on the Semantics of Eastern Eskimo Localizers, *Anthropological Linguistics* 13, 1971, page 92).

Other Arctic peoples have very complex systems. Ahtna, an Athapaskan language along the Copper River in Alaska, emphasizes stream drainages in its directionals. When the nine relevant roots, suffixes and prefixes are combined, a total of 216 directional words occur! And systems change over time and with environment. Navaho, a language related to Ahtna, in its dry environment thousands of miles to the south, has lost all the river-oriented roots. (See James Kari, A Note on Athapaskan Directionals, *International Journal of American Linguistics* 51, 1985, pages 471-473.)

In Icelandic four basic directional terms commonly translated as east, south, north and west occur but do not simply mean the cardinal directions; they also mean "in the direction leading ultimately to the east (etc.)" (See Einar Haugen, The Semantics of Icelandic Orientation, *Word* 13, 1957, pages 447-459).

A classic case of an "odd" (to us) direction system is described by a pair of linguists at two New Mexico Indian pueblos. They begin by warning that commonly when an investigator deals with directions while interviewing an American Indian informant, he or she may be given five or seven terms, some of them "obligingly supplied translations for English concepts." Being alert to the pitfalls, in research at Taos Pueblo they still obtained five different expressions for east, five for north, three for west and three for south. At Picuris Pueblo they were given four terms in counterclockwise sequence, followed by a fifth—"where the sun rises, what you would call the east; it really means east"—although analytically the meaning is "in the middle." Even then the regularly-used terms of reference for directions are skewed in terms of European cardinals; when the investigators asked informants to point "east," the direction they indicated was actually east-northeast, "north" is north-northwest, and so on. (See George L. and Felicia Harben Trager, The Cardinal Directions at Taos and Picuris, *Anthropological Linguistics* 12, February 1970, pages 31-37.)

Directions in the Ancient Old World

If it is granted that many different models for directions have existed among “natives,” what about the situation among the “civilized” peoples in the Old World from whom the Book of Mormon groups came? They too held models for directions at odds with our norms, so the documents tell us. Some Greek temples were oriented to the rising or setting points of certain stars; these had later to be repositioned as the points on the horizon changed due to precession. Many other Greek structures faced the rising sun at a solstice day, and still others had their corners to the cardinal points, that is, the walls themselves faced the intercardinals. (See A. L. Lewis, *Orientation, Memoirs, International Congress of Anthropology*, ed. C. S. Wake, Schulte: Chicago, 1894, page 114.) At no time did the Greeks follow an unbroken rule; certainly the simple-minded view that they always oriented “east” “to the sun,” which is often said of them, is not true (see Sharon C. Herbert, *The Orientation of Greek Temples, Palestine Exploration Quarterly* 116, January-June 1984, pages 31-34).

As with so much that is Greek, we need to look at possible Asiatic and Egyptian influences upon them. Sumerian directions were based on the prevailing winds of Mesopotamia which were considered to blow from the northwest, northeast, southeast and southwest. Consequently Babylonian maps had their top to the northwest. (Actually, a “direction” consisted of a quadrant rather than a point; the Persian Gulf, to the southeast, was considered “the sea of the rising sun,” although astronomically that was stretching.) (See Eckhard Unger, *Ancient Babylonian Maps and Plans, Antiquity* 9, 1935, pages 311-322; S. H. Hooke, *Babylonian and Assyrian Religion*, University of Oklahoma Press: Norman, 1963, page 42; H. L. F. Lutz, *Plaga Septentrionalis in Sumer-Akkadian Mythology*, in Walter J. Fischel, ed. *Semitic and Oriental Studies Presented to William Popp, University of California Publications in Semitic Philology* 11, 1951, pages 297-309.) In the terminology used in the Nuzi tablets of western Mesopotamia, meanwhile, elevation was also involved; west was “above,” thus Syria was “the upper land,” and east was below, so the Persian Gulf was “the lower sea” (see Cyrus H. Gordon, *Points of the Compass in the Nuzi Tablets, Revue d'Assyriologie* 31, 1934, page 101).

