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Title The Geologic History of Hill Cumorah





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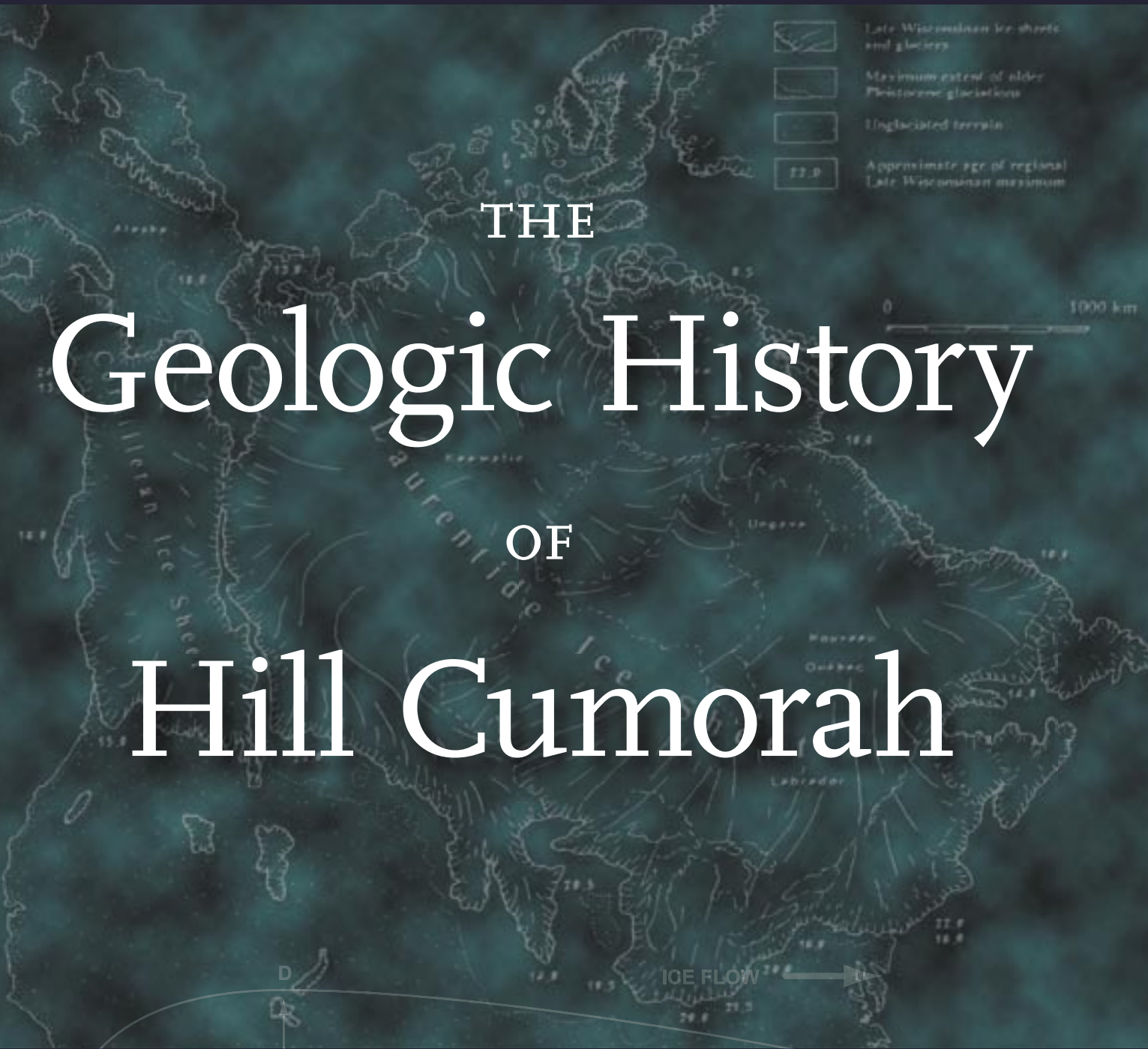
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Abstract This article discusses the geologic processes that occurred to form the Hill Cumorah and surrounding lands that would have made that area attractive to the Smith family and other early settlers and also presents reasons the hill was a suitable location for storing the golden plates for hundreds of years. The causes of glaciation, the definitions and types of glaciers, and the origin and characteristics of drumlins are explored.



-  Late Wisconsinan ice sheets and glaciers
-  Maximum extent of older Pleistocene glaciations
-  Unglaciated terrain
-  Approximate age of regional Late Wisconsinan maximum

THE Geologic History OF Hill Cumorah



MICHAEL J. DORAIS



Rochester

CUMORAH! THE VERY MENTION of the name brings multiple images to the minds of Latter-day Saints. We commonly think of the coming forth of the golden plates under the direction of the angel Moroni and of the faithfulness of the Prophet Joseph Smith in fulfilling his mission. We may also think of the preparation of the plates themselves, from Nephi's making a second set of plates, whose ultimate purposes he knew not, to Moroni's final words engraved on that sacred record before he placed it in the Hill Cumorah. The preparation of the Smith family may come to mind as well, such as the fact that Joseph was born of righteous parents and thus was spiritually prepared to become the prophet of the restoration. Perhaps less thought goes to the climatic¹ and financial difficulties that the Smith family experienced while living in New England, prompting them to move to New York in proximity to Cumorah, where a new dispensation would dawn.

But what of Hill Cumorah itself? The Lord in his foreknowledge knew that this hill would be the depository of the plates. What geologic processes occurred to form the hill and surrounding lands that would be attractive to the Smiths and other settlers in the early 19th century? Why was it a suitable

location for storing the golden plates for hundreds of years until the stone box that contained them was first opened by the boy prophet? A look at the geologic history of the Hill Cumorah affords answers to these questions.

