

Science Authenticates THE BOOK OF MORMON

SCIENCE and SCHOLARSHIP evaluate
contextual details
of the Book of Mormon

Confirming its authenticity
201 years after

the Angel Moroni delivered his commission to Joseph Smith

Gary Stradling, PhD

Retired from Los Alamos National Laboratory (40 yrs)
and Defense Threat Reduction Agency (5 yrs)

Grateful for support from Scripture Central*

esp. Matthew Roper: Anachronisms and the Book of Mormon: Trajectory and Trends of Evidence (May 26, 2023) Pre-publication draft
ALSO a tremendous amount of work from scholars, both LDS and non LDS, across many fields.

Disclaimer: I do not represent LANL, DTRA, the Los Alamos Faith and Science Forum, nor official
views of the Church of Jesus Christ of Latter-day Saints (LDS) (*Non-profit org: <https://scripturecentral.org/>)

But First: What does the Deeply Christian Book of Mormon claim to be?

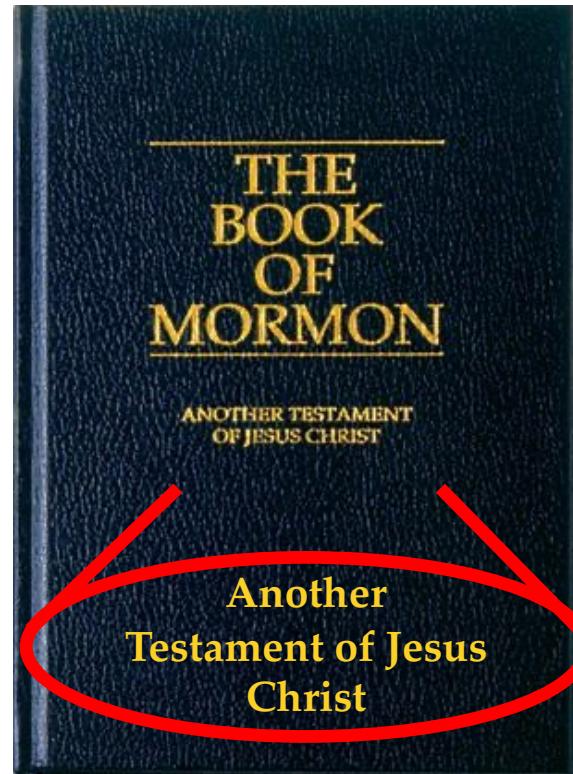
1000-year sacred history, written in Hebrew, by Israelites, fled from Jerusalem to the Americas in 600-BC

Focused on **Jesus Christ**: His teachings confirm the Bible, ancient prophecy about our time and the Americas

Most Latter-day Saints receive a direct spiritual confirmation of the truth of the Book of Mormon from the Holy Ghost, by asking God, “with a sincere heart, with real intent, having faith in Christ.”

It says it was prepared by God, over thousands of years, specifically for our day.

9/24/24
Promises to rescue us, by convincing Christianity, scattered Israel and the Gentiles, of the truth of the Bible, to draw all mankind to Jesus Christ. (Mormon 7:8-9)



Published in 1830 by Joseph Smith Jr.,
24 year-old uneducated farm laborer

Relevant Science Disciplines:

- Contemporaneous documentation and forensic event analysis
- Archeology: site and artifact-based studies of ancient peoples
- Anthropology: flow of peoples, cultures, and technical knowledge
- Geography: terrain, cities, historical human developments
- Geology: the geologic record and current geologic features
- Ancient Records: scribal traditions, record preservation, content comparisons, triangulation with Spanish and native chronicles
 - Linguistics/ Literary signatures
 - Metallurgy

We examine Book of Mormon content through scientific eyes

Archeology:

- **Old World:** Egyptian, Greek, Roman, Hittite, Phoenician etc.
- **Americas:** Ruins in North, South, and Meso-American: large, complex, sophisticated civilizations, ruins and artifacts. **Mostly post-1830 research.**

Archeology has limitations:

- **Incorrect presumptions:** e.g. Migrations are not all diffusion!; Not always cultural isolation!; Evolutionary development theory, **not necessarily true!**
- Very few human and animal artifacts survive the ages: bones, foods, wood, metal: only survive **only in unusually protected conditions.** (consider lack of evidence of Tamerlane, Genghis Kahn in Eurasia)
- Thermo-luminescent or radio-carbon dating sometimes possible
- Interpretation **without written records** rely on **inference and guesswork**



Mural fragment in San Bartolo, Guatemala, rediscovered 2003, presented at the Palacio Nacional de La Cultura, May 2006. Pre-Classic Maya art



Temple in Tikal
[Rialfver](#) at [nl.wikipedia](#)

Written records overrule archeological speculation!

- Old World records: Egyptian, Hittite, Aramaic, Phoenician, Hebrew, etc.
- New World: Spanish historical chronicles, Codices (16 exist) (routine destruction of records of conquered peoples)

Falsifiability Fallacy- you cannot prove that something did not happen:

“Absence of evidence is not, and should not be confused with, evidence of absence.” Prof Kitchens*
ie: If you did not find evidence (yet) that does not mean it did not exist!

Unique embedded Signatures **AUTHENTICATE** valuables

Counterfeiting and fraud **pretend** the quality, value, or authority of authentic treasures:

- Currency, official records, passports, identification papers, financial documents
- High-value commodities: medicines, electronics, engineering components, specialty foods and beverages, clothes, watches, jewelry, etc.
- **Pseudographic fraud in religious writings has long been an issue**

Validation signatures: seals, images, engraving, sealed components, imprints, and watermarks **prove authenticity!**

Signatures may be embedded as part of the fabric of an item, providing evidences of its origin and authenticity that cannot be counterfeit

The Book of Mormon is a religious tapestry,
painted on a fabric of context.

That contextual fabric holds many signatures of authenticity

From the time of its publication in 1830
Some Book of Mormon critics adopted a Scientific Approach
Cited contextual errors, anachronisms (chronological inconsistencies), scientific absurdities

1831- Alexander Campbell*: *Delusions: An Analysis of the Book of Mormon;*

and 1834 Eber D. Howe *Mormonism Unvailed:...*

Both examined **contextual details** in the Book of Mormon:

- proclaimed it to be false and deceiving.
- first formal documentation of significant questions

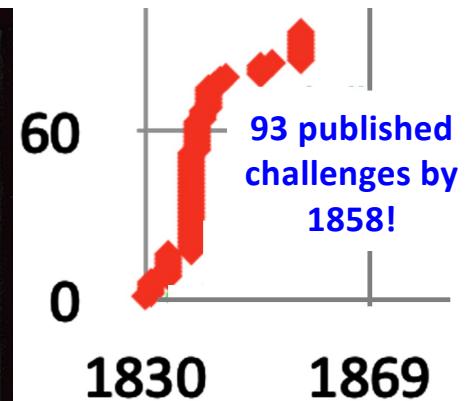
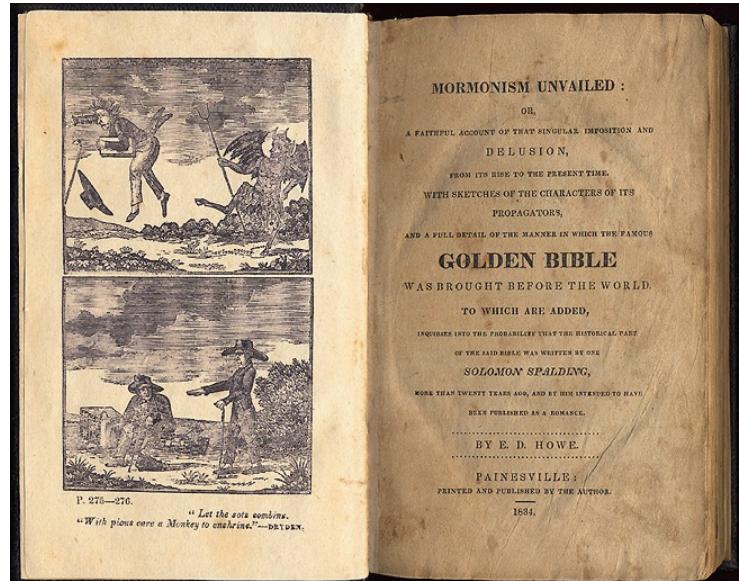
"No intelligent or well-educated man would have been guilty of so many anachronisms ... as characterize every part of the Book of Mormon." John A. Clark

1840 "Gleanings by the Way. VII," *Episcopal Recorder*, September 12,

Most of the challenges published by critics concerned ancient practices, thought to be inconsistent with 1830's archeological, biblical, or scholarly theories.

*Alexander Campbell founded the "Disciples of Christ" church

1- Gordon H. Fraser, *What Does the Book of Mormon Teach?* (Chicago: Moody Press, 1964): 11



Largely unanswered for 100 years

Criticism has stimulated LDS scholarship

In the last 80 years many LDS students have chosen academic career paths in:

- Archeology
- Ancient languages
- Textual analysis
- Linguistics
- Forensic document analysis
- Ancient religion scholarship, including evolution of Old Testament, Early Christianity
- Genetics
- Forensic study of LDS history

Some LDS scholars are respected at the highest levels of their fields.

LDS academic communities include: FARMS, FAIR, Dialogue, Maxwell Institute, Scripture Central, Interpreter Foundation, Journal of Book of Mormon Studies, New World Archaeological Foundation, Joseph Smith Papers Project, etc.

“Mormon Scholarship, Apologetics, and Evangelical Neglect: Losing the Battle and Not Knowing It?”

The Trinity Journal 19/2 (1998): 179-205 (26 years ago)

Carl Mosser & Paul Owen

“Spiritual warfare is a reality.it is a war of ideas that vies for people’s minds. ...

The Church of Jesus Christ of Latter-day Saints, has in recent years produced a substantial body of literature defending their beliefs. ...”

“In this battle the Mormons are fighting valiantly. And the evangelicals? It appears that we may be losing the battle and not knowing it. ...”