The Egyptians aligned some temples on stars (e.g., the temple of Akhenaton at El Amarna on the setting point of Spica) (see letters by J. J. Jacobson and L. B. Borst, under the heading “Egypt to Canterbury,” *Science* 167, 23 January 1970, page 333). Others were oriented to the solstices (see A. L. Lewis, cited above; also his *Some Notes on Orientation, Man*, 1903, pages 88-91; and J. N. Lockyer, *The Dawn of Astronomy*, MIT Press: Cambridge, 1964, originally 1894).

Direction could also be deeply involved in cosmology and myth. According to Polish anthropologist Andrzej Wiercinski, for example, directions in ancient sacred architecture were not merely guides to one's

location but an integral part of an “astrobiological model of the world and man” in which the cardinal points organized “the time-spatial order of rhythmically repeating” cosmic, biological and socio-cultural processes. He found this model “vivified, personificated and deified” in the dimensions of representations of the cosmic mountain in Mesopotamia (Etemenanki ziggurat), Egypt (in 28 pyramids), and Teotihuacan (Pyramid of the Sun) (see his *Pyramids and Ziggurats as the Architectonic Representations of the Archetype of the Cosmic Mountain*, *Katunob* 10, September 1977, pages 69-111; reprinted from *Almogaren*, volume 7; cf. in part with Mircea Eliade, *Patterns in Comparative Religion*, Meridian: New York, 1974, pages 374-379).

The Egyptian model for naming directions was based on a person facing upstream toward the head of the Nile, south in our terms. That direction was denominated by terms signifying “face,” “fore,” or “sedge,” among others. Our north was labeled by words with meanings “delta,” “papyrus,” “inundation,” “downstream,” “flow,” “back,” “aft or stern,” or “hindquarters.” Of the terms for our east and west, the most salient senses were, respectively, “left” and “right,” but there were others. (See a map in Sorenson’s possession drawn and annotated in 1986 by Robert F. Smith from many scholarly sources; in general terms, see Henri Frankfort *et al.*, *Before Philosophy: The Intellectual Adventure of Ancient Man*, Penguin Books: Baltimore, 1972, page 51.)

Hamblin points out that ancient peoples did not typically have the capacity to switch mental frameworks when confronted with strange situations, because only a tiny proportion ever left their homeland. Hamblin’s prime example is the Egyptians. They used circumlocutions to handle directions when outside their own land rather than to switch to an unfamiliar model. “When the Egyptians met another river [than the Nile, i.e.], the Euphrates, which flowed south instead of north, they had to express the . . . contrast by calling it ‘that circling water which goes downstream in going upstream’ . . . which could also be translated as ‘the river which flows ‘north’ by going ‘south’” (see William Hamblin, “Which Way Did He Go?” Some Notes on Book of Mormon Geography, unpublished manuscript in possession of John Sorenson; summarized in the *F.A.R.M.S. Update* for May 1990).

The Egyptian notion that the direction a person faces is key in a directional model is also found among virtually all speakers of Semitic languages. In Hebrew the terminology had one facing east, which was then called “fore” or “rising,” while west was signified by words meaning “sea,” “behind,” or “setting.” South was “right” or “desert” or the purely directional expression *darom*. North was signified by words meaning “mountains,” “lefthand,” or the directional word *sapon*. Jerusalem was “the center of the land,” and the Dead Sea was the “east sea” (although in modern terms we would say that it lies south-southeast of Jerusalem). (See S. H. Weingarten, *Yam Suf—Yam Ha’adom*, *Beth Mikra* 48, October-December 1971, pages 100-104, in Hebrew;

M. Dahood, *The Four Cardinal Points in Psalm 75,7 and Joel 2,2, Biblica* 52, 1971, page 397; also maps in Sorenson's possession prepared by Robert F. Smith).