Setting of Hill Cumorah

Cumorah is perhaps the most famous drumlin in the world, other than Breed's Hill, where the Battle of Bunker Hill took place during the American Revolutionary War. A drumlin, after the Gaelic word *druim* for hill, is an elongated hill formed by glacial processes. Cumorah is one of 10,000 similar hills of west-central New York that compose one of the largest drumlin fields in the world (see fig. 1). The field defines an east-west trending belt about 35 miles wide bordering the south side of Lake Ontario and extends for about 140 miles from Syracuse to the Niagara River.² In order to understand the processes that formed Hill Cumorah, a brief explanation of the causes of continental glaciation, the extent of Pleistocene glaciation, and the geomorphological evidence of glaciation in the Palmyra region of New York is in order.

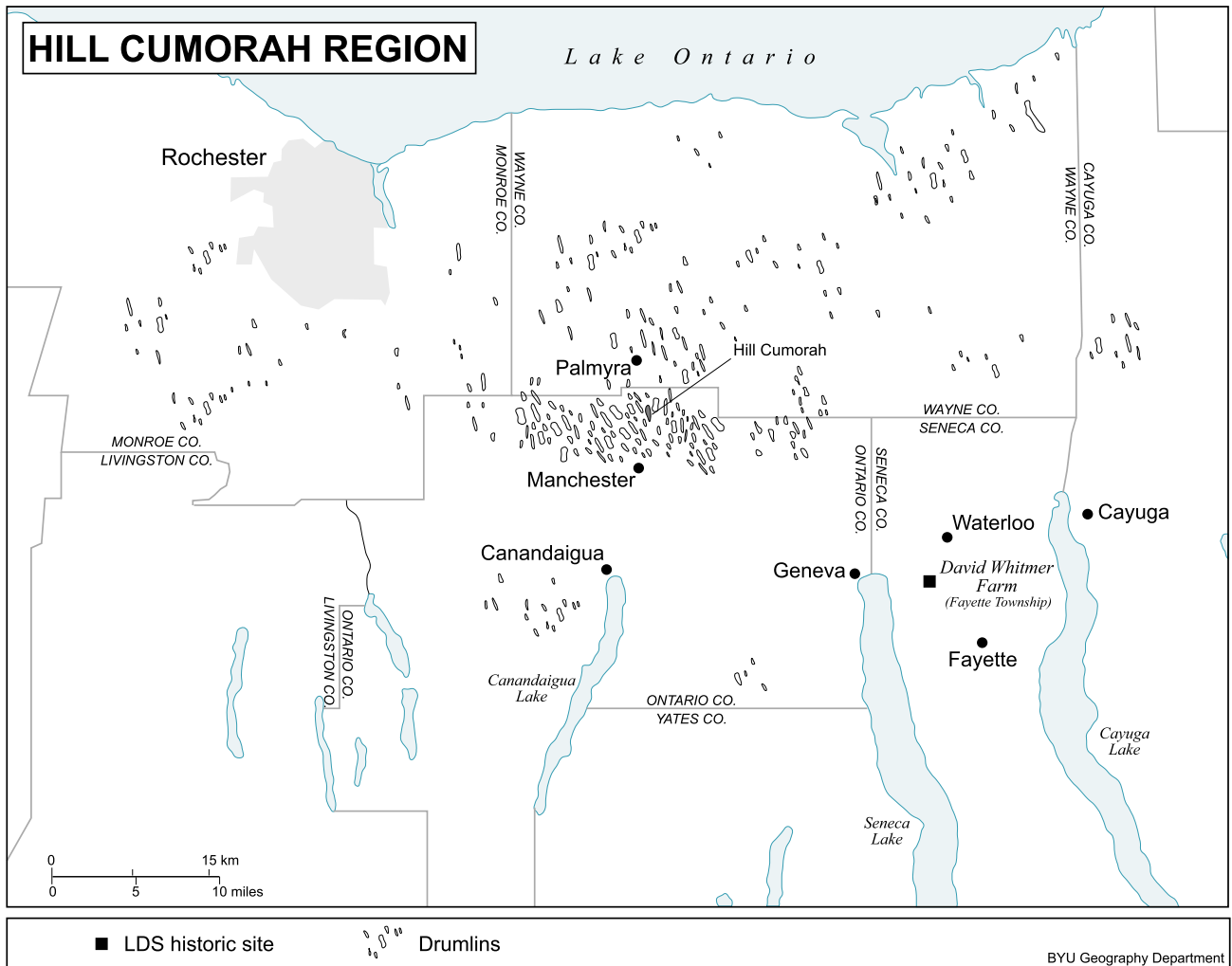
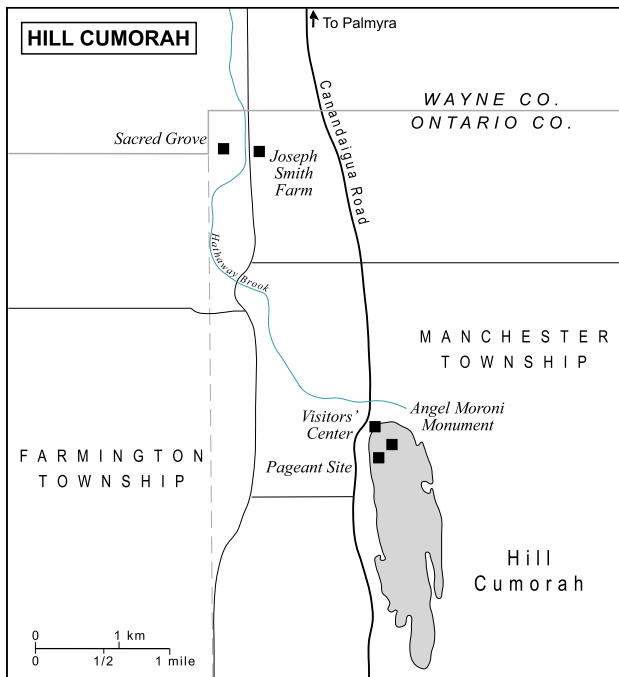


Figure 1. Numerous drumlins are scattered throughout the Hill Cumorah region (above), including the one named Hill Cumorah (left). Maps from *Historical Atlas of Mormonism*. © 1994 by The Gale Group. Reprinted by permission of The Gale Group.