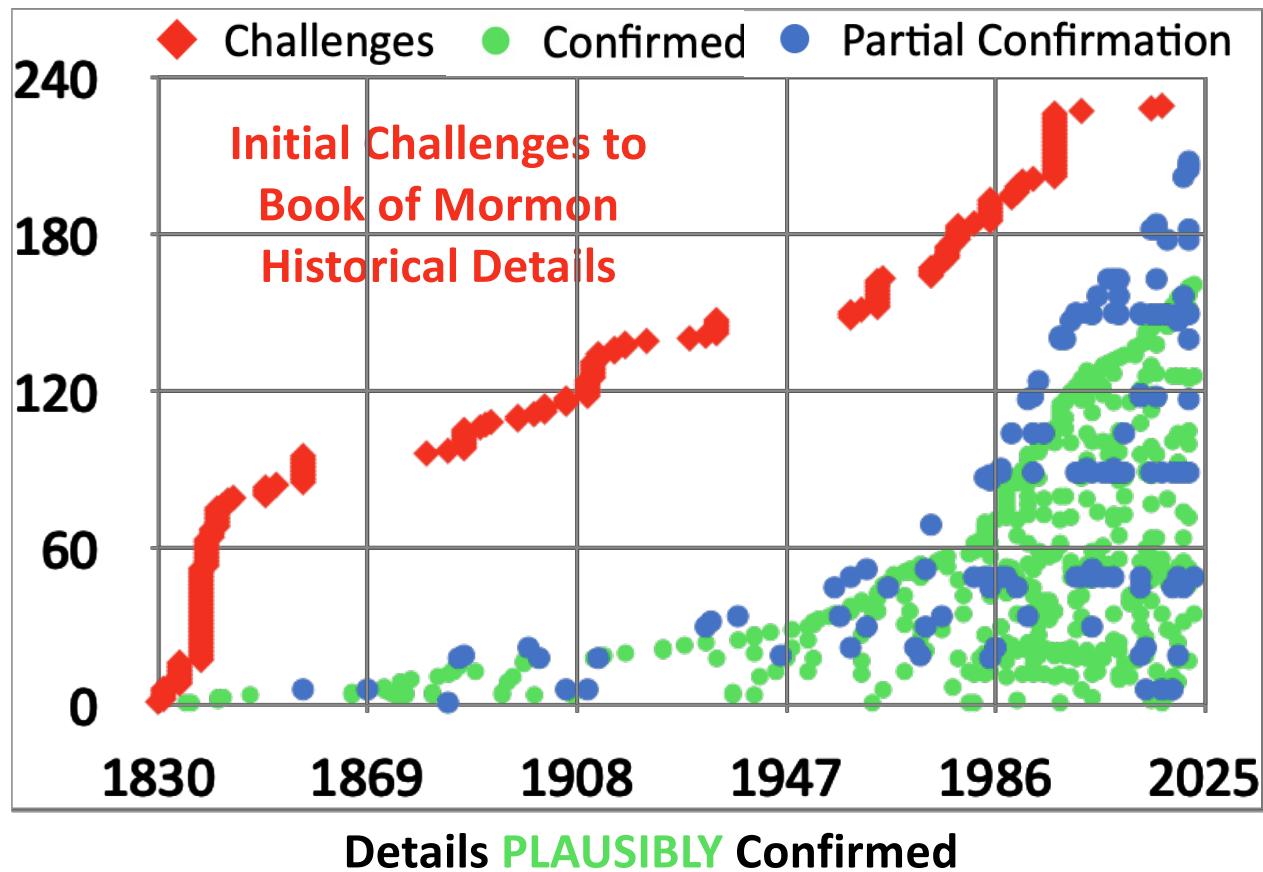
Publication of 229 challenges of embedded details Subsequent research Confirming or Partially-confirming Plausibility.

Matt Roper* reviewed 1000 critical publications and assessed scholarly responses, cataloging 1440 citations, giving current status

- Support confirmation or partial confirmation of challenged details.

- Rate of production of confirming evidence is accelerating with increased academic attention.

*Matthew Roper: Anachronisms and the Book of Mormon: Trajectory and Trends of Evidence (Prepublication May 26, 2023)



Red data points represent the initial publication date of each specific challenge.

Assessed Plausibility of 229 Challenges[#]

I will discuss items in Yellow

Confirmed as Plausible (168) 73%

- Three Day Journey
- River in a Valley
- Verifiable Details for Lehi's Trail
- Eastward Turn
- River Flowed into Red Sea
- Naming New Locations
- Not Much Fire
- Direction
- Much Fruit
- Eating raw meat
- Bountiful region
- Wild Honey
- Timber
- Ore
- Bellows
- Mountain at Bountiful
- Honey bees
- Scripture in Egyptian
- Metal Plates (OW)
- Jews Writing in Egyptian
- Israelite Writing on Metal
- Hebrew Name (Non-Biblical)
- Abbreviated (Hypocoristic) Names

- Egyptian Names
- Destruction Account Implausible
- Sunken Cities
- Great Tempest
- Destruction By Fire
- Whirlwind
- Earthquake
- Earthquakes in Mesoamerica
- Buildings Fall
- Thick Darkness
- Reformed Egyptian (OW)
- Inscriptions with Names of Justified Book of Mormon Places (OW)
- Scripture on Metal Darkness that Can be Felt
- Three Days of Darkness
- Inability to Light Fire
- Earth Carried Up
- Earth Closing Up

- Sacrifice Outside Temple
- Abundance of Ores (Copper, Gold, Silver, Iron)
- Forges/Furnaces (NW)
- Metal Money
- Jew (Pre-Exilic Term)
- Israelite Feasts, Customs, Festival
- 600 Year Chronology
- Killing Laban
- Seantum's Confession
- Temples Outside Jerusalem
- Non-Levitical Priests
- Synagogues by 600 BC. (OW)
- Native Traditions
- Civilization (NW)
- Large Cities
- Temples (NW)
- Spinning Tools

- Kings Prisons
- Barns
- Glass (OW)
- Art
- Lunar calendar
- Early Cement
- Archaeological Evidence
- Navigation
- Roads
- Lawyers
- Judges
- Tools to Hoe
- Pruning Tools
- Tools to Plow
- Sickles
- Buildings
- Barley
- Corn
- Grapes
- Wine
- Salt
- Highways
- Tilling Tools
- Pearls
- Silk
- Linen
- Leprosy
- Machinery

- Grain
- Tools to Thrash
- Sam
- Josh
- Mormon
- Deseret
- Liahona
- Irreantum
- Shazer
- Jarom
- Sheum
- Onidah
- Nephi
- Alma
- Zarahemla
- Omni
- Mosiah
- Anti
- Land of Jerusalem
- Bethlehem Part of the land of Jerusalem
- Ocean Route
- Length of Jaredite Voyage
- Pre-Columbian Sea Crossings

- Elephants pre-Columbian
- Elephants Contemporary with man
- Lions
- Wild animals
- Moths
- Dragons (Isaiah)
- Chickens
- Dogs
- Snake behavior
- Military Clothing
- Fortifications
- Warfare
- Wars of Conquest
- Armor
- Swords (NW)
- Swords (NW Early)
- Steel Swords (OW)
- Scimitars (OW)
- Scimitars (NW)
- Daggers
- Axes
- Battle Axes
- Javelins
- Spears
- Quivers

Continued

Assessed Plausibility: Continued

Confirmed (cont.)

- Horses and man
- Horse traditions*
- Cows
- Pre-Columbian Writing
- Pre-Columbian Writing (Early)
- Hiding Up Records
- Stone Monuments
- Trumpets
- Cords
- Ladders
- Tents
- Rations
- Raiders and Plunderers
- Steel (OW)
- Iron Working (NW)
- Iron Practical Use (NW)
- Horses Pre-Colombian
- Early Brass (OW)
- Brass (NW)
- Iron (NW)
- Fiery Darts
- Slings
- Shields
- Arm Shields
- Head Plates
- Breastplates
- Armies
- Large Armies
- Large Army Casualties
- Fainting Loss of Blood
- Prearranged Battles
- Post Decapitation Movement/ Breathing

Partially confirmed (33) 14%

- Horses in Book of Mormon Times
- Asses Pre-Columbian
- Asses in Book of Mormon Times
- Cows in Book of Mormon Times
- Oxen
- Oxen in Book of Mormon Times
- Cattle
- Sheep Pre-Columbian
- Flocks and herds
- Elephants in Book of Mormon Times
- Bow and Arrow (Early)
- Breastplates (Copper/Brass)
- Millions of War Deaths
- Wars of Extermination
- Early Copper
- Chains
- Early Metallurgy (NW)
- Gold Money
- Chariots
- Geographical Correlations
- Moroni
- Helaman
- Money Names
- Rameumptum
- Neas
- Gadianton
- Gid
- Giddianhi
- Egyptian Language (NW)
- Anthon Transcript
- Egyptian
- Hebrew Language (NW)
- Destruction At Times of Christ**
- Day, Night, and Day

Unconfirmed (28) 12%

- Asses traditions*
- Wheat
- Goats
- Compass
- Wild goats
- Ether
- Swine
- Zeniff
- Steel Swords (NW)
- Jonas
- Timothy
- Ziff
- Com
- Kim
- New World
- Metal Plates
- Inscriptions with BoM Names
- Iron Smelting (NW)
- Steel (NW)
- Silver Money
- Heliocentric Astronomy
- Book of Mormon Cities Identified
- Synagogues (NW)
- Hebrew Inscriptions
- Egyptian Inscriptions

*This refers to items not found in the text of the Book of Mormon.

What constitutes Evidence of Authenticity?

Evidence shows a fact to be **more or less probable**, may be **direct** or **circumstantial**.

Direct evidence is direct proof of a fact, such as the testimony of a credible eyewitness.

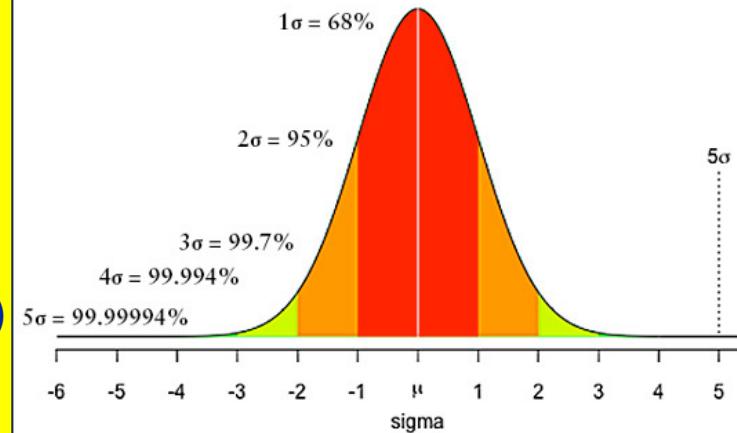
- ***Direct record, attribution, physical, tangible, unique***: e.g. continuous occupancy- like Jericho, or Beirut.
“**Scripted**”: Ancient records or artifacts attributing a name to a place.

Circumstantial evidence (sometimes called inferences) consists of a chain of circumstances or facts pointing to the existence of important things.

- ***Particularly specific, identifiable, unusual facts, anomalies***, NOT common knowledge in 1830, but proven in the historical, archaeological, or linguistic records.
- **Ensembles of complete systems of evidences**: e.g. an array of matching features
- Examples in the historical/archeological record that asserted anachronistic items/practices existed during the historical period in question, e.g. were plausible.

Standards of Proof- Probability Based

1. Preponderance of the Evidence- more likely than not, **better than 50% probability**- Civil cases
2. Clear and convincing evidence: produces a firm belief or conviction, greater than 75%, **highly probable** – certain legal cases
3. Beyond a reasonable doubt: **NO reasonable alternate explanation exists**: Highest legal standard of proof. (98%-99%)
4. Particle physics standard of proof for new particle discovery: $P(\text{error}) = 5\sigma = 1/3.5 \text{ million} = 0.00000028$



$$P_{\text{Authentic}} = 1 - P_{\text{False}}$$

Requiring two items to be **simultaneously** false is:

(Fact (A) **AND** Fact (B | A) False), so independent **probabilities simply multiply**: $P_{\text{False}} = P_f(A) \times P_f(B)$

If the events depend on each other, then a **correlation reduction factor** must be included

So the probabilities of many **simultaneous** propositions also **multiply**:

$$P_{\text{False}} = P_f(1) \times P_f(2) \times P_f(3) \times \dots P_f(n) / P_{\text{correlation}}$$

where $P_f(i)$ is the probability that the i^{th} detail is false. $P_{\text{correlation}}$ is the correlation factor of the events happening all together.