It should also be pointed out that while the Hebrew terms for "rising" or "fore" are glossed in English as "east," that probably obscures the precise meaning. We have seen that in the parallel (Semitic) Babylonian case, "east" was actually "northeast." There is a good chance that Hebrew "rising," concerning the sun, refers to the sunrise point on the horizon at new year's day (see Morgenstern, below), but that would not have been cardinal east.

The use of several overlaid conceptual schemes (reminding us, as in the Samoan case, of the complexity of history) seems indicated by the multiple terms employed in Hebrew. For instance, the terms "desert," "mountains," and "sea" suggest a very old environmentally-derived scheme of thought, while the words "rising" and "setting" are clearly solar. Morgenstern maintained that the first and second temples at Jerusalem were aligned so that the first rays of the sun on the morning of the fall equinox (new year's day) shone directly in through the eastern gate and down the long axis of the court and building into the holy of holies. (See Julian Morgenstern, *Biblical Theophanies, Zeitschrift für Assyriologie* 25, 1911, 139-193; and his *The Fire Upon the Altar*, Quadrangle Books: Chicago, 1963, page 7.) The sun chariots referred to in 2 Kings 23:11 were probably related by syncretism to this new year's rising direction, and note Ezekiel 8:16 where apostate worshippers were seen to face "the east," worshipping the sun. Hellenized Judaism of the centuries just before the Christian era re-emphasized the solar connection, identifying Yahweh with Helios, the divine sun charioteer of the Greeks, thus sun-associated directional terms were emphasized at that time (see Edwin R. Goodenough, *Jewish Symbols in the Greco-Roman Period*, Princeton University Press: Princeton, 1968, volume 7, pages 73-81, and volume 8, page 215). Further research probably would permit separating at least these two models for directions and perhaps others, all being compounded in usage and later Israelite thought.

During the Christian era, the dispersed Jews argued much about directions in relation to prayer; some believed all prayer, and thus synagogues, should be aligned toward Jerusalem, while others simply faced east. Early Christians also prayed facing the east, although that eventually changed (see John Wilkinson, *Orientation, Jewish and Christian, Palestine Exploration Quarterly* 116, 1984, pages 16-30). St. Peter's Cathedral in Rome is oriented to the spring equinoctial sunrise (probably built on a pagan Roman foundation), and many churches were aligned so that at sunrise the light fell on the altar on the birth or name day of their patron saint (see Jacobson letter cited above).

Later, Islamic religionists disagreed equally about the direction of prayer. Early mosques from Spain to India were established facing Mecca, but between the eighth and fourteenth centuries differences of opinions arose and

Muslim mathematicians and astronomers devoted much attention to determining the direction of prayer. Some took their lead from the words of the prophet, Mohammed, who, while visiting in Medina, said that the direction of prayer should be due south (Mecca is south of Medina), but based literally on those words, mosques in many other places were built facing south even though Mecca was not southward from those spots (see *Differences among Muslim Mathematicians, Cycles*, August 1982, page 199).

Clearly, Old World civilizations held many ideas about how directions were to be determined, assigned significance, and labeled. The cardinal points were only a relatively late, technical answer to the question "what directions are there?" From a survey of ideas such as these that were known in the part of the world where Book of Mormon peoples originated we see some possibilities that enlighten us about how the Nephites may have oriented themselves, but by no means do exclusive answers to what their conceptions actually were leap out at us.

In America

The prospect that any other part of America than Mesoamerica was the scene of Book of Mormon events is so slight that only this obvious candidate area will be considered here.

Modern ethnographic studies are very important for understanding this matter of directions, because they permit learning directly from informants the concepts involved in their thinking. One result of a number of such studies is that we know that local variations existed in concepts of direction, even though certain generally underlying ideas can also be detected.