CAUSES OF GLACIATION

The geologic record preserves evidence of many glacial advances and retreats during the last billion years of the earth's history. However, these glaciation events are somewhat unusual in that conditions conducive to widespread glaciation occurred only during specific times: the late Proterozoic (ca. 800 to 600 million years ago), the Pennsylvanian and Permian (ca. 350 to 250 million years ago), and the late Neogene to Quaternary (the last 4 million years).³ Within each of these major periods, many short-term fluctuations occurred in which ice sheets and glaciers repeatedly advanced and retreated. The causes, while not completely understood, are com-

monly linked to astronomical factors that influence the intensity of radiation from the sun.⁴ These factors include changes in shape of the earth's orbital path, the precession of the equinoxes, and changes in inclination of the earth's axis. The combination of these factors is thought to generate climatic conditions that occur with a cycle of approximately 40,000 years.

However, the major periods of widespread glaciation have not occurred on a cyclical 40,000-year basis throughout the earth's history but are mainly limited to the Late Proterozoic, Pennsylvanian-Permian, and Neogene-Quaternary events mentioned above. Thus other factors must also play a role in the estab-

lishment of glacial conditions. Some of these events include the distribution of land masses, the opening or closing of straits, oceanic circulation patterns, the abundance of volcanic eruptions, and changes in global relief.⁵ For example, the uplift of mountains creates high-altitude conditions more suitable to enhanced snow precipitation.⁶ Ocean circulation patterns may play a major role in the distribution of equatorial heat. When the polar regions were occupied by broad, open oceans, major oceanic currents would have mixed with equatorial waters and warmed the polar oceans. This seems to have been the condition throughout most of geologic history. At times when the poles were occupied by large conti-

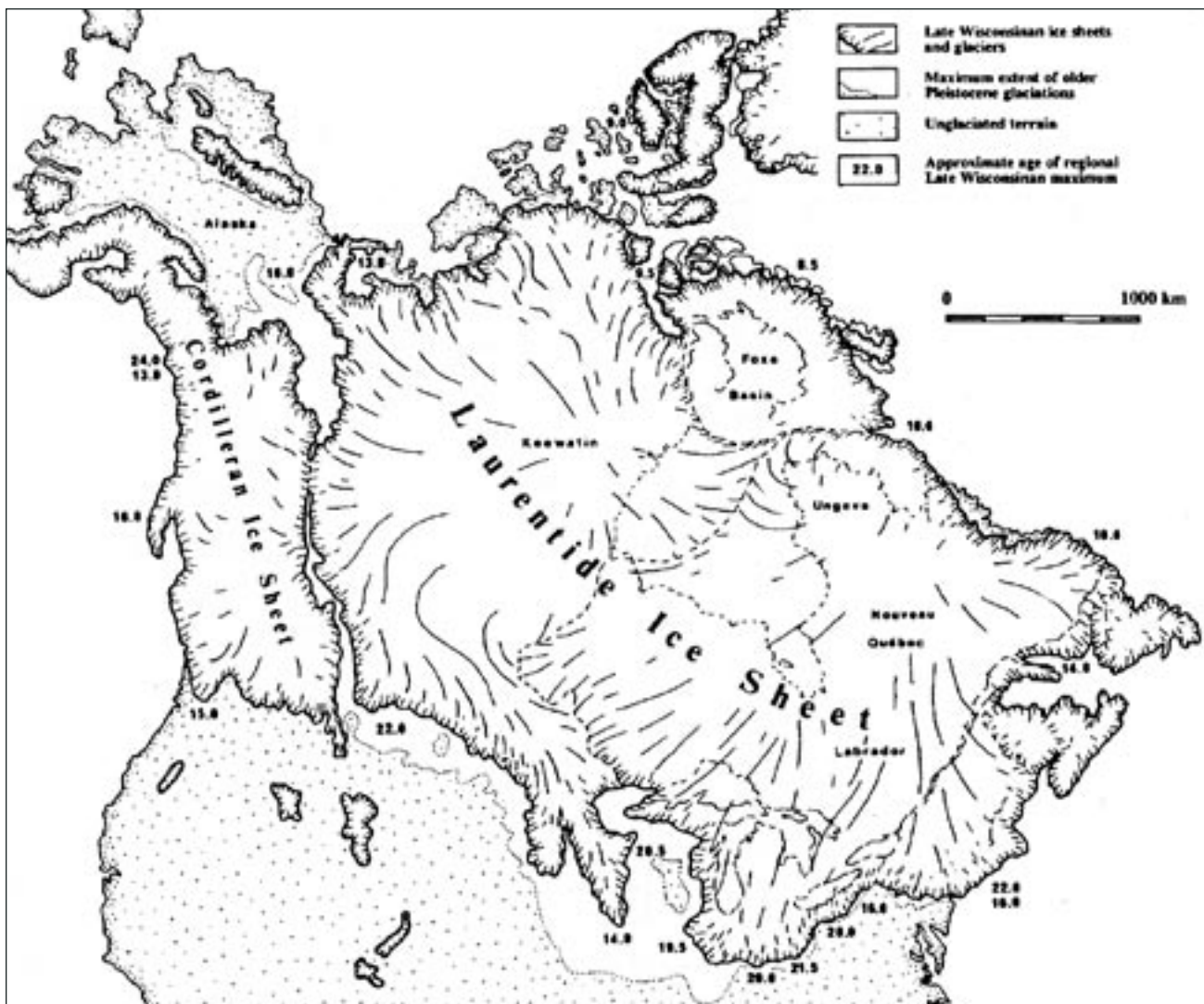


Figure 2. Map showing the extent of the Wisconsin Glaciation in North America. From Jürgen Ehlers, *Quaternary and Glacial Geology* (1996). © John Wiley & Sons Limited. Reproduced with permission.

nents (such as the current position of Antarctica) or by restricted, landlocked oceanic basins (such as the present configuration of the Arctic Ocean), conditions were favorable and, coupled with the astronomical factors, contributed to icehouse conditions and widespread glaciation.