**Our analysis will be referenced to
scientific evidence and frequency-based probability analysis**

We ALL understand probabilities: You meet someone you know, while traveling- Coincidence?

Probability: $P = \text{people you know} / \text{other possible contacts}$

While traveling to Florida recently, I met **an acquaintance** at the **same beach!** **What are the odds of that meeting being coincidental?**

Probability = # of people I know/# of possible travelers

$$P = 1000/1,000,000 = 1/1000$$

Coincidentally meeting **two** different people you know, simultaneously!?

$$P = P_1 * P_2$$

$$P = (1/1000) \times (1/1000) = 1/1,000,000 \quad \text{One in a million!}$$

The **Odds** of seven other members of my family, with their families, all showing up on a Florida beach, at the same time, by **Coincidence** is so low as to be **ZERO**.

IT HAD TO BE A PLANNED GATHERING



These are the kinds of odds of the Book of Mormon being a fiction, while **COINCIDENTALLY matching real world data!**

As we discuss the Book of Mormon probabilities of authenticity, I will assess, using these four nominal classes of Statistical Frequency: α , β , γ , δ

- Specific but Ordinary: $P_\alpha \approx 1/10$
- Scarce: $P_\beta \approx 1/250$
- Exceptional: $P_\gamma \approx 1/10,000$
- Unique: $P_\delta \approx 1/1,000,000$

Roughly Logarithmic

Certainly Approximate

Intentionally UNDERESTIMATED

Extensive *non-religious* context, across many topic areas (for which there was little 1830 justification) provide compelling evidence:

- 1 Logistics and Complexity: Technical comparison with “Best in Class” equivalent- Tolkien & LOTR
- 2 Journey across the Arabian Peninsula: confirmation of plausibility of itinerary and location details
- 3 Recording methods- Egyptian shorthand script, recording on metal plates
- 4 Linguistic details consistent with the Hebrew-origin text: Textual structure, names, wordplays, poetic forms
- 5 Record of 3 Nephi cataclysm consistent with geographical, geological, volcanic, and seismic science
- 6. Contextual description of advanced pre-Columbian societies
- 7. Detailed and extensive chronicles of warfare: strategy, tactics, intelligence, weapons, body armor, fortifications, hostage taking, prisoner swaps, supply logistics, etc. consistent with history and archeology
- 8. Transoceanic voyages: across Indian Ocean, Indonesia, and the Pacific by novices (El Nino effect, extensive cultural, biological, immunological evidence of communication with Old World)
- 9. Deforestation account and extensive use of cement in ancient Meso-America

Etc., etc.,- there are many more

I will discuss the five of these topics in detail, more easily-explained examples for clarity and impact-
Many other evidences are more complex, but just as compelling.

Logistics and Complexity:

Technical Feasibility

Once published in 1830:

Detailed, complex, coherent content of the Book of Mormon?

Can you “make this stuff up”?

Details *might be examined and evaluated by Science*

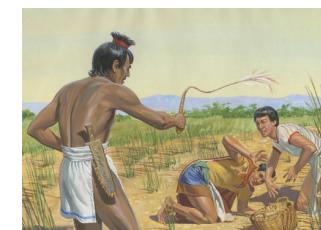
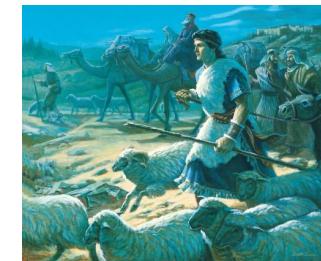
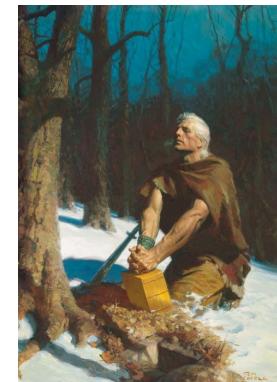
Hebrew/Christian religion: based on **600 BC** scripture
on Brass Plates: Old Testament + more

A new land: settlement, geography, internal relations and conflict, division, migrations, war: strategy, tactics, intelligence, conspiracies, armaments, and defenses,

1000-year history: complex and self-consistent chronologies, mostly in first-person accounts: religion, social practices, politics, warfare, culture, technology, money, agriculture, etc.

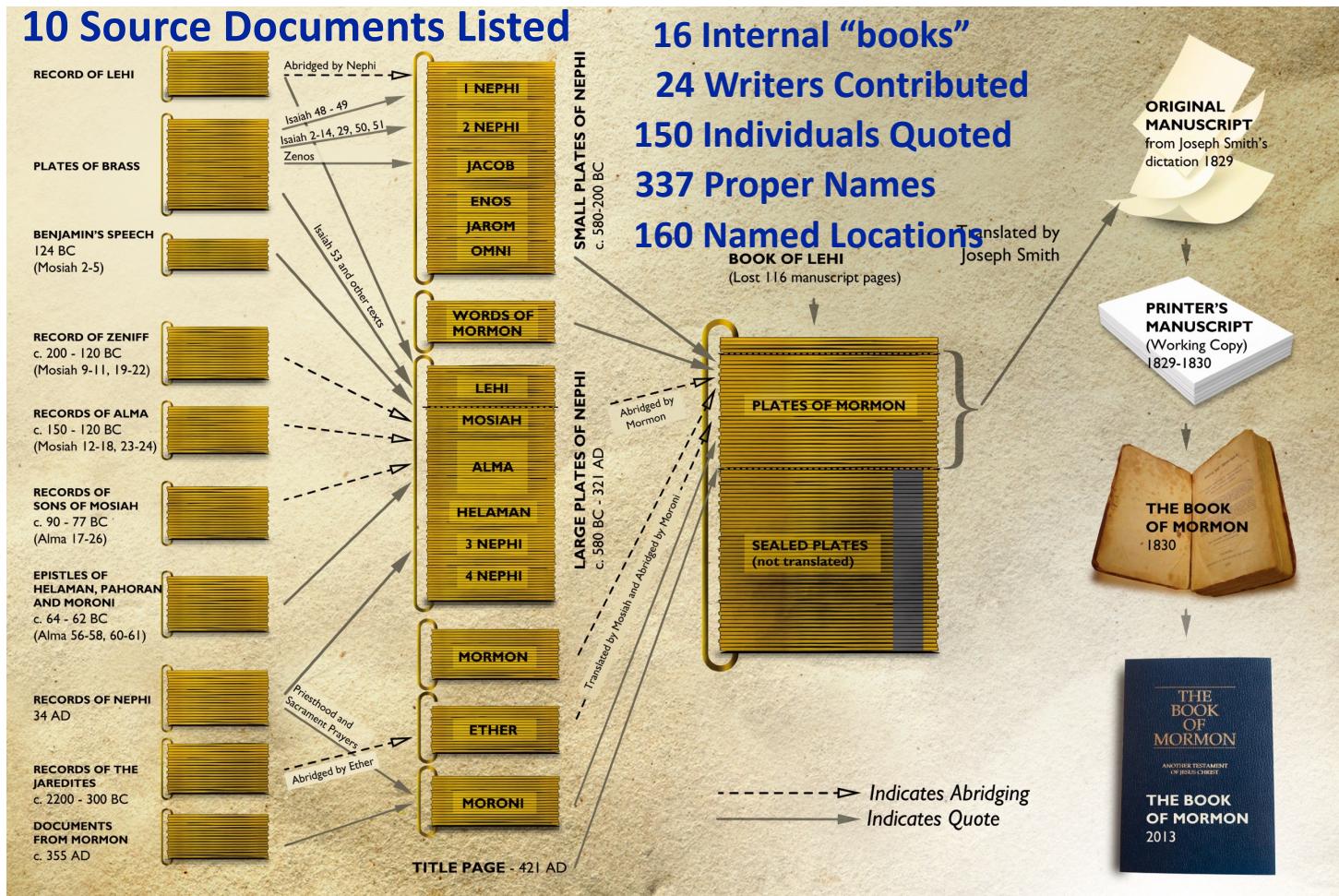
2nd civilization 1600 years previously.

Accounts of other migrations ...



Written w/o reference to the modern time, culture, and place
(Problem of writing fiction about unknown place and time)

The structure of the Book of Mormon is complex!



Chain of Custody (author's name, relationship, responsibility) of each source document provided.

Technical feasibility of Joseph Smith creating the Book of Mormon?

Compare relevant metrics with JRR Tolkien's "Hobbit", LOTR

LOTR:
Lord
Of
The
Rings
Trilogy

	Age at publication	Education	Collaborative support	War Experience	Production time (days)	# of Pages Hobbit	Names	Linguistic Diversity of Names***	Named Locations	Poetry**
J Smith-BofM	24	3 rd grade, frontier*	None	None	74	590	337	5.2	160	100's
JRR Tolkien-Hobbit, LOTR	45	Greek, Latin, widely read, 1st w/ Honors from Exeter College, Oxford University ; Professor 17 years	Weekly Inklings meetings- CS Lewis + 11 others	WW I, Lieutenant, trenches, Battle of Somme, Injured	2190 (6 years) + 16 years prep work	304	197	0.8	33	61
Ratio	1/2	~1/10	0	0	1/30	2x	1.7x	6x	5x	2x

All LOTR
1178 pages

*For a detailed analysis comparing JS/BofM with many other authors, see Brian C. Hales, *Interpreter: a Journal of Latter-day Faith and Scholarship*, 31 (2019) 151-190

** Richard Dilworth Rust, 1991, "Poetry in the Book of Mormon" <https://archive.bookofmormoncentral.org/content/poetry-book-mormon>

*** <https://journal.interpreterfoundation.org/comparing-book-of-mormon-names-with-those-found-in-j-r-r-tolkiens-works-an-exploratory-study/>

Rough comparison between Joseph Smith's Book of Mormon accomplishment and Tolkien's classic masterpiece.