In highland Chiapas, Mexico, Vogt found that the path of the sun provides the basic directions in use by the people of Zinacantan, Chiapas. "There is no abstract way of saying North, South, East, or West in [their] Tzotzil [language]. Instead our concept of East is approximated by words that translate as 'place where the Sun rises,' and West by 'place where the Sun sets.' What we regard as South and North are 'the sides of the path of the Sun;'" Zinacantecos differentiate the two [sides] by facing the 'place where the Sun rises' and distinguishing between the right hand and the left hand." (Evan Z. Vogt, *The Zinacantecos of Mexico: A Modern Maya Way of Life*, Holt, Rinehart and Winston: New York, 1970, page 4; treated more fully in his *Zinacantan. A Maya Community in the Highlands of Chiapas*, Harvard University Press: Cambridge, 1969, pages 602-603.) June Nash got basically the same picture in Tzo'ontahal, Chiapas (see *In the Eyes of the Ancestors. Belief and Behavior in a Maya Community*: Yale University Press: New Haven, 1970, page 293). (Differences in native terminology for the two "sides" may confuse us if we fail to realize that sometimes reference is to the right or left of an observer, who faces east, and at other times to the Sun's own perspective, as he advances across the sky facing west.)

At one time Vogt summarized the ethnographic information this way: "Maya spatial orientation to the four corners of their universe is not based upon our cardinal directions of N, S, E, W, but probably either upon intercardinal points (i.e. NE, NW, SW, SE) or upon two directions in the East and two directions in the West (i.e. sunrise at winter solstice, sunrise at summer solstice, sunset at winter solstice, and sunset at summer solstice)." (See Evon Z. Vogt, Summary and Appraisal, in *Desarrollo Cultural de los Mayas*, editado por Evon Z. Vogt y Alberto Ruz L., Universidad Nacional Autónoma de México: México, 1964, page 390.)

Helen Neuenswander found in Cubulco Achi, Guatemala, that the moon, not the sun, is primary; the Maya Indians there speak of west as "here," *hewa*, and east as "there," *hela*, while north is "my right" and south "my left," apparently based upon watching the moon set in the west. But the sun does the reverse; it comes up *hewa*, "here," and goes down *hela*, "there," so that *hewa* then must be read as east and *hela* as west! (See her Vestiges of Early Maya Time Concepts in a Contemporary Maya Community: Implications for Epigraphy, *Estudios de Cultura Maya* 13, 1981, page 143.) Clearly, local frameworks vary in detail from locality to locality.

There is also substantial evidence that the four horizontal directions are linked conceptually with vertical ones in ways hard for us to understand. For example Gary Gossen found at Chamula, Chiapas, that the surface north-south axis was construed to be somehow equivalent to a vertical axis, hence north = up and south = down. The sixteenth century documents in Spanish reporting native beliefs say the same thing, and Coggins postulates the same for both the classic Maya and for Izapa—she considers that east/north/zenith signified rulership, heat, rising, goodness, and maleness, west/south/nadir connoted darkness, cold, evil and femaleness (see Clemency Coggins, *The Zenith, the Mountain, the Center, and the Sea*, pages 111-123 in A. F. Aveni and Gary Urton, editors, *Ethnoastronomy and Archaeoastronomy in the American Tropics*, *Annals of the New York Academy of Sciences* 385, 1982). For the Aztecs Klein tells us that "The north . . . shared with the east the connotations of the sky and the 'above,' while the south, like the west, represented the earth and the 'below.'" (See Cecilia F. Klein, *Post-Classic Mexican Death Imagery as a Sign of Cyclic Completion*, in *Death and the Afterlife in Pre-Columbian America*, edited by Elizabeth P. Benson, Dumbarton Oaks: Washington, 1975, page 81. See also note 35 to chapter one in my *An Ancient American Setting for the Book of Mormon*, Deseret Book and F.A.R.M.S.: Salt Lake City, 1985, page 358.)