During periods when all of the above factors, or at least the necessary combination of the essential factors, caused global cooling, snow began to accumulate in the northern latitudes to the extent that vast glaciers covering huge land areas formed and began to flow across the northern regions of North America (glaciers formed in Europe and elsewhere as well).

DEFINITION AND TYPES OF GLACIERS

Glaciers are bodies of ice that are massive enough to flow under their own weight. They occur in regions where the input from winter snowfall exceeds what melts during the summer. Present-day sites of glacial formation occur only at high lati-

tudes or high elevations, but such was not the situation during the relatively recent geologic past.

Freshly fallen snow contains about 80 percent air among 20 percent ice crystals. The snow compacts as it is compressed by additional snowfall and partial melting. Over time, the snow becomes denser and contains an ever-decreasing amount of pore space for air as the grains become rounded and compacted. By the end of winter, old snow may have a porosity of about 50 percent. *Firn*, from a German word meaning “anything related to last year,” or in this usage “last year’s snow,” is even more granular and rounded, with a porosity of 20–30 percent. Deeply buried firn is further compacted and is transformed to glacial ice with less than 20 percent pore space. When accumulated snow and ice reach a thickness of about 130 feet, the ice is able to flow under its own weight even though it remains in the solid state.

Glaciers that form in mountains are called *alpine* or *valley glaciers*. These are rivers of moving ice that flow downhill. Once melted, they leave



Figure 3. This Greenland ice sheet resembles the ice sheet that once lay across the northeastern corridor of the United States and created an extensive drumlin field. Photo courtesy of Peter G. Knight.

behind eroded U-shaped valleys such as those of Yosemite Valley (in California's Sierra Nevada) and those of Little Cottonwood Canyon (in Utah's Wasatch Range). Other glaciers form ice sheets that are not confined to mountain valleys but cover large areas of thousands of square miles. The immense size of these glaciers is indicated by the name *continental glaciers*. There are currently two continental glaciers remaining on Earth, covering much of Greenland and Antarctica. These glaciers approach 10,000 feet in thickness and continually flow away from the main accumulation areas, much like pancake batter flows across a pan as additional batter is poured in the center of the pancake. A glacier of immense size, named the Laurentide Ice Sheet, was centered on Hudson Bay in Canada and flowed over large portions of North America. It was most extensive around 21,000 years ago, when glaciers covered most of Canada and much of the northern United States (see fig. 2).

When the input of snow to a glacier matches the output by melting and sublimation, the glacier's margin, or edge, remains stationary. In spite of the stationary margin, however, the ice is constantly flowing toward the margins, with the rate of melting being matched by the flow. When the rate of input is greater than that of melting, the mass of the glacier increases and the glacier advances over larger areas. Conversely, when the rate of input is less than that of melting, the mass of the glacier shrinks in size, even though the ice still continually flows toward the margins.

This constant movement of ice hundreds to thousands of feet thick gives a glacier an enormous capacity to erode the bedrock over which it flows. Erosion is mainly accomplished by *plucking*, as blocks of bedrock are removed along joints and fractures by the flowing ice, and by *abrasion*, which results in a tremendous amount of material being transported by continental glaciers, mainly in the lower portions of the continental ice sheet. Some of

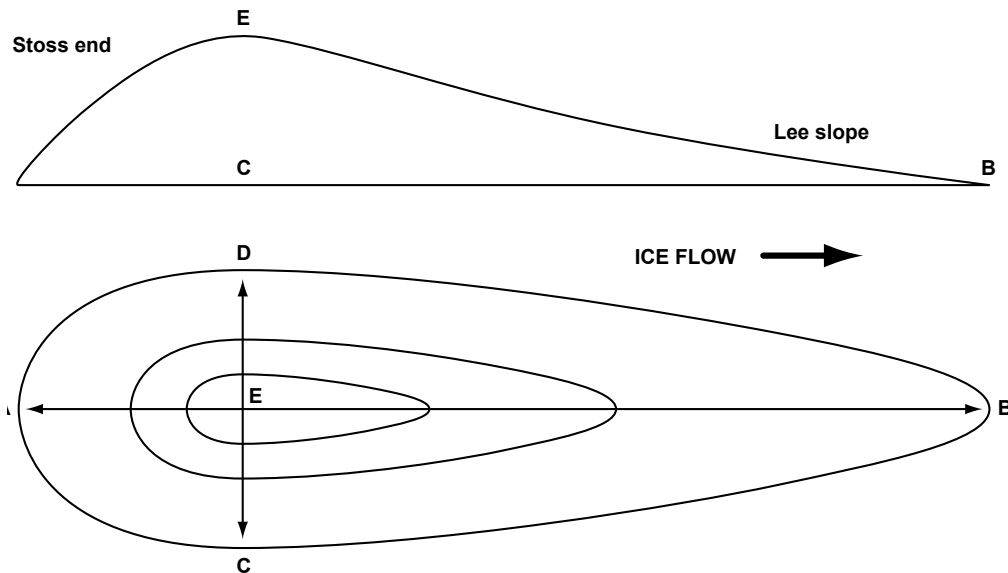


Figure 4. Profile and cross section of a drumlin with typical elongated and inverted-spoon shape.

this eroded material, called *drift*, is smeared below the glacial ice, but most is transported within or on the ice sheet to be dumped at the margin of the glacier in a similar manner to material being dropped at the edge of a conveyor belt. Accumulations of this marginal material, or *end moraines*, mark the extent of glaciation. Moraines occur south of the Hill Cumorah region, indicating that western New York was once completely covered by the Laurentide glacial sheet.