	Age at publication	Education	Collaborative support	War Experience	Production time (days)	# of Pages Hobbit	Names	Linguistic Diversity of Names***	Named Locations	Poetry**
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Ratio	1/2				0			6x	5x	2x

Unique
 $P_Y \approx 10^{-6}$

All LOTR
278 pages

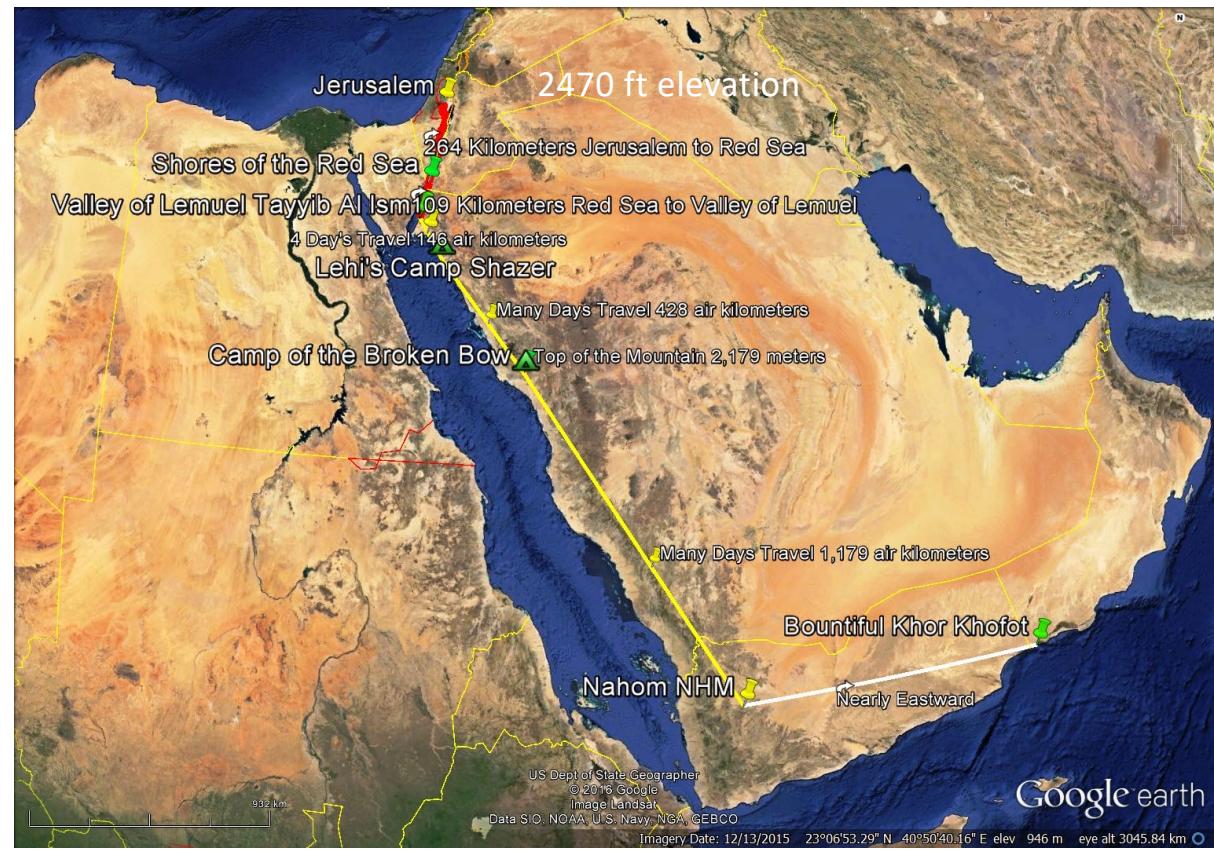
Smith's book, by technical measures, is much more complex, deep, poetic, and original than Tolkien's masterpiece, written in 1/30th of the time, with no training, practice, support group, notes, drafts, maps, timelines, or other reference materials.

Also, Tolkien has many inconsistencies, errors of fact, naive warfare.

https://tolkiengateway.net/wiki/Mistakes_and_inconsistencies_in_Tolkien%27s_works

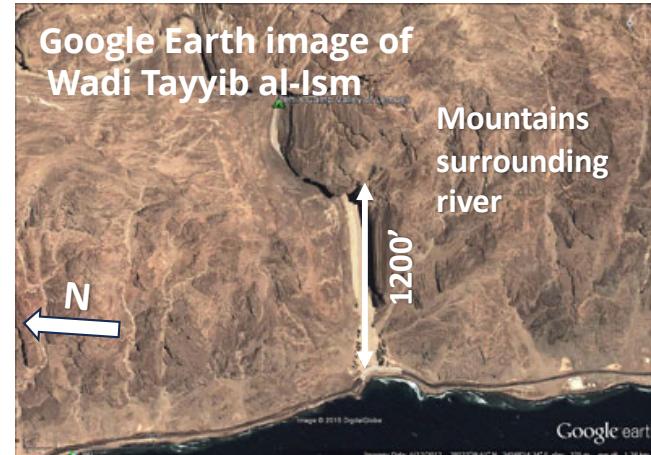
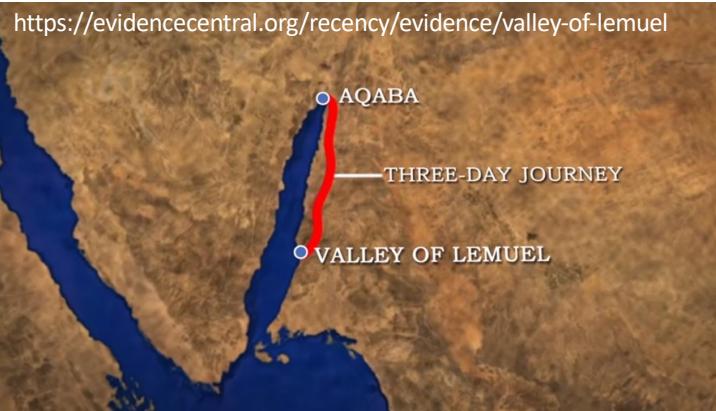
Journey from Jerusalem, down the Arabian Peninsula: 15 details- locations-in order of progression, specific features & distances; confirmed by modern “fact checkers”

- Lehi assigned to warn Jews in Jerusalem, met with anger and threats, flees for his life, with family, friends
 - From *land of Jerusalem*, down to Red Sea (2470' elevation change)
 - 3 days journey “in the wilderness” near Red Sea
 - Camped at water source on Red Sea coast (Tayyib Al Ism) – **only** such continuously flowing river in NW Arabian peninsula
 - 4 days S-SE to Shazer **unique oasis with hunting grounds**
 - Long journey S-SE along **network of oasis, ancient Incense Trail**
 - Came to “**Nahom**” (NHM “scripted!”)
 - Traveled East to Bountiful: **bees, forest, ocean shore, iron ore.**



Great narrative video at <https://youtu.be/5yjKSaegLJg>

1 Nephi 2: 4 ...departed into the wilderness. **5** And he came down by the borders **near the shore of the Red Sea** (200 mi); and he traveled in the wilderness in the borders which are nearer the Red Sea ...
6 ...he had traveled three days in the wilderness, he pitched his tent **in a valley by the side of a river of water**.
8 ...the river... emptied into the Red Sea (**continually running into the fountain**); and the **valley was in the borders near the mouth thereof**... **10** ... firm and steadfast, and immovable ...



Two images of Wadi Tayyib al-Isrn
via lds.org

1 Nephi 16:12–14:

*And it came to pass that we did take our tents and **depart into the wilderness, across the river Laman**. And it came to pass that we **traveled for the space of four days, nearly a south-southeast direction**, and we did pitch our tents again; and we did call the name of the place **Shazer**. And it came to pass that we did take our bows and our arrows, and **go forth into the wilderness to slay food for our families**; And we did go forth again in the wilderness, following the same direction, keeping in the most fertile parts of the wilderness, which were in the borders near the Red Sea.*



Warren P. Aston, “[Nephi’s ‘Shazer’: The Fourth Arabian Pillar of the Book of Mormon](#),” *Interpreter: A Journal of Latter-day Saint Faith and Scholarship* 39 (2020): 61–69.



Wadi Sharma (“Shazer”) is approximately 70 miles (4 days journey) southeast of the Valley of Lemuel

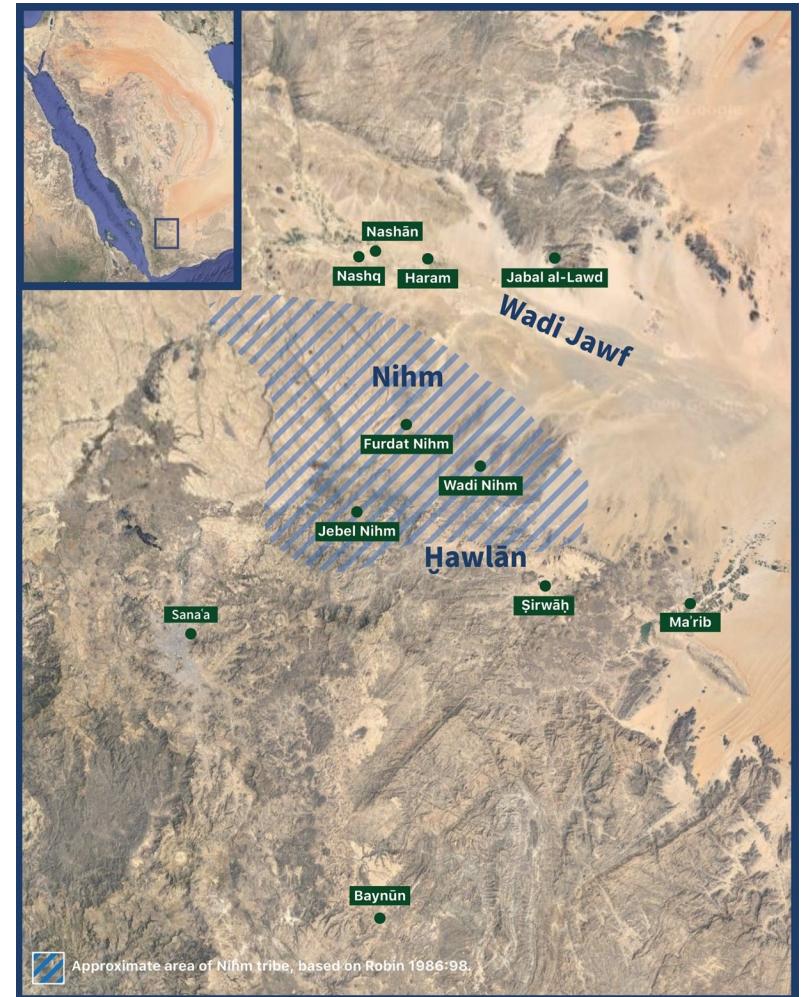
...Explorer and researcher Warren Aston found ...
the only valley that allows for southward travel in this region
 ... opposite from the proposed encampment site, ... required
Lehi's party to cross the valley's river or stream, ... this valley
 “leads southeast through the mountains to emerge in a broad
 plain ... offering a multitude of possible pathways that bring the
 traveler to the... (network of oasis, that provide hunting to this
 day).

1 Nephi 16: 33 *And it came to pass that we did again take our journey, traveling nearly the same course (S-SE) as in the beginning; and after we had traveled for the space of many days we did pitch our tents again, that we might tarry for the space of a time.*

34 *And it came to pass that Ishmael died, and was buried in the place which was called **Nahom (NHM)**.*



Nahom: southwest corner of Arabia, where the ancient trade routes moving southward now turn eastward.² The Nihm region, in Yemen, matches closely with these details.