Something else we learn from contemporary sources is the problem for mental constructs caused by the fact that the land in this area lies at an angle to the cardinal points. Directional references are just not neat. For example, in Carter Wilson's ethnographically accurate novel about the Indians of Chamula (*Crazy February: Death and Life in the Mayan Highlands of Mexico*, University of California Press: Berkeley, 1974; originally J. B. Lippincott, 1965,

page 49), the municipal officer asks the schoolteacher if he knows about the Lacandon Indians. No. "They live south of here. Many days away, in hot country," he says "pointing south." But we see on a map of Chiapas that the Lacandon Indians actually live east-southeast, not "south," from Chamula. (Incidentally, the "many days" is about 75 miles, through jungle.) Archaeologist Kenneth Hirth falls easily into the same pattern in stating, "north of the Maya region . . . at Monte Alban in Oaxaca." Actually Monte Alban lies directly west, yet indeed northward (see Transportation Architecture at Xochicalco, Morelos, Mexico, *Current Anthropology* 23, 1982, page 322). But the prime example of seeming confusion comes from the account of Padre Thomas Gage who traveled between Mexico City and Guatemala City about 350 years ago. After going from Tehuantepec through Chiapas headed "south," he refers to Pacific coastal Chiapas (the Tonala-Arriaga area) more or less accurately as "northwest" from Guatemala City, but Chiapa de Corzo seemed to him "northeast," whereas our maps show it northwest. Equally interesting, he says that they go "westward to the South Sea" of the Spaniards. (See *Thomas Gage's Travels in the New World*, edited by J. Eric S. Thompson, University of Oklahoma Press: Norman, 1958.)

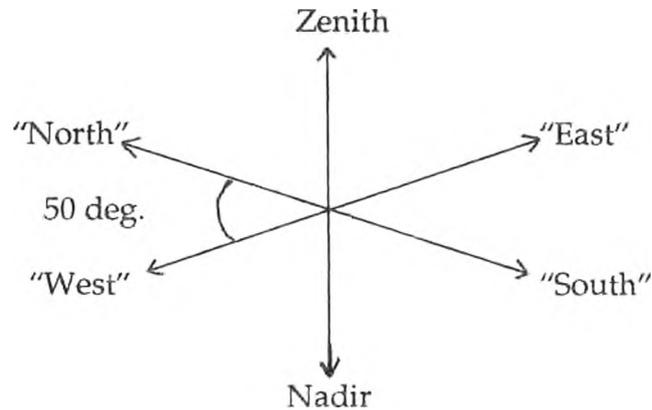
While pragmatic travelers, let alone the mass of "natives," may have used some frames of directional reference that can only be called off-handedly pragmatic, sophisticated observers, in ancient times as well as among today's "natives," have exhibited a great deal of technical knowledge that assures us their terminologies do not reflect ignorance but different views of the cosmos. Astronomy was developed significantly in Mesoamerica. For example, at the site of Ihuatzio in north-central Mexico are three truncated pyramids oriented perfectly with the cardinal points. An observer who stands at those structures at noon on June 21, the summer solstice, discovers that the sun is precisely overhead; the builders erected these structures to mark the northernmost point at which the sun could be observed directly overhead (see James Cornell, *The First Stargazers. An Introduction to the Origins of Astronomy*, Athlone: London, 1981, chapter one). At Monte Alban Aveni found that the perpendicular from Structure J points close to the position of the star Capella, which would have appeared above the horizon just before dawn on about the same date as the passage of the sun through zenith, thus the star "announced" the sun's imminent zenith (see Horst Hartung, Monte Alban in the Valley of Oaxaca, in, *Mesoamerican Sites and World-Views*, edited by Elizabeth P. Benson, Dumbarton Oaks: Washington, 1981, pages 60-63). Structure J even had a built in hole into which the sun sheds perfectly vertical light on the zenith day. Terry Stocker has established that Building C at Tula aligns with Venus as evening star, as well as with the major mountain it faces in that direction (personal communication). At Teotihuacan, the builders could lay out lines miles long with great accuracy, so when crossing angles are consistently off by a degree or so, it is obvious that this was intentional and quite surely based on astronomical sightings (see Rene Millon, *The*

Teotihuacan Map, University of Texas Press: Austin, 1973, page 38; James W. Dow, *Astronomical Orientations at Teotihuacan*, *American Antiquity* 32, 1967, pages 326-334).