ORIGIN AND CHARACTERISTICS OF DRUMLINS AND HILL CUMORAH

A type of drift deposited by continental glaciers, drumlins are not uniformly distributed under continental glaciers but form in distinct areas called *drumlin swarms* or *fields* (see fig. 1). Although their dimensions vary, drumlins are elongated, tapered hills that range from one-half to three-quarters of a mile in length, are about a quarter of a mile wide, and rise approximately 100 to 150 feet above the surrounding lowlands.⁷ In profile, they resemble inverted spoons with the shallow lee slope pointing in the direction of ice flow (see fig. 4). The aspect ratios of drumlins are thought to reflect the speed of the glacier that produced them. That is, narrower and longer drumlins may indicate faster glacial movements than wider, shorter ones.⁸

Because the formation of drumlins is a process that occurs under glaciers and is unobservable, the origin of drumlins has been a controversial topic. One theory is that because some drumlins contain stratified sands and gravels similar to those deposited by streams, the drumlins are water deposits.⁹ Subglacial flooding is thought to carry immense volumes of floodwater and sediment in cavities between the glacier and its underlying rock and sediment bed. Another theory is that because other drumlins are not stratified but consist of *till*, a poorly sorted sediment deposited by glaciers, drumlins are the result of a deformable layer of sediment between the glacier and bedrock.¹⁰ The sediment layer that forms drumlins is shaped by pressure exerted by the mass of the overlying glacier, with the sediment migrating to lower pressure regions under the ice sheet.

Beginning about 19,000 years ago, when the Laurentide Ice Sheet began to melt at a faster rate than snow accumulated at its source, the margin of the glacier retreated, disappearing entirely from the Palmyra area around 12,000 years ago.¹¹ As the ice retreated, glacial features that had formed below the ice sheet were exposed, including the large drumlin fields of west-central New York.

Hill Cumorah is typical of the drumlins of this region, being 1.7 miles long and 0.4 miles wide and attaining a height of 140 feet above the lowland topography. The hill is also typical because its elongated profile is shaped like an inverted spoon with one end of the hill being steeper (the location of the Angel Moroni Monument and the pageant) and the other tapering off at a shallower angle (see fig. 6). Perpendicular to its length, the hill has a cross-

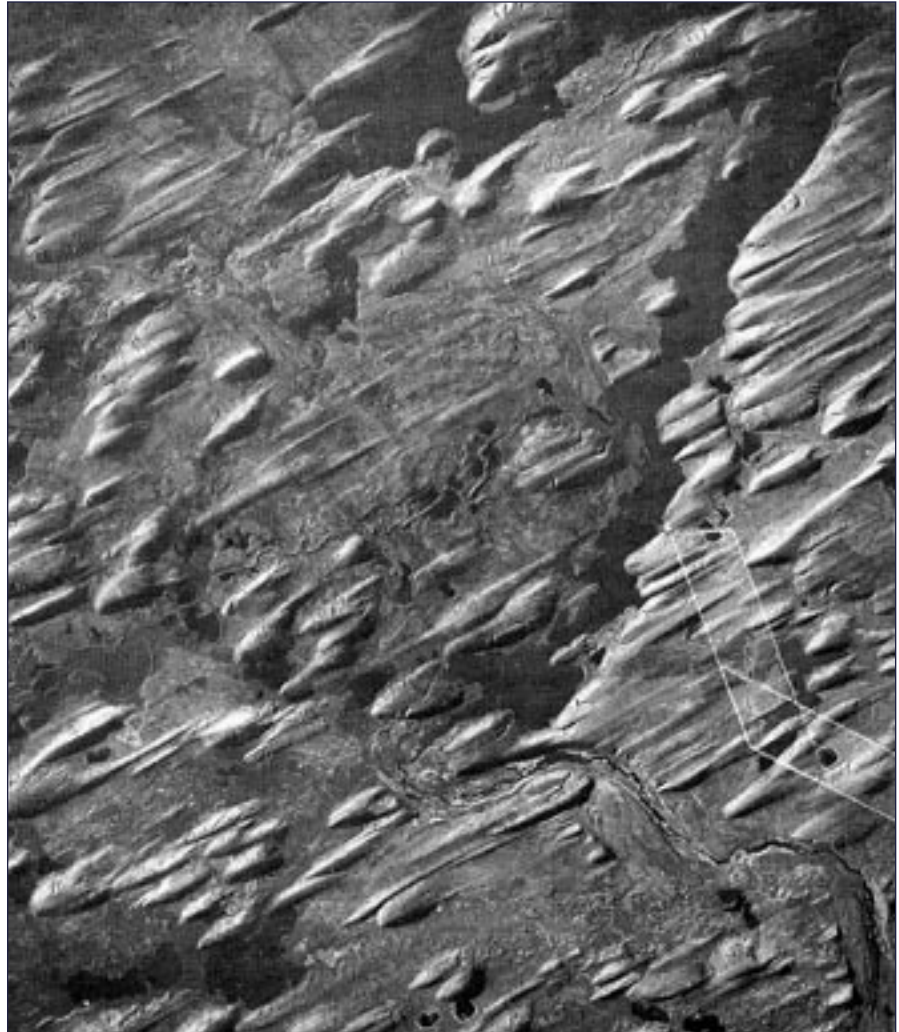


Figure 5. Aerial photo of drumlin field in northern Saskatchewan caused by an ice flow from the bottom left. Photo from Douglas I. Benn and David J. A. Evans, *Glaciers and Glaciation* (1998). Reprinted by permission.

tional profile common to drumlins, namely, a wide base of several hundred feet and a narrow summit, especially at the northern end where it narrows to less than 20 feet.

Drumlins are composed of a variety of materials including mixtures of till, sand, and gravel.¹² Most of these materials have high porosity and permeability, which, combined with the slope of the hill, would have allowed efficient water drainage that could have been important in the preservation of the plates, Urim and Thummim, Laban's sword, and the Liahona over the centuries after their deposition in the stone box by Moroni.