Bountiful location description (coastal oasis with lush tropical vegetation):

1 Nephi 17: 5 *And we did come to the land which we called Bountiful, because of its much fruit and also wild honey; ... we beheld the sea, ...*

6 *... we did pitch our tents by the seashore; ... the voice of the Lord came unto me, saying: Arise, and get thee into the mountain. ... the Lord spake unto me, saying: Thou shalt construct a ship, after the manner which I shall show thee...*

9 *And I said: Lord, whither shall I go that I may find ore to molten, that I may make tools to construct the ship after the manner which thou hast shown unto me?*

10 *And it came to pass that the Lord told me whither I should go to find ore, that I might make tools.*

... I did smite two stones together (flint) that I might make fire. ...

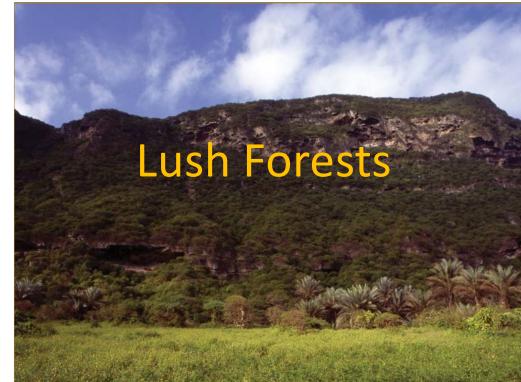
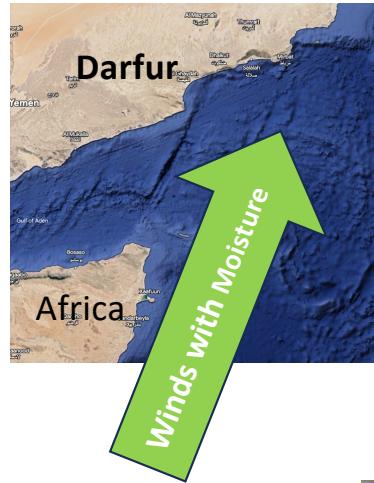
16 *And it came to pass that I did make tools of the ore which I did molten out of the rock.*

For modern confirmation:

- Lush coastal area adjacent to high mountain
- Plentiful honey and fruit
- Accessible seashore: camping and shipbuilding
- Hunting: for dried meat for journey
- Timbers: for shipbuilding
- Iron ore: suitable for low-temperature smelting/forging

2

Several narrow areas on the south coast of the Arabian Peninsula are fed by moist winds up from the Horn of Africa: Khor Kharfot, Qara Mountains of southern Oman, in the Dhofar region best matches, confirming the existence of a Bountiful-like location



9/24/24

Journey of Faith: From Jerusalem to the Promised Land S Kent Brown, Peter Johnson
BYU 2006

<https://evidencecentral.org/receency/evidence/bountiful>

Confirming the existence of the rare and improbable ore deposit

Iron-ore rare in Arabia. Igneous formations, also rare in Arabia. One on **Salalah Coast, unknown to official geology agencies.**

Iron ore smelting requires hot temperatures, much hotter than a wood fire.

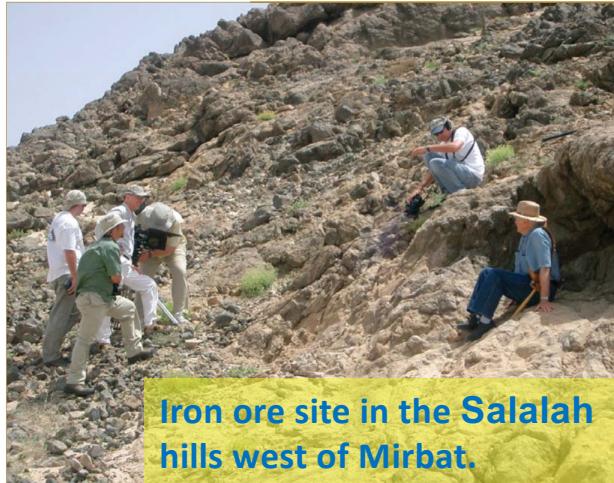
East of Salalah are very unusual **orange and red carbonate-rich veins, intruding granite and other igneous bodies.** Particular types of iron-rich mineralization--**limonite and ferroan dolomite**—(natural mixture of iron and carbonate).

Carbonate lowers the melting point of iron -- achievable with a wood fire and bellows. **“one in a million!” detail.**

9/24/24



Ore deposit at Khor Kharfot.
Photo by Warren Aston



Iron ore site in the Salalah hills west of Mirbat.

2

The probability of 1830's writer independently coming up with any of these extremely specific details, which have been confirmed to correspond to the real world, **are vanishingly small**. Could these Old World details and narrative have been conveyed by alternate sources?

Location Detail on Lehi's Arabian Peninsula Journey	Class of Anomaly	Probability of Guessing Location with general 1830 knowledge	Cumulative Probability $P_f = P(1) P(2) P(3) \dots P(8)$
3 days journey in Red Sea wilderness to Tayyib al-Ism	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/10$
Tayyib al-Ism valley and river features	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/100$
Shazer distance, direction, character	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/1000$
Incense Trail character and direction	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/10,000$
Location, character of tropical paradise	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/100,000$
Nahom name and location	β - Scarce	$P_\beta \approx 1/250$	$\approx 1/250,000,000$
Direction change to safely cross interior	β - Scarce	$P_\beta \approx 1/250$	$\approx 1/62,500,000,000$
Existence and suitability of iron ore deposits	δ - Unique	$P_\delta \approx 1/1,000,000$	$\approx 1.6 \times 10^{-16}$

But:

- Many travelers plied the area
- Were there any travelogues from the period?
- If so, this is improbable, but not unimpeachable evidence, even if an alternate information source remains unknown, **EXCEPT for the Unique item: The rare, small, specific carbonite iron ore deposit**

Hebrew and Egyptian Language, Plates, and the Book of Mormon

Lehi descended from Joseph and Manasseh-Egyptian nobility. It is reasonable that they retained Egyptian scholarship, and passed that knowledge through generations.

Lehi, ... was a descendant of Manasseh (who grew up in Egypt), who was the son of Joseph- Alma 10: 3

Yea, I make a record in the language of my father, which consists of the learning of the Jews and the language of the Egyptians. - 1 Nephi 1:2

Our father, Lehi, ... having been taught in the language of the Egyptians ... could read these (Brass Plates) engravings, and teach them to his children, that thereby they could teach them to their children... Mosiah 1:4

And now, behold, we have written this record according to our knowledge, in the characters which are called among us the reformed Egyptian, being handed down and altered by us, according to our manner of speech.

And if our plates had been sufficiently large we should have written in Hebrew; but the Hebrew hath been altered by us also; and if we could have written in Hebrew, behold, ye would have had no imperfection in our record. Mormon 9:32-33

These passages say that the gold plates were written in the Hebrew language, but transliterated into “reformed Egyptian characters.” This kind of transliteration, using the dominant language of the Mediterranean at that time, was common, and is well documented.²²

Language and the Book of Mormon

- Hebrew and Egyptian speaking people, 1000-year history, with scriptures in “*language of Egyptians*”
- Written in “*reformed Egyptian*” script, for brevity, on metal “plates of ore”.
- Many recent paleographic examples of metal records, from this time period. Also of Mediterranean languages recorded using Egyptian scripts – but no book-length histories



9/24/24
Portion of Copper Scroll at Jordan Archaeological Museum
(Photo by Don Knebel)

HIERATIC.						DEMOTIC.
HIERO-GLYPHIC	OLD EMPIRE	MID EMPIRE	NEW EMPIRE BEGINNING	NEW EMPIRE	HELLEN-ISTIC	
p	□	{	E	III	III	2
m	¶	4	5	3	3	3
k	□	9	5	7	1	9
mr	□	12	8	9	4	2
sl	13	12	11	11	10	10

“Reform” in Old World

C+B-Egypt-Fig2-LetterDevelopment.PNG
Wikipedia

Old World archeological examples of metal-scribed plates, used for sacred writing, now exist.
Hamblin, William J. (2007) "Sacred Writing on Metal Plates in the Ancient Mediterranean," Review of Books on the Book of Mormon 1989–2011: Vol. 19 : No. 1 , Article 8.
Neal Rappleye- "Written on Gold Plates" –Prepublication

Matching descriptions to content: Egyptian demotic or hieratic script-

Is there enough room for a 269,510 word book on the gold plates? (yes)

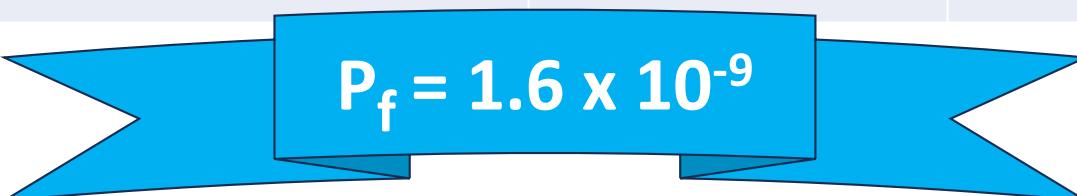
Are such plates attested in the ancient world? (Yes)

Neil Rappleye- in an exhaustive paper “**Written Upon Gold Plates**,” *Comparing Witness Descriptions with Artifacts from the Pre-Modern World*, 54 pages

- Discussion of contemporaneous witnesses, official and incidental
- Detailed examination of size, weight, texture, feel, character size and description of actual plates
- Extensive examples of metal records in Old World from 1200 BC, and in New World from 400 BC
- Historical matching plates, gold-plated copper, or *tumbaga*- copper/gold alloy etched for a soft gold surface
- Detailed examination of character size requirements to meet word count/volume considerations.

Writing, script, and recording details confirmed

Details	Class of Anomaly	Probability of Guessing Details	Cumulative Probability $P_f = P(1) P(2) P(3) \dots P(6)$
Egyptian script & Hebrew Language	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/10$
“Reformed” Egyptian script- progression	β - Scarce	$P_\beta \approx 1/10$	$\approx 1/100$
Density of writing matches word count metrics	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/1000$
Modifications over 1000 years	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$\approx 1/10,000$
Writing on brass and gold plates historical	β - Scarce	$P_\beta \approx 1/250$	$\approx 1/250,000$
Metalworking features match “tumbaga”	β - Scarce	$P_\beta \approx 1/250$	$\approx 1/625,000,000$



$$P_f = 1.6 \times 10^{-9}$$

Signatures of Hebrew source language/culture embedded in the *English* Book of Mormon

Found:

- Embedded Hebrew, Egyptian, & Middle East language artifacts and cultural signatures: structure, syntax, names, descriptive traditions
- Names- 337 BoM names, 149 Biblical, 188 novel. Many of the latter have been attested in Middle Eastern languages, esp Hebrew. [Wilcox, Brad](#), [Wendy Baker-Smemoe](#), [Bruce L. Brown](#), and [Sharon Black](#). "Comparing Book of Mormon Names with Those Found in J.R.R. Tolkien's Works: An Exploratory Study." *Interpreter: A Journal of Mormon Scripture* 30 (2018): 105-124. Tvedtnes, John A.; Gee, John; and Roper, Matthew (2000) "Book of Mormon Names Attested in Ancient Hebrew Inscriptions," *Journal of Book of Mormon Studies*: Vol. 9 : No. 1 , Article 11.
- Hundreds of examples of poetic structures, characteristically Hebrew, e.g. chiasmus, etc. are found in the text- [Book of Mormon Chiasmus: 292 Extraordinary Examples](#), February 15, 2021, [Donald W Parry](#), Stonewall press
- Word plays- phonetic puns- are found, when translated back into Hebrew! Twenty examples of such “word play” can be seen at: <https://evidencecentral.org/>

4

Chiasms in the Book of Mormon (5-layer)

A	And now it shall come to pass, that whosoever shall not take upon him the name of Christ must be called by some other name;		
	B	therefore, he findeth himself on the left hand of God.	
	C	And I would that ye should remember also, that this is the name	
	D	that I said I should give unto you that never should be blotted out,	
	E	except it be through transgression;	
Mosiah 5:10-12	E'	therefore, take heed that ye do not transgress,	
	D'	that the name be not blotted out of your hearts.	
	C'	I say unto you, I would that ye should remember to retain the name written always in your hearts,	
	B'	that ye are not found on the left hand of God,	
A'	but that ye hear and know the voice by which ye shall be called, and also, the name by which he shall call you.		

