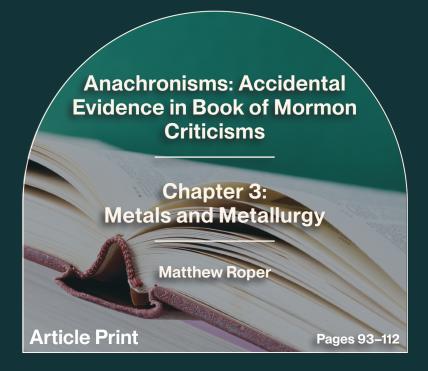


# Interpreter

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#### Anachronisms: Accidental Evidence in Book of Mormon Criticisms

#### **Matthew Roper**

[Editor's Note: We are pleased to present chapter 3 from a book entitled Anachronisms: Accidental Evidence in Book of Mormon Criticisms. It is presented in serialized form in this volume of Interpreter: A Journal of Latter-day Saint Faith and Scholarship.]

## Chapter 3: Metals and Metallurgy

Some readers have viewed references to metals and early metallurgy in the Book of Mormon as out of place. Alleged anachronisms include metal objects valued by Nephi in the Old World, as well as those possessed by the Nephites in the New World. These include references to iron, steel brass, copper, metal money, chains, the availability of ores, and general metallurgy.

#### 68. Steel (OW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** Nephi stated that Laban had a sword of "most precious steel" (1 Nephi 4:9). Some critics have claimed that steel was unknown at this time in the ancient Near East.<sup>1</sup>

**Response:** "Wrought iron heated in contact with charcoal (carbon) at high temperature produces carburized iron or steel, which is more malleable than cast iron," write Philip King and Lawrence Stager. "Steel can be hardened by quenching (practiced as early as the tenth

century B.C.E.), that is, cooling off red-hot steel by sudden immersion into a vat of cold liquid."<sup>2</sup>

Archaeological examples of steel swords have been discovered from the land of Israel that date to Nephi's day and show that steel was known much earlier in the ancient Near East than was once assumed. Nephi's description of Laban's steel sword is consistent with these discoveries which were made long after the Book of Mormon was published.<sup>3</sup> A chemical analysis was completed for over sixty objects (all badly corroded) found at Iron Age Israelite centers, including bracelets, tools, knives, and weapons. "The results showed that 'ghost structures' of pearlite, clearly indicating the presence of carbon, were present in almost all the objects (excluding three), demonstrating that almost all were made of steel."

#### 69. Early Brass (OW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** Nephi states that Laban possessed plates of brass (1 Nephi 3:3). He also described a miraculous device that the Lord provided to guide Lehi's family on their wilderness journey that was made of "fine brass" (1 Nephi 16:10). According to one critic of the Book of Mormon, "Brass was unknown before Christ with very rare exceptions. The Romans were among the first to use it and used it in coins in 20 B.C. It was several centuries before brass came into common use."<sup>5</sup>

**Response:** Brass is an alloy of copper and zinc. Biblical scholars hold that the Hebrew word translated as *brass* in the King James Version likely refers to copper or the copper alloy bronze. So, it is possible that some of the references to brass in the Book of Mormon refer to bronze. New discoveries, however, have shown that actual brass was developed in the ancient Near East and fashioned into valuable objects. Brass artifacts have been recovered from archaeological sites dating before the seventh century BC.<sup>6</sup> Chemical analysis of a brass bracelet and several other fragments from Tepe Yahya in southeastern Iran (1700 BC) and two finger rings from Nuzi in northern Iraq (1350 BC) show that they were the product of deliberate brass making, leading a team of researchers to conclude that "copper zinc alloys existed almost two thousand years before the date generally accepted for the development of the cementation process, suggesting that the history of brass is longer and more complex than is generally believed."<sup>7</sup>

These discoveries (figure 26) show that ancient metallurgists were deliberately making brass long before the time of Lehi.<sup>8</sup>

#### 70. Early Metallurgy (NW)

Status: Partially Confirmed (1966–2024)