The tills and outwash deposits from the ice sheet at Palmyra are excellent sources of sand and



Figure 6. Aerial view of Hill Cumorah looking northeast. Photo by Paul Gilbert © 2004.

gravel and are well suited for agriculture. It was these fertile soils that attracted the Smiths and other early agriculturally minded settlers. Indeed, had glaciation and till deposition not produced good farmlands in western New York, the Smiths might not have migrated there, and the restoration of the gospel might have commenced elsewhere. We readily recognize that the religious freedoms provided by the Constitution of the United States, coupled with the religious fervor that swept western New York in the early 1800s, were essential to providing the political and cultural conditions necessary for the restoration of the gospel. But it was the development of the appropriate climate and agricul-

tural conditions of western New York by glaciation and till deposition that brought the Smiths to Palmyra. Once the family was there, the unique political and cultural conditions provided the appropriate setting for the boy prophet to begin his divinely appointed mission. While it is faith promoting to see the Lord's foresight in the preparation and preservation of the plates, it is also faith promoting to see an even greater foreknowledge of the Lord throughout the thousands of years of geologic history that led to the formation of Hill Cumorah and the surrounding lands. For he who has seen "the least of these hath seen God moving in his majesty and power" (Doctrine and Covenants 88:47). ❏

39. Some may regard this aspect of Clark's assessment as overly enthusiastic. Larson's language is epic in cast, not "lifelike" in the sense of common, everyday speech. But it is life-affirming and powerful in its ability to project the terrible conflicts that come to each of us as a result of our being "free to choose liberty and eternal life, . . . or to choose captivity and death" (2 Nephi 2:27).
40. Larson, *Coriantumr*, 71.
41. *Ibid.*, 7.
42. Merrill Bradshaw, *Coriantumr* (incomplete opera on a play by Clinton Larson, first scene only: "Sarah's Soliloquy"), an unpublished voice/piano manuscript copy resides in the Music Division of BYU's Harold B. Lee Library.
43. Larson, *Coriantumr*, 11. Bradshaw's text differs in the last two lines from the published play, which gives the following: "The broad plains and the rivers, alone as the unbreathing Trees in the heavy days of our travelling here."
44. There is yet another possibility, one that is always a potential problem when attempting to deal with a fictional *mise-en-scène*. Perhaps the anachronisms and misconceptions in Larson's script, laid bare through later research in the second half of the 20th century, ultimately made him uncomfortable with the material.
45. *Moroni* was the first of three theatrical works sponsored by the Promised Valley Playhouse (at that time a cultural appendage of the church) to educate and inspire through music and drama. The second was on the life of Christ and the third on Joseph Smith.
46. Prefatory note from the script published by the Promised Valley Playhouse, Salt Lake City, 1977.
47. Carma Wadley, "Hand of Mormon' a monumental task," *Deseret Morning News*, Sunday, 31 August 2003, sec. E1.
48. Another recent addition to the genre is Meredith R. Taylor's *Abinadi* (2003), an opera on the well-known Book of Mormon prophet.
49. See Robertson Wilson, "Leroy Robertson and the *Oratorio from the Book of Mormon*," 4–13.
50. Former Tabernacle organist Robert Cundick's doctoral thesis, for example, was an extended work for chorus and orchestra, "The Song of Nephi" (1955), completed under Robertson's tutelage at the University of Utah. Cundick had copied the parts for the *Oratorio from the Book of Mormon* and thus had a first-hand acquaintance with the score.
51. Taylor, *Coriantumr*, manuscript copy, L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University. Taylor's prolific output also includes several symphonies with Book of Mormon themes, including symphonies 4 and 7, which contain excerpts from *Coriantumr*.
52. Darwin Wolford, *The Land of Joseph*, BYU–Idaho, Dept. of Music (Rexburg, ID: unpublished, 1976). Wolford was one of a number of Robertson's composition students. Robertson taught at BYU and the University of Utah in the 1930s through the 1960s.
53. Darwin Wolford and Mabel Jones Gabbott, *Song from Cumorah* (Orem, UT: Jackman Music, 1980).
54. Melanie Hoffman and Marvin Payne, *Scripture Scouts, Musical Adventures in the Book of Mormon, The Wonderful Book of Gold* (Salt Lake City: Deseret Book Co., 1986, 1987, 1992). The entire series contains 30 episodes, each with its own song.