Chiasms in the Bible (8 layer)

- A Ye shall know them
- B by their fruits.
- C Do men gather grapes of thorns, or figs of thistles?
- D Even so every good tree
- E bringeth forth good fruit;
- F But a corrupt tree
- G bringeth forth evil fruit.
- H A good tree
- G cannot bring forth evil fruit
- F neither can a corrupt tree
- E bring forth good fruit.
- D Every tree
- C that bringeth not forth good fruit is hewn down, and cast into the fire.
- B Wherefore by their fruits

A ye shall know them. ([Matthew 7:16–20](#))

Hundreds! While not unique to Hebrew writing, certainly characteristic of it. Not common to 19th century prose.

Embedded ancient language signatures within English text

Details	Class of Anomaly	Probability of Guessing Details	Cumulative Probability $P_f = P(1) P(2) P(3) \dots P(5)$
Hebrew Grammar	β - Scarce	$P_\beta \approx 1/250$	$<1/250$
Non-Biblical use of Hebrew phrases: e.g. "it came to pass"	β - Scarce	$P_\beta \approx 1/250$	$< 1/6.25 \times 10^4$
Non-Biblical Hebrew, Egyptian, Phoenician names attested	γ - Exceptional	$P_\gamma \approx 1/10,000$	$< 1/6.25 \times 10^8$
Hebrew poetic structures: Chiasmus, parallelisms	γ - Exceptional	$P_\gamma \approx 1/10,000$	$< 1/6.25 \times 10^{12}$
Extensive Hebrew wordplays, phonetic puns	δ - Unique	$P_\delta \approx 1/1,000,000$	$< 1/6.25 \times 10^{18}$

$$P_f = 1.6 \times 10^{-17}$$

For any one of these Hebraic signatures to appear in isolation is a low probability.

For all of these to appear together, while certainly correlated, also confirms the text, prior to translation, to be culturally and linguistically Hebrew, with very high probability.

Cataclysmic events recorded at the time of Christ's death

In the middle of a history of politics, warfare, and migrations- suddenly a natural disaster with 20 highly-specific details

(3 Nephi 8) “In year 34 since Christ’s birth, the 1st month, the 4th day”:

- 1. **Three hours** of extreme violence
- 2. A great storm, strong and terrible tempest
- 3. Great whirlwinds
- 4. Terrible thunder
- 5. Exceedingly sharp lightning
- 6. Falling objects crushing people
- 7. Shaking of the whole earth
- 8. Burning of cities
- 9. Sinking of cities into the sea
- 10. Earth carried up on cities
- 11. Sinking and burial of cities
- 12. **Three days** of thick darkness
- 13. Palpable darkness
- 14. No fires or lights
- 15. Cannot burn very dry wood
- 16. Vapors of smoke
- 17. Changing of whole face of the land
- 18. Breaking and scattering of rocks
- 19. Breaking up of highways and earth
- 20. Breaking up of cities, destruction of inhabitants

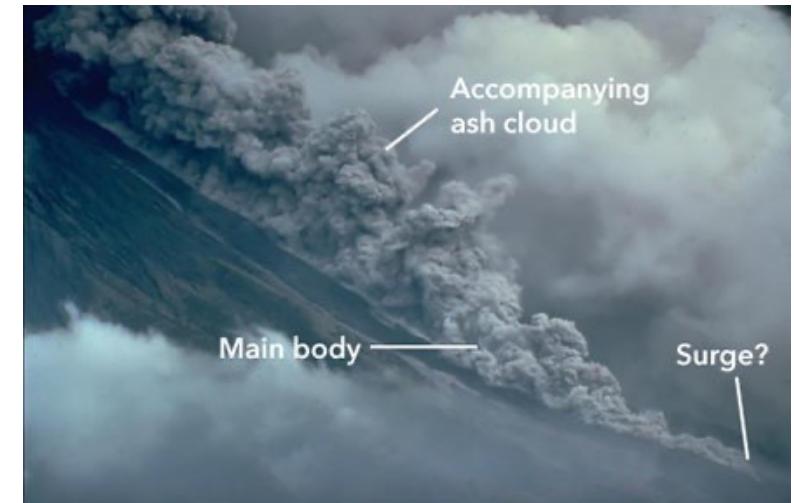
**Very specific volcanic and seismic events
Should correlate with modern geology and geography!**



Arnold Friberg painting: Nephites, in the midst of general destruction, looking up towards the resurrected Jesus Christ.

Book of Mormon account confirmed by modern scientific observations to be detailed, accurate description of major volcanic explosions, with pyroclastic flows, accompanied by specific types of earthquakes.

- Gale strength winds, whirlwinds, terrible thunder, earthquakes
- Vast, prolonged lightning, burning cities
- Pyroclastic gas flows: obscured sight, inhibited flame, tangible darkness, heavy smoke
- Volcanic “bombs” of solidifying lava falling from sky
- Duration: hours of initial violence, days of lingering smoke
- Magnitude of effect: shaking down buildings, landslides, significant elevation changes, buried cities, drowned cities, cities covered earth, broken strata
- Historical and geological studies place a large volcanic eruption near this time and location



[Amazing Video of a Pyroclastic Flow at Santiaguito in Guatemala | WIRED](#)

Kowallis, Bart J.. "In the Thirty and Fourth Year: A Geologist's View of the Great Destruction in 3 Nephi." *BYU Studies Quarterly* 37, no. 3 (1997): 136-190.

1830 America lived in the aftermath of the 1815 explosion of Tambora in Indonesia, but no comprehensive descriptions of the phenomena matching these details were in publication.

Volcanic lightning, whirlwinds



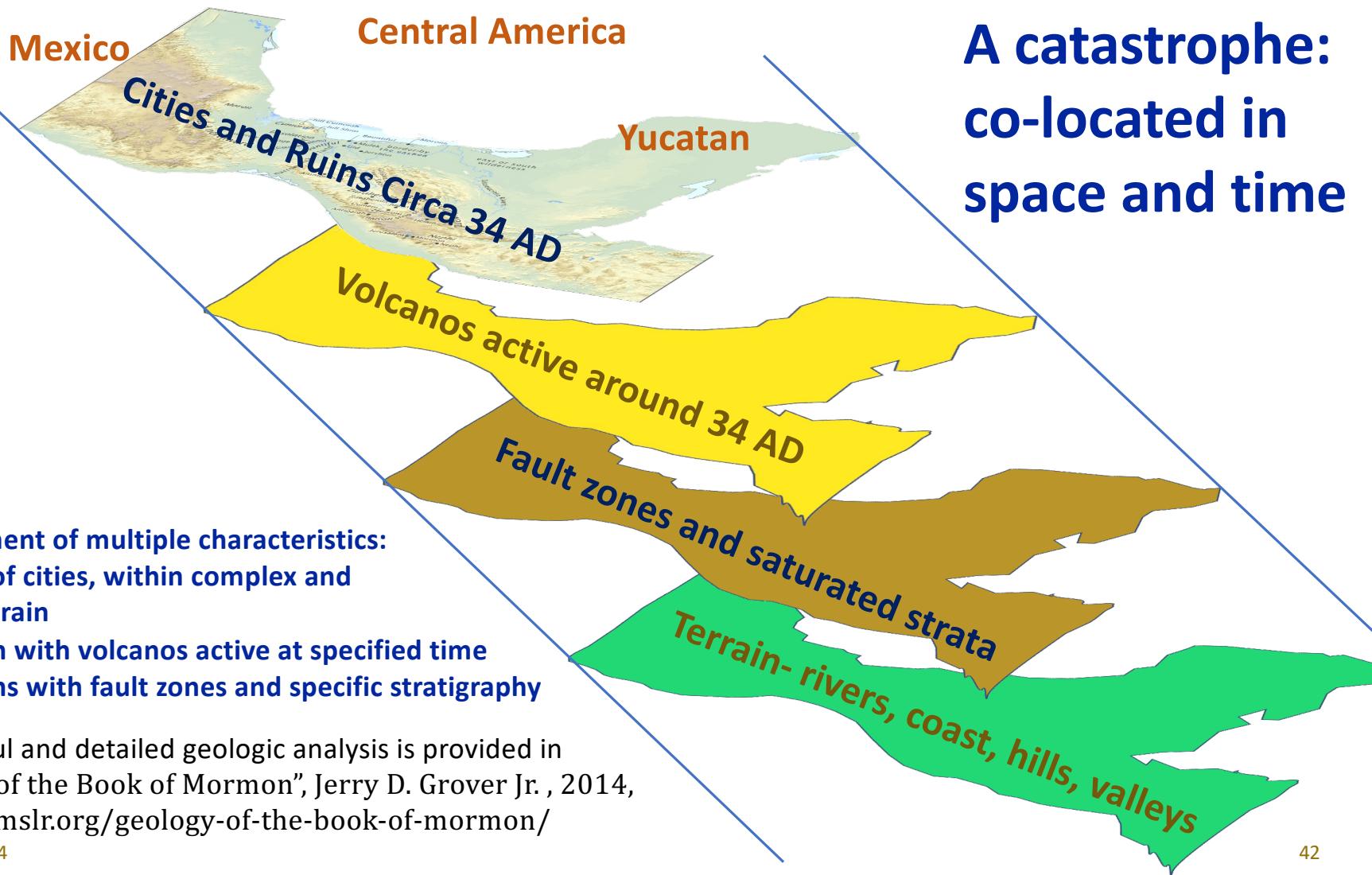
Volcanic lightning from the June 2011 eruption of the Cordón Caulle volcano in Chile (courtesy Negroni, 2014)