**Critics' Claim:** The Book of Mormon indicates that during Book of Mormon times gold, silver, copper, and iron metallurgy was known to at least some craftsmen (2 Nephi 5:15; Helaman 6:11; Ether 10:7, 12, 23). Some have claimed that metallurgy was unknown in pre-Columbian times until just a few centuries before the European Conquest.<sup>9</sup>

**Response:** Non-ferrous metallurgy was known in the Andes of South America by the early Horizon (700–200 BC).<sup>10</sup> Dorothy Hosler has established that copper metallurgy which involved complex smelting



**Figure 26.** Bronze Phoenician bowl with Egyptian motifs. (*Wikimedia Commons*, s.v. "Bowl with Egyptian motifs. Phoenician, ca. 9th-8th c. BCE. British Museum," commons.wikimedia.org/wiki/File:Bowl\_with\_Egyptian\_motifs.\_Phoenician, \_ca.\_9th-8th\_c.\_BCE.\_British\_Museum.jpg.)

technologies was established in western Mexico by 600 AD, where copper bells, needles, tweezers, awls, rings, and other ornaments have been found. While this is after the time of the Book of Mormon, it is much earlier than had once been thought. There are additional indications that metallurgy was known in Mesoamerica even earlier, possibly introduced through trade from South America. Figurines recovered from shaft-tombs in western Mexico dating between 200 BC and AD 200 portray earrings in styles found in northwestern South America. In addition, John Sorenson has noted several words for metal and metal objects dating to the Preclassic period in Mexico, including words for bell.

#### 71. Pre-Columbian Brass (NW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** Both the Nephites and the Jaredites are said to have had brass (1 Nephi 5:15; Mosiah 11:3; Ether 10:23). Some have claimed that brass was completely unknown in the Americas before the advent of Columbus. According to one critic, "there is not the slightest evidence that the aborigines of this continent anywhere knew anything about the practical use of ... brass." <sup>15</sup>

**Response:** Cortes stated that the Aztec marketplace sold items of brass.<sup>16</sup> Actual Tarascan brass (copper with 15% zinc) has now been found in western Mexico dating to pre-Columbian times.<sup>17</sup>

#### 72. Iron (NW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** Both the Nephites and the Jaredites are said to have had iron (2 Nephi 5:15; Mosiah 11:8; Ether 10:23). Some have claimed that iron did not exist in the Americas during the time of the Book of Mormon.<sup>18</sup>

**Response:** Various kinds of natural iron and meteoric iron were known in ancient America, and from as early as Olmec times in Mesoamerica.<sup>19</sup>

#### 73. Iron Working (NW)

**Status: Confirmed** (1966–2024)

Critics' Claim: Book of Mormon peoples are said to have worked in

all manner of iron (2 Nephi 5:15; Mosiah 11:8; Ether 10:23). Some critics have claimed that there is no evidence of iron working in pre-Columbian times.<sup>20</sup>

**Response:** Several kinds of iron were worked and crafted in various ways in pre-Columbian Mesoamerica.<sup>21</sup> During the Postclassic era, the highland Maya of Guatemala collected tribute iron and other metals. "They were worked into ornaments and employed in a variety of decorative manners."<sup>22</sup> Furthermore, some Aztec nobles possessed rare knives and daggers crafted from meteoric iron which were highly prized.<sup>23</sup> A Mexican tradition relates that Cuanomoat and Ceutarit, pre-Columbian ancestral cultural heroes of several west Mexican tribes, "taught them to make fire and also gave them machetes or cutlasses of iron."<sup>24</sup>

#### 74. Practical Use of Iron (NW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** Some critics have claimed that that there is no evidence that pre-Columbian peoples understood any of the practical uses of iron. According to one, "there is not the slightest evidence that the aborigines of this continent anywhere knew anything about the practical use of iron."<sup>25</sup>

**Response:** Research on Mesoamerican iron objects from Olmec (figure 27) and subsequent Maya and Aztec times indicate a clear awareness of the practical value and use of iron.<sup>26</sup> Some examples of worked iron objects date to Olmec times.<sup>27</sup> Pre-Columbian mirrors were crafted from iron hematite and iron pyrite and are among the most remarkable pre-Columbian objects that have survived (figure 28). These have been the subject of a recent detailed study by specialists. The earliest known examples are large round Olmec mirrors of polished hematite ore. "Words and photographs cannot convey a real feel for the technical quality and artistic power of these mirrors—they possess a remarkable appeal for both the eye and the mind."<sup>28</sup>