The most widely recognized basis for site orientation is the position of sunrise or sunset at the solstices; Vogt, Girard, Villa Rojas and other ethnographers have found abundant evidence for this among living groups in southern Mesoamerica. Vincent Malmström has shown that whole strings of ancient ceremonial sites, occasionally stretched over scores, and perhaps hundreds, of miles in Mesoamerica are lined up with each other and ultimately with some prominent, presumably sacred, mountain across which the sun rises at a solstice. For example, apparently three major sites line up with each other so that the view from (or over) them would, under ideal conditions, see the sun come up over Cerro El Vigia on the morning of winter solstice (see *A Reconstruction of the Chronology of Mesoamerican Calendrical Systems*, *Journal for the History of Astronomy* 9, 1978, pages 105-116). (As El Vigia is in the minds of many a strong candidate to have been the original hill Cumorah, it is of interest that one of the most careful analyses of the possible meaning of "Cumorah" has it as "Arise-O-Light; Arise-Revelation!" or perhaps "Mound-of-Light; Hill-of-Revelation"—so Robert F. Smith, 1975 personal communication.) V. Garth Norman has established similar phenomena of great complexity at the site of Izapa; several structures and alignments of mounds are oriented at 114 degrees on the winter solstice rising point of the sun (or the summer solstice setting point in the "west"). (See *Izapa Sculpture, Part 2: Text, Papers*, *BYU New World Archaeological Foundation*, No. 30, 1976, page 3.)

It is well known that very few Mesoamerican sites or structures are oriented to the cardinal points. Aveni found that at about 95% of all sites studied, the primary axis is skewed slightly east of north (see Hartung cited above). Some sites follow more than one axis, whether simultaneously or representing historical change by reconstruction is uncertain. The most comprehensive studies of the orientation systems employed have been done by Franz Tichy. He concludes that our cardinal directions "appear to have little meaning in Mesoamerica." "The times of sunrise and sunset on the horizon on the days of the solstices define, with zenith and nadir points, the six cardinal directions of Mesoamerica." Each of the solstitial directions forms an angle toward east and west which is approximately 50 degrees in Central Mexico, as shown on the Aztec Calendar Stone. (See *Order and Relationship of Space and Time in Mesoamerica: Myth or Reality?* in *Mesoamerican Sites and World-Views*, edited by Elizabeth P. Benson, Dumbarton Oaks: Washington, 1981, 217-245; expanded, in German, in *Ibero-Amerikanisches Archiv* 2, 1976, pages 113-154; also *Space and Time in the Cosmivision of Mesoamerica*, edited by Tichy, *Lateinamerika Studien* 10, Wilhelm Fink: Munich, 1982.) Closs comes close to the same point from his studies of the stars and zodiac: Maya directional glyphs probably have been oversimplified

by western scholars who have read them too simply as referring to the cardinal directions. "Now, it should be noted that in the Maya languages 'East' signifies 'where the sun rises' and not necessarily the cardinal direction;" rather his work "implies that the East glyph may mark direction of sunrise and is not restricted to cardinal direction east" (see Michael P. Closs, *Venus Dates Revisited*, *Archaeoastronomy* 4, 1981, pages 38-41). These new findings mean that what Tichy calls the "Mesoamerican cardinal directions" in three dimensions would look like this:



Still, many complications mar the deceptive simplicity of this scheme. The literature is now large, but for example Tichy studied hundreds of sites in Puebla and Tlaxcala, Mexico, and found that three different orientation schemes prevailed (7, 16 and 25 degrees off north), and they did not differ consistently over history but were present simultaneously in certain periods. Meanwhile, as already seen above, other orientation systems besides a solstitial one were at work—but none of them were based on the cardinal points *per se*. For example, at Copan in the extreme south of Mesoamerica, orientation was to sunrise points on midyear days, not the solstices (Tichy 1981 cited above, page 235). Vogt has suggested that both cardinal and intercardinal directions may have been used among the highland Maya, that is, there was an eight-point system of directions (see Vogt, *Zinacantan*, 1969, page 603). Vincent Malmström further points out that certain orientation angles for sites do not fit any known local solar or astronomical facts. Explaining what was going on in these cases is beyond us at this stage, unless they represent local systems hallowed at some key ceremonial center or other, such as Izapa, then exported to other localities independent of physical conditions there (see *Architecture, Astronomy, and Calendrics in Pre-Columbian Mesoamerica*, in *Archaeoastronomy in the Americas*, edited by Ray A. Williamson, pages 249-261, Anthropological Papers 22, Ballena Press: Los Altos, CA, 1981). So at this point in time we cannot be confident about any single explanation of Mesoamerican direction usage.