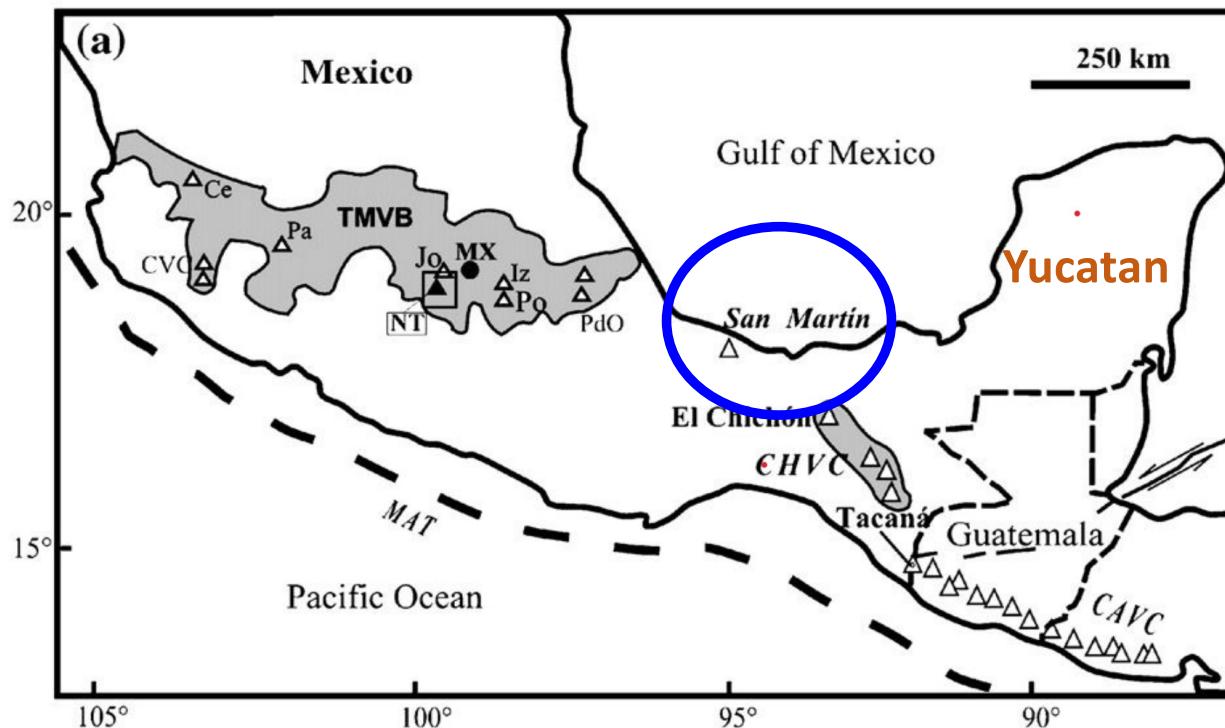
Whirlwinds formed following a pyroclastic flow from the eruption of the Sinabung, Indonesia, volcano on January 24, 2014 (courtesy Photovolcanica, 2014)

Geology of the Book of Mormon, Grover p 158, 187

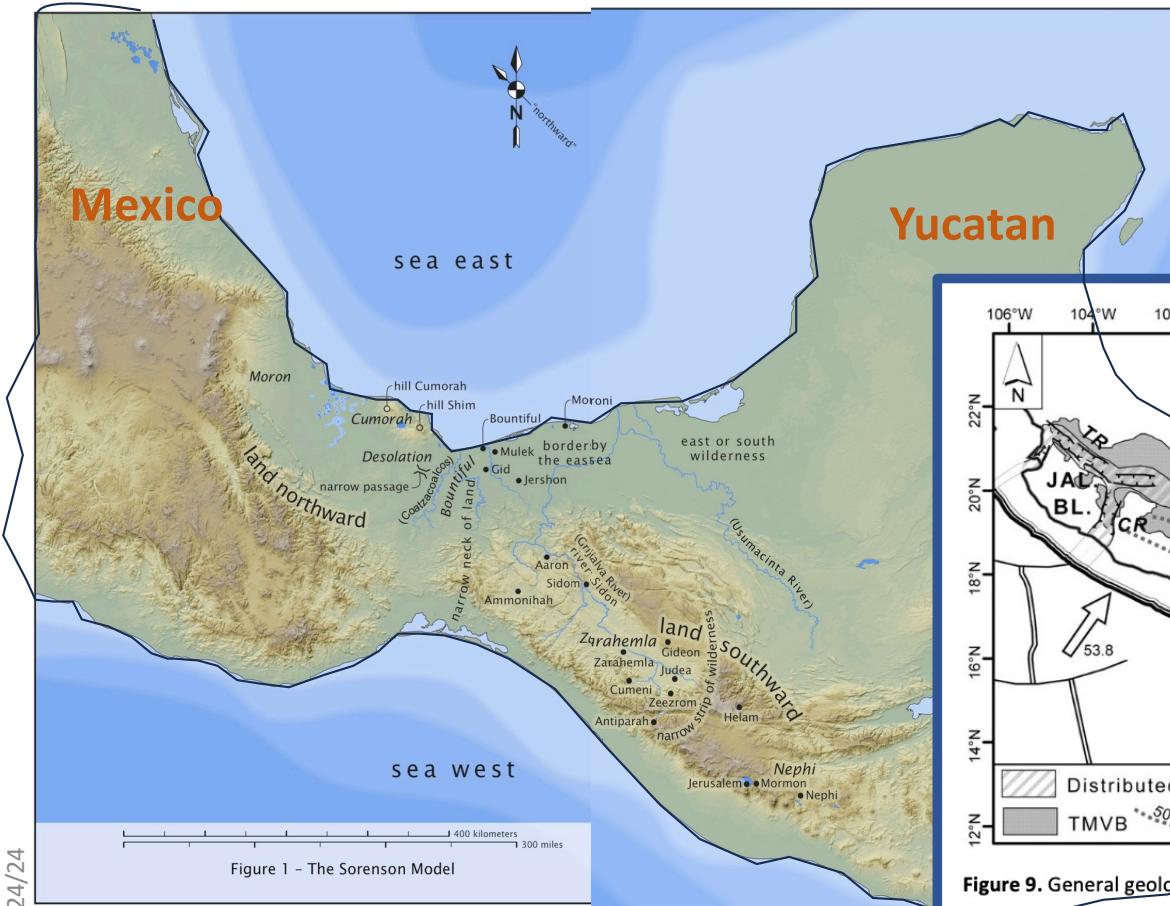
5



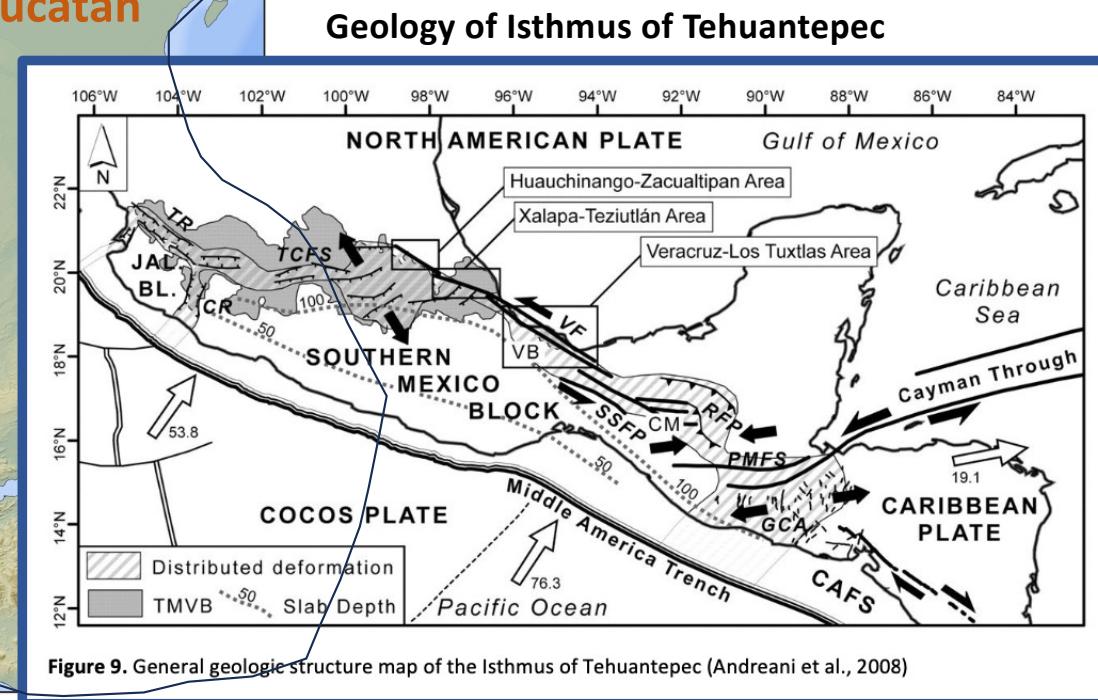
Volcano locations:



Forensic overlay of terrain, Sorenson's model, and geology

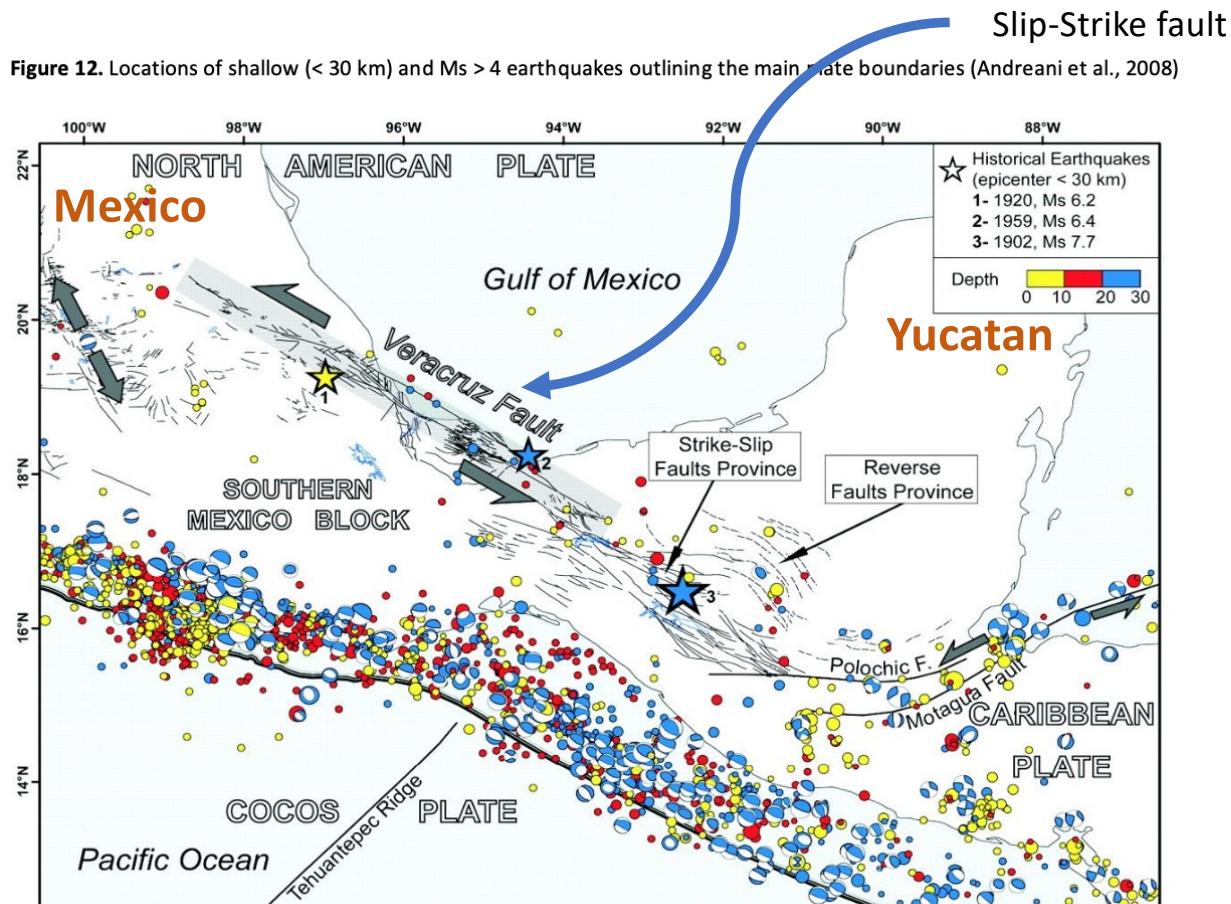


John Sorenson's mapping of Book of Mormon places against MesoAmerican terrain.