Other examples, recovered from La Venta, "have a gracefulness, dignity, and perfection that makes it hard to think of them as . . . only ornamental."<sup>29</sup> Even though apparently worked by hand, "the concavity on the front is as carefully ground as many modern optical lenses, and the optical qualities of some allow them to be used to ignite fires and project 'camera lucida' images on flat surfaces."<sup>30</sup> Examples of



Figure 27. Olmec hematite mirror from Guerrero. (Linda Schele, s.v. "Guerrero," research.famsi.org/schele\_photos\_list.php?search=\*Guerrero\*.)

similar iron mirrors are also known from Costa Rica, some of which date as early as 300 BC in that region.<sup>31</sup>

Mayan artisans likewise skillfully worked pieces of iron pyrite into mosaic mirrors. Two prominent Mayanists described several rare specimens recovered from Nebaj Guatemala as "marvels of painstaking craftsmanship." An analysis by Emiliano Gallaga indicates that such mirrors represent a tremendous investment in time and effort. "We estimate an average of 900–1,300 hours, or 110–160 days, of work for a single artisan to make a single pyrite mirror. . . . This amount of time could be reduced if people were very skilled after lots of practice or if multiple people were working on the same object and divided the work of the steps of manufacture." Such objects would have been rare but highly prized elite items, "probably restricted to nobles who had the power to commission such objects from royal artisans."

Archaeologists working at Teotihuacan excavated thousands of objects from a tunnel underneath the Temple of the Feathered Serpent which had once been deposited there as offerings. Recent analysis has suggested that red and yellow substances found on the



Figure 28. Olmec hematite seated dwarf figurine. (Elizabeth P. Benson and Beatriz de la Fuente. Olmec Art of Ancient Mexico (National Museum of Art, Washington, DC, 1996), figure 60.)

eyes of masks and disk-like ornaments (called Tecazuitlapillis) found there "are not pigments or adhesives as some researchers have mentioned, but may actually be decomposed iron-ore minerals originally used for their reflective qualities" which, through the long process of oxidation or hydration, were previously unrecognized as iron.<sup>35</sup>

Due to oxidation and other factors, many iron objects have not survived or have not been recognized and identified by archaeologists. Based upon what has been recovered so far, however, it is clear that pre-Columbian peoples were able to work and produce fine objects from iron ores for a variety of practical and religious uses, just as the Book of Mormon suggests.36

#### 75. Iron Smelting (NW)

Status: Unconfirmed

**Critics' Claim:** References to the ability to make steel in the text suggest that Book of Mormon peoples could smelt iron (Ether 7:9). Some critics have claimed that there is no evidence for iron-smelting in pre-Columbian times.<sup>37</sup>

**Response:** There is currently no evidence for iron smelting in pre-Columbian times.<sup>38</sup>

#### 76. Steel (NW)

**Status: Unconfirmed** 

**Critics' Claim:** Prince Shule, in the book of Ether, is said to have made steel swords (Ether 7:9). Critics have claimed that references to pre-Columbian steel are anachronistic for ancient America.<sup>39</sup>

**Response:** There is currently no evidence for pre-Columbian steel.

### 77. Abundance of Ores, Copper, Gold, Silver, and Iron Together (NW)

**Status: Confirmed** (1966–2024)

**Critics' Claim:** The Book of Mormon indicates that its people had access to a variety of metals such as gold, silver, copper, and iron (1 Nephi 18:25; 2 Nephi 5:15; Mosiah 11:3, 8; Ether 10:23). Some have claimed that these metals are not found together anywhere in the Americas.<sup>40</sup>

**Response:** Gold, silver, copper, and iron were all known and valued in pre-Columbian Mesoamerica in contrast to many other regions in the New World. In fact, there were words for each of these metals in pre-Columbian languages. In Guatemala, the Maya "were well acquainted with several metals. Gold and silver were classed under the general name *puvak*, and distinguished as white and yellow; iron and copper were both known as *ghigh*, and distinguished also by their color. The metals formed an important element of their riches and are constantly referred to as part of the tribute paid to the rulers. They were worked into ornaments, and employed in a variety of decorative manners."