Historical or regional variations are also visible in direction-associated colors and their meanings. Specific colors were symbolically associated with the directions both at the time of the conquest in Yucatan and earlier among the classic Maya (see Heinrich Berlin and David H. Kelley, *The 819-day Count and Color-direction Symbolism among the Classic Maya*, Tulane University, *Middle American Research Institute Publication* 26, 1970, pages 9-17). But the Quiche Maya in highland Guatemala had a different set (Munro S. Edmonson, *The Book of Counsel: The Popol Vuh of the Quiche Maya of Guatemala*, Tulane University, *Middle American Research Institute, Publication* 35, 1971, page 69), and other groups had still other arrangements (see Carroll L. Riley, *Color-direction Symbolism: An Example of Mexican-Southwestern Contacts*, *America Indigena* 23, 1963, pages 49-60). (Color-direction associations also were well known in the Old World, thus the "Red" and "Black" Seas. See, for example, J. A. Fitzmyer, *The Genesis Apocryphon of Qumran Cave I: A Commentary*, Rome, 1966, pages 136-137.)

Interestingly, the Quiche called the lowland area along the Gulf coast in Tabasco and Campeche states of Mexico "the East." We would now think of that zone as "the north." (See Adrian Recinos, Delia Goetz, and S. G. Morley, trans., *Popol Vuh*, University of Oklahoma Press: Norman, 1950, pages 68-69, 207.)

One completely different basis has been suggested for the orientation of Mesoamerican sites, that is, magnetism. John B. Carlson, based on a find and suggestion by Michael Coe, concluded that the Olmec culture may have known and used a lodestone magnetic compass (see *Lodestone Compass: Chinese or Olmec Primacy?* *Science* 189, 1975, pages 753-760). Malmström added an observation on a monument at Izapa that led him to suggest that magnetism was known there (see *Izapa: Cultural Hearth of the Olmecs?* *Proceedings, Association of American Geographers* 8, 1976, pages 32-35, and *Knowledge of Magnetism in Pre-Columbian Meso-America*, *Nature* 259, 1976, page 390). Angel Garcia Cook had earlier found at Tlalancaleca, Puebla, Mexico, "a great block of stone," polished all over and forming a sort of vertical plate in the site center. It gave a metallic sound when struck and had strong magnetism. The date assigned is about 800 B.C. Garcia Cook believed that it served anciently to orient the site in relation to magnetism. While no demonstration has been made that establishes this idea definitely, it remains an interesting possibility (see *Algunos Descubrimientos en Tlalancaleca*, Edo. de Puebla, *Comunicaciones, Proyecto Puebla-Tlaxcala* 9, 1973; reprinted in *Katunob* 8 (3), February 1973, pages 25-34).

Our survey of some data on the question of directions in Mesoamerican cultures shows that a number of bases existed, that multiple models co-existed, that none of models were clearly coordinate with the cardinal points, and that insufficient information exists at this time to make the picture very clear.

Book of Mormon Directions

No complete analysis will be attempted here of the language of the text. But even a few observations should convince us that the subject is complex, if anybody doubted that. Here are some numbers for the use of several expressions (from Reynolds' *Concordance*, omitting Old World terms):

"north"	26 times	"south"	25 times*
"land north"	5	"land south"	5
"land northward"	31	"land southward"	14
"northward"	14	"southward"	6
"west and north"	2		
"west"	28	"east"	36
		"eastward"	2

(* not counting "south wilderness")

It is not obvious what one is to make of these numbers except that the Nephite terminological system for directions is less than straightforward. Clearly enough, "east" and "west" were much less significant than "north" - "south" axis. The use of the "-ward" suffix in relation to north is tremendously disproportionate. A careful analysis needs to be made of all uses of these and every other directional term (including "forward" as well as "came" vs. "went").