55. Steven Kapp Perry and Brad Wilcox, *From Cumorah's Hill: The Book of Mormon Speaks to Our Day* (Provo, UT: Prime Recordings, 1990).
56. Margaret Smoot, *Voices from the Dust* (unpublished, 1990).
57. Jeff Goodrich, *I Heard Him Come and Other Songs about the Savior* (Salt Lake City: Deseret Book). Direct inspiration for this piece is attributed by the composer to John 1:11–13 and Doctrine and Covenants 93:1–2, but the doctrine of Christ as taught in Moroni 10:32 seems even more apt and is certainly reflected in the text.
- Look Once Again at Cumorah's Hill: The Poets' View**
Louise Helps
1. These poems are similar to each other. One was clearly a reworking of the other.
- The Hill Cumorah Monument: An Inspired Creation of Torleif S. Knaphus**
Allen P. Gerritsen
1. Torleif S. Knaphus, "Description of the Hill Cumorah Monument," ca. 1935, in possession of the author. In a few instances, the punctuation and spelling in quotations from Knaphus's writings have been normalized.
 2. Torleif Knaphus, *Personal Journal of Torleif S. Knaphus*, trans. Brit Woodbury, unpublished document in the author's possession, 2.
 3. *Personal History of Torleif Knaphus*, as dictated to Linda Knaphus, 1957, in the author's possession, 4.
 4. Rowan Taylor, *Coriantumr*, 3.
 5. For more on Knaphus and his youth, see William G. Hartley, "Torleif Knaphus, Sculptor Saint," *Ensign*, July 1980, 10–15.
 6. *Improvement Era*, April 1935, 200.
 7. "The Life of Torleif Severin Knaphus," unpublished autobiography, Family and Church History Department Archives, The Church of Jesus Christ of Latter-day Saints.
 8. Torleif S. Knaphus, "Work Done for the Church of Jesus Christ of Latter-day Saints," date unknown, list in the author's possession.
 9. LaVar Wallgren (craftsman who made the casts), personal interview, May 2001.
 10. Concerning the identity of this angel, Rebecca Bean remarked, "I say 'angel,' [but] I don't know. I asked Brother Knaphus, when he told me the story, if it was the Angel Moroni that came to him. He said, 'Sister Bean, that's my secret.' But I really feel that it was the Angel Moroni who came [to him]" (Rebecca Bean, fireside address given in Salt Lake City in 1964. This address appears under the title "The Mormons Return to Palmyra" at <http://joda.cis.temple.edu/~nichols/drhaws/hpalmyra.html> [accessed July 2004]).
 11. Rebecca Bean, fireside address.
 12. According to Rebecca Bean's account, the angel, in response to Torleif's prayer about which of the seven drawings to take to the Brethren, told him which drawing was the right one. This raises the question of why Torleif presented all seven drawings to the Brethren and not just the designated one. This matter is resolved in the following account: "When the sculptor inquired [of the angel] how he should confront the Brethren with this choice [the sketch that the angel's finger pointed to] (inasmuch as they were the ones making the decision), he was instructed that they would choose the one the Lord had chosen." Rand H. Packer, "History of Four Mormon Landmarks in Western New York: The Joseph Smith Farm, Hill Cumorah, the Martin Harris Farm, and the Peter Whitmer, Sr., Farm" (master's thesis, Brigham Young University, 1975), 31–32.
 13. Antone Clark, "Finding the Face of an Angel," http://www.ezratclark.org/familyfile_findingthefaceofanangel.asp (accessed July 2004).
 14. Knaphus, "Work Done for the Church."
 15. Marie Knaphus James (Torleif's daughter), personal interview, September 2003.
 16. The text on the plaque is nearly identical to Torleif's description that appears in his "Description of the Hill Cumorah Monument," 23 June 1935, in the author's possession.
 17. Knaphus, "Description of the Hill Cumorah Monument."
 18. John D. Giles, "The Symbolism of the Angel Moroni Monument—Hill Cumorah," *Instructor*, April 1951, 99.
 19. Marie Knaphus James, personal interview, September 2003.
 20. Kit Poole, "Missionary sees family image in statue of the Angel Moroni," *Church News*, 15 January 1994, 12.
 21. This and other details are taken from Clark, "Finding the Face of an Angel," posted on the Ezra T. Clark family Web site. See n. 13 above.
 22. Clark, "Finding the Face of an Angel."
 23. Torleif S. Knaphus, "The Call—Brief Description and Impressions of My Trip," unpublished document in the author's possession, June 1934.
 24. Knaphus, "The Call."
 25. Byron Warner, "Statue Makes a Left Turn," *Church News*, 17 April 1976, 3.
 26. Journal History of the Church, 21 July 1935, "Monument Dedicated," United Press, clipping taken from the *Los Angeles Times*, 22 July 1935.
 27. Journal History of the Church, July 21, 1935, "Mormons Dedicate Moroni Statue," clipping taken from *Rochester Evening Journal* and the *Post Express*, July 22, 1935.
 28. Knaphus, "Description of the Hill Cumorah Monument."