#### 78. Forges or Furnaces (NW)

**Status: Partially Confirmed** (1966–2024)

**Critics' Claim:** The existence of metallurgy among the Nephites and the Jaredites implies that they would have had forges or furnaces of some kind. Some critics claim that pre-Columbian peoples did not have forges or furnaces of any kind.<sup>43</sup>

**Response:** Ancient furnaces used to smelt metal could be a relatively simple affair.<sup>44</sup> During the Postclassic period in Mexico, metal workers cast some metals in small crucibles. According to Warwick Bray, "for working metal the Aztec smith used a furnace heated by charcoal, the draught being supplied by a man blowing through a tube into the embers."<sup>45</sup> As portrayed in an illustration from the Florentine Codex, these clay furnaces were rather small.<sup>46</sup> So while they clearly would have smelted metal somewhere, the small nature of such crucibles may not be easily located and identified by the archaeologist.

#### 79. Metal Money (NW)

**Status: Confirmed** (1845–1965)

**Critics' Claim:** Pieces of metal money are mentioned in the Book of Mormon (Alma 11:4–19). Some have claimed that metal money of any kind was unknown in pre-Columbian times. "All the known media of exchange of the Maya have been identified, not only in their own land but also along the ancient trade routes, but never metallic money."<sup>47</sup>

**Response:** Several kinds of metal money were used in Mesoamerica and South America in pre-Columbian times (see figure 29).<sup>48</sup>

#### 80. Gold Money

**Status: Partially Confirmed** (1845–1965)

**Critics' Claim:** The Nephites are said to have had pieces of gold money (Alma 11:4–19). Some have claimed that gold was never used for money in pre-Columbian times.<sup>49</sup>

**Response:** Historical sources indicate that the Aztecs used quills filled with gold dust as one of several mediums of exchange.<sup>50</sup> Alberto Francisco Pradeau suggests that small gold planchets representing humans, animals, or deities may have also been used by Aztec merchants in trade.<sup>51</sup> There was a word for *money* in Proto-Mixtecan, a language spoken in central Mexico circa 1000 BC, which also meant *bright*, *shining*.<sup>52</sup> The word is related to other words meaning *coppercolored*, *yellow*,<sup>53</sup> or *precious metal*,<sup>54</sup> thus hinting at the possibility that gold was being used as a form of money from very early times.



**Figure 29.** Axe-money from Mexico at the Prehistory Museum of Valencia. (*Wikipedia*, s.v. "Axe-monies," en.wikipedia.org/wiki/Axe-monies.)

#### 81. Silver Money

Status: Unconfirmed

**Critics' Claim:** The Nephites are said to have had pieces of silver money (Alma 11:4–19). Some have claimed that there was no silver money in pre-Columbian times.<sup>55</sup>

**Response:** Silver was a valuable and utilized metal in ancient Mesoamerica, and at certain times was demanded as tribute.<sup>56</sup> There is currently no evidence that silver was used as money in pre-Columbian times. It should be noted, however, that "scholars have estimated that 95 percent of Aztec gold, silver, and copper objects were eventually melted to bullion."<sup>57</sup>

#### 82. Copper (Early)

**Status: Partially Confirmed** (1966–2024)

Critics' Claim: The Nephites and the Jaredites worked in copper

(1 Nephi 18:25; 2 Nephi 5:15; Jarom 1:8; Mosiah 8:10; 11:3, 8, 10; Ether 10:23). Some critics have claimed that there is no evidence for the early use of copper in pre-Columbian times before the Postclassic period.<sup>58</sup>

**Response:** Although still some 200 years late, copper metallurgy can now be dated to around AD 600 in western Mexico.<sup>59</sup>

#### 83. Chains

Status: Partially Confirmed (1966–2024)