I conclude this appendix by drawing attention to two scenarios that have been proposed as possibilities to help explain Nephite direction references as they seem to have been developed to fit a physical land (Mesoamerica, in general the only reasonable correlation evident at this time) which is basically not oriented to the cardinal points.

Hamblin's contribution goes this way:

How would Nephi and his descendants, utilizing the 'learning of the Jews and the language of the Egyptians' (1 Ne. 1.2), have written the words north, south, east and west? The Hebrews, like most Semitic peoples, oriented themselves by facing east, toward the rising sun Thus east in Hebrew was simply 'front' (*qedem*) with south as 'right' (*yamin*), north as 'left' (*semol*), and west as 'behind' (*achor*) or 'sea' (*yam*).

But Nephi and his descendants actually wrote in the 'language of the Egyptians' (1 Ne. 1.2, Mos. 1.4, Morm. 9.32). How did the Egyptians name the four cardinal directions . . . ? [See earlier data.]

If you adjust the Hebrew way of thinking to match the Egyptian. . . , you find in fact that Hebrew west (behind) has basically the same semantic meaning as Egyptian north (back of the head); Hebrew east (front) equals Egyptian south (face); Hebrew north (left) matches Egyptian east (left); with Hebrew south (right) being Egyptian west (right).

Now let us suppose that Nephi, or any of his descendants, sat down at the gold plates and began to write in 'the language of the Egyptians.' He wants to write the word 'land westward' and naturally thinks to himself in Hebrew 'back.' But as he writes the Hebrew word 'land backward' in Egyptian characters, he realizes that in the Egyptian language he is actually writing the word for 'land northward.' So what does Nephi do? Write the Egyptian word, with Hebrew meaning in mind, or the Egyptian word, with the Egyptian meaning in mind?

If Nephi used the Egyptian terms with Hebrew meanings in mind, and if Joseph Smith translated these terms literally, you end up with a remarkable coincidence. The conceptual Hebrew (and modern) 'land westward' (Heb. behind) would be written in Egypto-Nephite characters as 'land northward,' (Eg. behind) while the conceptual Hebrew (and modern) 'land eastward' (Heb. front) would have been written in Egypto-Nephite as 'land southward' (Eg. front) In other words, you find the conceptual geography of the Hebrew universe must be 'distorted' in relation to the Egyptian vocabulary in precisely the same way that Nephite geography is 'distorted' in relation to Mesoamerica. (See Hamblin, cited above.)

Meanwhile I once made the following suggestion:

Suppose, for a moment, that you were with Lehi's party as it arrived on the Pacific coast of Central America. By western civilization's general present-day terminology, the shore would be oriented approximately northwest-southeast. When you said yamah, intending 'westward,' the term would mean literally 'seaward,' although the water would actually be behind your back to today's southwest. Further, the first step you took inland, away from the sea, would be 'eastward' ('to the fore,' literally) in Hebrew; but we today would say the motion had been northeast. In the absence of a conscious group decision to shift the sense of their Hebrew direction terms by 45 degrees or more (something almost impossible linguistically), the little group of colonists would have fallen into a new directional language pattern, skewed from the cardinal points, as their Semitic-language model encountered the new setting.

Out of the materials presented in this appendix, plus more not here mentioned and even yet to be discovered, diligent, inspired students may bring order and rationality to our understanding of how Israelite, Nephite and American terminological systems for directions were articulated and are represented in our present text. While we do not know the answers at this time (and perhaps not even the questions), we should at least be warned against the trap of ethnocentric naivete or inadequate scholarship manifest when someone insists that "north must mean where the north star lies" or that "rotating the Nephite directions" is something that interpreters now do

in violation of the text. The Book of Mormon is the authority on the Book of Mormon. Our problem is to discover what it is saying to us.