Images from: Geology of the Book of Mormon, Jerry D. Grover Jr., 2014

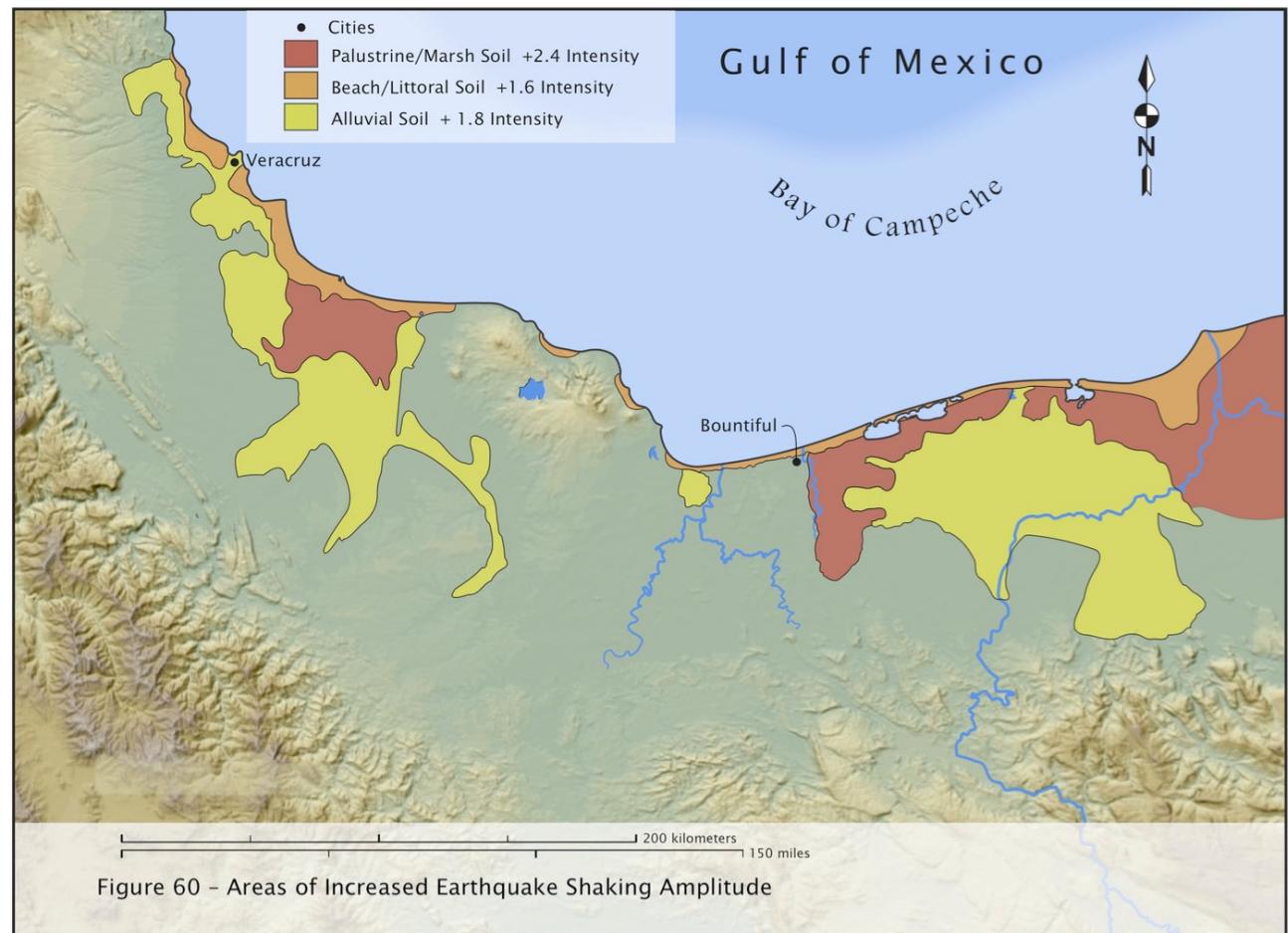
Earthquake and fault map: astride complex subduction zone overlaps of the Cocos Plate, North American Plate, and the Caribbean Plate



Images from Geology of the Book of Mormon, Jerry D. Grover Jr.

Earthquakes and soil structure:

Soft soil and
“slip/strike” fault
earthquakes cause:
sinking in water,
buildings being
swallowed up in soil



Images from: Geology of the Book of Mormon, Jerry D. Grover Jr. 46

Reasonable scientific explanations for all physical events referenced in the 3rd Nephi catastrophe and all prophetic descriptions of that event:

“tumultuous noises” to “great mountain” have all found a reasonable and plausible explanation in the geology and meteorology within the Isthmus of Tehuantepec.

Locations defined and established for geological events in the 3rd Nephi catastrophe

... very close to the ‘proven’ standard.

- A volcanic eruption occurred as part of the 3rd Nephi destruction
- A volcanic eruption alone cannot account for all of the destruction in 3rd Nephi; the destruction necessarily involved a regional earthquake
- a regional earthquake and one volcano and their after-effects can account for all of the destruction in 3rd Nephi, with the exception of the city of Jerusalem, which appears to be a local event
- The primary regional earthquake occurred on the Veracruz fault system
- The primary volcano involved is indicated to be the San Martín volcano based on its position in the Isthmus and on the Veracruz fault system, and the eruption need not have exceeded a 4 on the VEI explosivity scale.

(This does) not mean that there were no other volcanos active or that were no other fault systems activated—there very well could have been. Quoted: from Geology of the Book of Mormon, Jerry D. Grover Jr. , p222.

Accurate descriptions of volcanic explosion phenomena

Details (condensed to 8 categories)	Class of Anomaly	Probability of Guessing Details	Cumulative Probability P(1) P(2) P(3)...P(8) =
Extensive lightning and thunder	α - Specific but Ordinary	$P_\alpha \approx 1/10$	<10
Storms, winds, whirlwinds	α - Specific but Ordinary	$P_\alpha \approx 1/10$	$<1/100$
Earthquakes	β - Scarce	$P_\beta \approx 1/250$	$<1/25,000$
Accurate durations- 3 hours/3 days	β - Scarce	$P_\beta \approx 1/250$	$< 1/6250000$
Stratigraphic rupture	β - Scarce	$P_\beta \approx 1/250$	$< 1/1562500000$
Volcanic bombs	γ - Exceptional	$P_\gamma \approx 1/10,000$	$< 6.4 \times 10^{-14}$
Cities sunken, drowned, burned	γ - Exceptional	$P_\gamma \approx 1/10,000$	$< 6.4 \times 10^{-20}$
Pyroclastic gas/debris flow details: darkness, smoke, flame-suppressing	δ - Unique	$P_\delta \approx 1/1,000,000$	$< 6.4 \times 10^{-24}$

$$P_f < 10^{-24}$$

For any one of these volcanic/seismic signatures to appear in isolation is a low probability.

For all of them to appear together, while certainly correlated, also confirms that this is probably a real description of a volcanic explosion/earthquake.

- 1 Logistics and complexity compared with Tolkien
- 2 Journey across the Arabian Peninsula details
- 3 Recording methods- Egyptian script & gold-like plates
- 4 Hebrew language
- 5 Linguistic details
- Cataclysm account consistent with geology

Combined probability calculation:

Probability of being authentic $\equiv 1 - \left(P_1 \times P_2 \times P_3 \times P_4 \times P_5 \dots P_i \right)$

P_i = Probability of guessing “ith” confirmed anomalous detail

$$\begin{aligned}
 & P_1 \times P_2 \times P_3 \times P_4 \times P_5 \\
 & = (10^{-4}) \times (1.6 \times 10^{-16}) \times (6.4 \times 10^{-12}) \times (1.6 \times 10^{-17}) \times (10^{-24}) \\
 & = 1.6 \times 10^{-72}
 \end{aligned}$$

A probability of authenticity being
 $P = 1 - 10^{-72}$ is just 1!

Much higher confidence than the 5σ required of physics discovery, and much much more than required of legal proof.

With so many scholarly challenges to the authenticity of the deeply Christian Book of Mormon, why did so many uneducated Latter-day Saints accept it, use it as a guide and anchor to their faith, and endure many trials and persecutions?

My own experience with divine confirmation of the authenticity of the Book of Mormon began when I read it for myself at age 9 and has continued throughout my life.

- And when ye shall receive these things, I would exhort you that ye would ask God, the Eternal Father, in the name of Christ, if these things are not true; and if ye shall ask with a sincere heart, with real intent, having faith in Christ, he will manifest the truth of it unto you, by the power of the Holy Ghost.
- And by the power of the Holy Ghost ye may know the truth of all things. *Moroni 3:4-5*

Latter-day Saints with a testimony from God of the truth of the Book of Mormon, consider anachronisms to be **“interesting questions”**

“Hmmm, interesting. When will science validate this fact?”

Having independent knowledge from God, of the divine and Christian origins of the Book of Mormon will always be necessary for its full impact to be realized.

The Book of Mormon's authenticity is established by Science:

- Many challenges of “anachronisms” are now plausible according to modern science
- Many contextual details of the Book are confirmed with modern science.
- Statistical compounding of the confirmed details confirms authenticity to a level which far exceeds highest legal or scientific standards
- There are many more examples of complex and plausible events in the Book of Mormon than described here

Thank you

And thanks to the many who have done original technical analysis of the Book of Mormon:

Hugh Nibley, John L. Sorenson, Jack Welsh, Jerry Grover, Neil Rappleye, Matt Roper, Bart Kowallis, Brian Dale, Bruce Dale, Kurt Magleby, S Kent Brown, Peter Johnson, Ron Harris, Warren P. Aston

Questions to stradlingg@gmail.com

I have uploaded these slides to my website:
LDSFaithandScience.org

<https://ldsfaitandscience.org/science-authenticates-the-book-of-mormon/>

Faith Illuminating Science–Science Illuminating Faith