**Critics' Claim:** The text refers to "chains" (Alma 5:7, 9–10; 12:6, 11; 26:14). Some have claimed that metal chains were unknown in pre-Columbian times.<sup>60</sup>

**Response:** First, it should be recognized that the Book of Mormon's discussions of chains in New World contexts is consistently symbolic. Rather than referencing items of material culture, "chains" represented the captivating powers of death and hell. It is thus possible that "chains" was a carry-over concept from the Nephites' Hebrew past, and that its basic meaning was preserved on the brass plates. Furthermore, the Book of Mormon doesn't specify the nature and composition of these chains, whether they are metallic links or simply restraining bands of some other material. In any case, archaeological examples of ornamental chains are attested from the Postclassic period in Mexico.<sup>61</sup>

#### **Summary of Results**

From 1830 until 1844, five items relating to metals and metallurgy were mentioned by writers and were unconfirmed (figure 30). From 1845 until 1965 the total number rose to twelve (figure 31), one of which was confirmed, three partially confirmed, and eight unconfirmed. By 2024 sixteen items had been mentioned, eight were confirmed, five partially confirmed, and three were unconfirmed (figure 32).



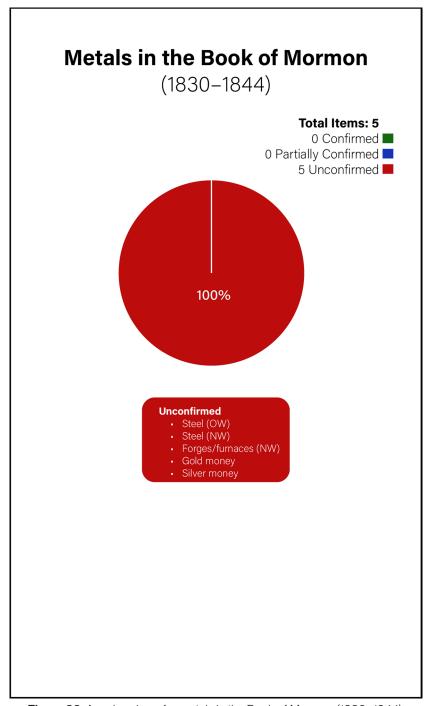


Figure 30. Anachronisms for metals in the Book of Mormon (1830–1844).

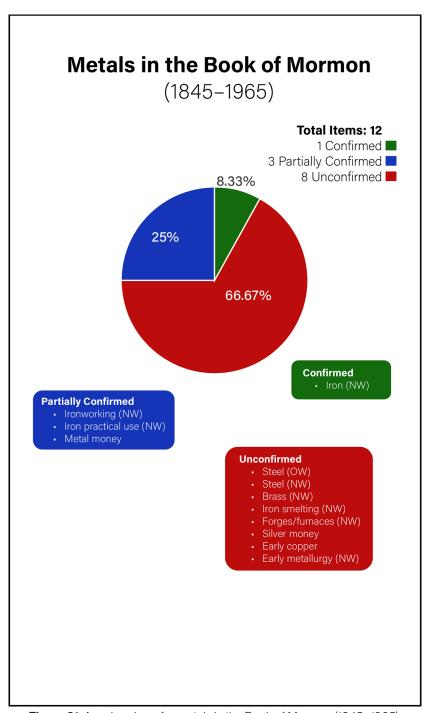


Figure 31. Anachronisms for metals in the Book of Mormon (1845–1965).

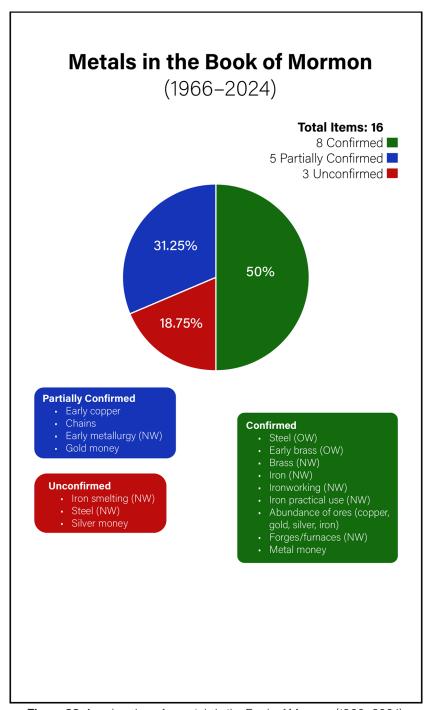


Figure 32. Anachronisms for metals in the Book of Mormon (1966–2024).