The Geologic History of Hill Cumorah

Michael J. Dorais

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2. J. W. Miller Jr., "Variations in New York Drumlins," *Annals of the Association of American Geographers* 62/3 (1972): 418–23.
3. W. Kenneth Hamblin and Eric H. Christiansen, *Earth's Dynamic Systems*, 9th ed. (Upper Saddle River, NJ: Prentice Hall, 2001).
4. M. Milankovitch, *Kanon der Erdbestrahlung und seine Anwendung auf das Eiszeitenproblem* (Belgrade: Königlich Serbische Akademie, 1941), 133.
5. Jürgen Ehlers, *Quaternary and Glacial Geology* (Chichester, England: John Wiley & Sons, 1996); I. Peter Martini, Michael E. Brookfield, and Steven Sadura, *Principles of Glacial Geomorphology and Geology* (Upper Saddle River, NJ: Prentice Hall, 2001), 110–30.
6. M. E. Ragmo, and W. F. Ruddimann, "Tectonic Forcing of Late Cenozoic Climate," *Nature* 359 (1992): 117–22.

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 11. Donald Cadwell (of the New York Geological Survey), personal communication to author, 2004.
 12. Ehlers, *Quaternary and Glacial Geology*.
- Archaeology and Cumorah Questions**
John E. Clark
1. E. G. Squier, *Antiquities of the State of New York* (Buffalo, NY: Derby, 1851).
 2. William A. Ritchie, *The Archaeology of New York State*, rev. ed. (Fleischmanns, NY: Purple Mountain Press, 1994).
 3. For Pennsylvania, see Jay F. Custer, *Prehistoric Cultures in Eastern Pennsylvania* (Harrisburg: Commonwealth of Pennsylvania, Pennsylvania Historical and Museum Commission, 1996).
 4. Squier, *Antiquities of the State of New York*, 7.
 5. It is important to note that other places in the Americas do fit these requirements, and this is what most of the debate is about. See John L. Sorenson, *The Geography of Book of Mormon Events: A Source Book*, rev. ed. (Provo, UT: FARMS, 1992).
 6. Barry C. Kent, Ira F. Smith III, and Catherine McCann, eds., *Foundations of Pennsylvania Prehistory* (Harrisburg: Pennsylvania Historical and Museum Commission, 1971).
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 8. Neal L. Trubowitz, *Highway Archeology and Settlement Study in the Genesee Valley* (George's Mills, NH: Occasional Publications in Northeast Anthropology, 1983).
 9. Trubowitz, *Highway Archeology*, 144–45.
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 11. Consult John L. Sorenson, *An Ancient American Setting for the Book of Mormon* (Salt Lake City: Deseret Book, 1985), 1–95; *Mormon's Map* (Provo, UT: FARMS, 2000); and *The Geography of Book of Mormon Events*, 209–315, 329–53; also David A. Palmer, *In Search of Cumorah: New Evidences for the Book of Mormon from Ancient Mexico* (Bountiful, UT: Horizon, 1981).
- [What's in a Word?]
Pairs and Merisms in 3 Nephi
Cynthia L. Hallen with Josh Sorenson
1. James T. Duke, "Word Pairs and Distinctive Combinations in the Book of Mormon," *JBMS* 12/2 (2003): 32–41.
 2. James Strong, ed., *New Strong's Exhaustive Concordance of the Bible*, in *The Scriptures: CD-ROM Resource Edition 1.0*. A widely available printed version of Strong's classic work is *The New Strong's Exhaustive Concordance of the Bible* (Nashville: Thomas Nelson, 1990).
 3. Calvert Watkins, *How to Kill a Dragon: Aspects of Indo-European Poetics* (New York: Oxford Univ. Press, 1995), 41–46.
 4. Watkins, *How to Kill a Dragon*, 45.
- [What's in a Name?]
The Name Cumorah
Paul Y. Hoskisson
1. The name *Cumorah* appears only in Mormon 6:2, 4–6, 11 and 8:2.
 2. For a discussion of which languages are relevant for producing Book of Mormon onomasticon etymologies, see Paul Y. Hoskisson, "An Introduction to the Relevance of and a Methodology for a Study of the Proper Names of the Book of Mormon," in *By Study and Also by Faith: Essays in Honor of Hugh W. Nibley* (Salt Lake City: Deseret Book and FARMS, 1990), 2:126–35.
 3. All proper nouns in the ancient world (and even most modern proper nouns) have a meaning. The meaning may be randomly applied, such as "Kolob Canyon" near Springville, Utah, or it may reflect the actual nature of the feature being named, such as "Long Island." Or it may reflect a positive or negative view of the actual place, such as "Rattlesnake Ridge" near Provo, Utah, or "Pleasant Grove" just north of Provo.
 4. As far as I know, Joanne Hackett was the first to propose this etymology. A copy of her unpublished work is currently in my possession.
 5. Royal Skousen, ed., *The Printer's Manuscript of the Book of Mormon*, pt. 2 (Provo, UT: FARMS, 2001), 892–93, 896.
 6. From a photostatic copy in my possession of an original 1830 edition.
 7. As per *The Printer's Manuscript*, 892, note to line 9, "the spelling *Camorah* shows that O[liver] C[owdery]'s u in [the original manuscript] looks like an a." The two spellings with o might also indicate that the (so far) unidentified scribe who wrote that section of the printer's manuscript mistook Oliver's u's in the original manuscript for o's. Oliver himself comments that the spelling of the 1830 edition is wrong and should have been spelled *Cumorah* and not *Camorah* (*Messenger and Advocate* 1/10 [July 1835]: 158a). The spelling of *Cumorah* was standardized in the 1837 edition, the next-to-last edition that Joseph Smith himself helped edit.
 8. Both Ugaritic, another Northwest Semitic language closely related to Hebrew, and Arabic, a Southwest Semitic language, contain both phonemes and represent them with different characters. In Phoenician, like Hebrew, both phonemes are represented by the same character. English and other Indo-European languages that I am aware of do not possess either phoneme. For more on 'ayin, see my discussion in "The Name Alma," *JBMS* 7/1 (1998): 72.
 9. In most cases we can determine whether the Hebrew 'ayin derives from an original 'ayin or gayin because the cognate words in Ugaritic or Arabic or both preserve the difference. In addition to *Gomorrah*, the place-name *Gaza* falls into this category.
 10. In Hebrew the doubling of consonants is phonemic, meaning that if a letter is doubled, the meaning of the word changes. Normally, doubling is indicated by the insertion in the letter of a small dot, called a *dagesh*, the size of the period at the end of this sentence. According to Hebrew grammarians, an r cannot take a *dagesh*. Therefore, when the context requires that the r be doubled, the r is said to be "virtually doubled" and does not receive a *dagesh*.
 11. For example, see Numbers 27:21 and 1 Samuel 28:6.
 12. See David A. Palmer, *In Search of Cumorah* (Bountiful, UT: Horizon, 1981), 21, for an example of this interpretation.
 13. Stephen D. Ricks and John A. Tvedtnes, in "The Hebrew Origin of Some Book of Mormon Place Names," *JBMS* 6/2 (1997): 255–57, point out many of these difficulties.
 14. It might be said that both *qum* and *orah* are commands, yielding "Arise, Shine." The biblical passage most like this suggestion for *Cumorah* is Isaiah 60:1, *qūmī'ōrī*, containing the feminine command forms, "arise" and "shine." But *cum orah* lacks the long i vowel marker of the feminine imperative form and therefore cannot be feminine; and to read both *cum* and *orah* as masculine imperatives requires that *orah* be an energetic (a special form of the masculine imperative that ends in the long vowel ā, represented in Hebrew orthography by אָ) and *qum* not be an energetic, which is unlikely. For the energetic in Hebrew, see *Gesenius' Hebrew Grammar*, ed. E. Kautzsch, 2nd English ed., rev. A. E. Cowley (Oxford: Clarendon, 1920), §48i. While it is also true that there are three instances in the Hebrew Old Testament of what look like masculine singular imperatives used with feminine singular nouns, it is possible in all three instances to explain the apparent masculine imperative as a different form. In addition to the example in *Gesenius* §110k, note that the feminine ending of the imperative is a long vowel and not a consonant. It was therefore represented in the script only when the use of a *mater lectionis* generally came into play. Thus, all three instances may have originally been feminine, but the long i vowel marker was never represented in the text. Suffice it to say, to see in *Cumorah* a combination of "rise" and "shine" is at best plausible, but unlikely.
 15. Joanne Hackett and Robert F. Smith both have suggested this root in unpublished etymologies in my possession.
 16. *The Assyrian Dictionary of the Oriental Institute of the University*