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- 35. Julie Gazzola, Sergio Gomez Chavez, and Thomas Calligaro, "Identification and Use of Pyrite and Hematite at Teotihuacan," in Gallaga and Blainey, *Manufactured Light*, 121.
- 36. For additional uses of iron, see Scripture Central Staff, "Decorative Iron," Evidence 356, 11 July 2022, scripturecentral.org/evidence/decorative-iron.
- 37. John Fiske, The Discovery of America (Boston: Houghton Mifflin, 1892), 1:179n2.
- 38. Evidence of smelting is not always apparent in the archaeological record. Paul Craddock and Janet Lang observe,

The evidence for smelting often proved disappointing: by and large intact smelting installation do not survive, and at best the evidence is enigmatic and at worst non-existent. For much of the earliest periods of metal production, there is virtually no tangible evidence of the smelting processes, as exemplified here at sites in Britain, the Middle East and in the Balkans, leading to suggestion that the ores must have been smelted somewhere else. The problem is that this somewhere else never seems to materialize.

- Paul T. Craddock and Janet Lang, *Mining and Metal Production through the Ages*, ed. Paul T. Craddock and Janet Lang (London: British Museum Press, 2003), 8.
- 39. Howe, Mormonism Unvailed, 25–26; Hunt, Mormonism, 22; Lamb, Golden Bible, 300–2; Townshend, Why I Am Not a Mormon, 14; Alva A. Tanner, A Key to the Book of Mormon (Oakley, ID: printed by the author, 1916), 3; Charles A. Shook, Cumorah Revisited (Cincinnati, OH: Standard Publishing, 1910), 359, 372–79; Kinney, Islam of America, 66–67; Biederwolf, Mormonism under the Searchlight, 21; Sundberg, Mysterious Book of Mormon, 13; Peter Vokac, "More on the Nephites and the Book of Mormon," Biblical Archaeology Review 14, no. 6 (1988): 18; White, Letters to a Mormon Elder, 168–69.
- 40. Key, Book of Mormon in the Light of Science, 35–36.
- 41. On gold, silver, and copper, see John L. Lund, *Mesoamerica and the Book of Mormon: Is This the Place?* (n.p.: The Communications Company, 2007), 127–31. On iron, see Marc Gordon Blainey, "Surfaces and Beyond: The Political,

- Ideological, and Economic Significance of Ancient Maya Iron-Ore Mirrors" (master's thesis, Trent University, 2007), 168–75.
- 42. Brinton, Annals of the Cakchiquels, 18-19.
- 43. Philanthropist of Chester County, *Mormonism Unmasked* (Philadelphia: T.K. & P. G. Collins, 1840), 6.
- 44. "The earliest copper smelting [in ancient Jordan] is likely to have taken place in crucibles and has left very little tangible evidence. In the succeeding Early Bronze Age, the first true slag-forming processes developed based on manganese-rich slags, and using wind-blown furnaces set upon the edges of hills into the prevailing wind. The furnaces were small, their most distinctive features being the small silica-rich rods that probably were used to reinforce the clay lining of the furnaces." A. Hauptmann, "Developments in Copper Metallurgy during the Fourth and Third Millennia B.C. at Feinan, Jordan," in Craddock and Lang, Mining and Metal Production through the Ages, 90.
- 45. Warwick Bray, Everyday Life of the Aztecs (New York: Dorset Press, 1968), 129. See also Elizabeth H. Paris, "Metallurgy, Mayapan, and the Postclassic Mesoamerican World System," Ancient Mesoamerica 19 (2008): 49–50; Blanca Maldonado and Thilo Rehren, "Early Copper Smelting at Itziparatzico, Mexico," Journal of Archaeological Science 36, no. 9 (2009): 1998–2006.
- 46. Bray, Everyday Life of the Aztecs, 128, figure 52. For recent evidence of furnace smelting during the Post-Classic in west Mexico, see Maldonado and Rehren, "Early Copper Smelting at Itziparatzico, Mexico," 1998–2006.
- 47. Gordon H. Fraser, *Joseph and the Golden Plates* (Eugene, OR: Industrial Litho, 1978), 63; Walter Martin, *The Maze of Mormonism* (Santa Ana, CA: Vision House, 1978), 56.
- 48. See Dorothy Hosler, Heather Lechtman, and Olaf Holm, Axe-Monies and Their Relatives (Washington, DC: Dumbarton Oaks Research Library and Collection, 1990); Hosler, Sounds and Colors of Power, 109–10, 121, 130–32, 156, 166–68, 171–74; Hosler, "Metal Production," 167–69; Kim Cullen Cobb et al., "The Craft, Use, and Distribution of Axe-Monies in Mesoamerica," in Waves of Influence: Pacific Maritime Networks Connecting Mexico, Central America, and Northwestern South America, ed. Christopher S. Beekman and Collin McEwan (Washington, DC: Dumbarton Oaks Research Library and Collection, 2022), 347–415.
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- 50. James Lockhart, *The Nahuas after the Conquest* (Stanford, CA: Stanford University Press, 1992), 177.
- 51. Alberto Francisco Pradeau, *Numismatic History of Mexico from the Pre-Columbian Epoch to 1823* (Los Angeles: A. F. Pradeau, 1938), 17.
- 52. Robert E. Longacre, "Proto-Mixtecan," *International Journal of American Linguistics* 23, no. 4 (October 1957): 119.
- 53. Calvin Rensch, *Comparative Otomanguean Phonology* (Bloomington, IN: Indiana University Publications, 1976): 266–67.

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- 56. See Elizabeth H. Paris et al., "Metalworking at Mayapan, Yucatan, Mexico: Discoveries from the R-183 Group," *Ancient Mesoamerica* (2022): 432–54. See also Argyrios Periferakis, "Geology and the Aztecs: How the Ore Deposits of Mesoamerica Influenced the Socioeconomic Development of an Empire, from Its Emergence to Its Downfall," *Bulletin of the Geological Society of Greece*, *Special Publications* 7 (2019): 671: "In this research we... document how the Aztecs mined for or collected as tribute gold, silver, copper, turquoise, jadeite and obsidian, how the availability of such commodities shaped their civilization and how in the end lead to their demise."
- 57. Dorothy Hosler, "Aztec Metallurgy," in *The Oxford Handbook of the Aztecs*, ed. Deborah L. Nichols and Enrique Rodríquez-Alegría (New York: Oxford University Press, 2017), 319.
- 58. Lamb, Golden Bible, 300-2.
- 59. Hosler, Sounds and Colors of Power, 45–85. For a discussion of the constraints of tracking metallurgical processes and a case study on the production and distribution of copper artifacts, see Niklas Schulze and Blanca E. Maldonado, "The Movement of Metal Goods in the Mesoamerican Late Postclassic Period: A Case Study from the Templo Mayor in Tenochtitlan," in *Interregional Interaction in Ancient Mesoamerica*, ed. Joshua D. Englehardt and Michael D. Carrasco (Louisville, CO: University of Colorado Press, 2019), 313–40.
- 60. Price, "Book of Mormon vs. Anthropological Prehistory," 38.
- 61. Joseph B. Mountjoy and Luis Torres M., "The Production and Use of Prehispanic Metal Artifacts in the Central Coastal Area of Jalisco, Mexico," *The Archaeology of West and Northwest Mesoamerica*, ed. Michael S. Foster and Phillip C. Weigand (Boulder, CO: Westview, 1985), 138, 141. See also Schulze and Maldonado, "Movement of Metal Goods in the Mesoamerican Late Postclassic Period," 325, which quotes from the Spanish historian Bernardino de Sahagún. He reports that metallurgists were also merchants of their wares, including "gold chains or necklaces."

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