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Title Out of the Dust: Steel in Early Metallurgy

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Abstract During the 19th century, critics of the Book of Mormon claimed that steel was not known in the Near East or ancient America during the appropriate Book of Mormon times. This assertion, if true, would discredit the authenticity of the Book of Mormon. However, in more recent decades, proof that Mesopotamian peoples used steel has been revealed. This discovery means that steel was used well before the oldest Book of Mormon people lived. Further research regarding steel in ancient America is still necessary; however, it appears that five Mesoamerican proto-languages have a word for *metal*, suggesting that the people who spoke those languages were familiar with some form of metal.



OUT OF THE DUST

Steel in Early Metallurgy

John L. Sorenson

In the Book of Mormon, Nephi reports that Laban's sword had a blade "of the most precious steel" (1 Nephi 4:9). He also says that his bow "was made [in part, at least] of fine steel" (1 Nephi 16:18). In America, Nephi taught some of his people to work in iron and steel (see 2 Nephi 5:15). A couple of centuries later, the Nephites were still making objects of iron and steel (see Jarom 1:8), although nothing more is told of those metals during the final 800 years of Nephite history. Moreover, Ether 7:9 reports that even the Jaredites "made swords out of steel."

The credibility of these statements was quickly challenged by 19th-century critics,¹ and the charge has been echoed almost up to the present.² The complaint was twofold: (1) "steel" was not known in the Near East in Nephi's day, and (2) neither iron nor steel was known in ancient America at

any time. Both criticisms are now out of date in the light of scientific and historical research done over recent decades.

"The first smelting of iron [ore] may have taken place as early as 5000 BC" at Samarra, Mesopotamia,³ but more commonly early iron was recovered from fallen meteors (yielding iron with a characteristic 4+% nickel content). By the middle of the fourth millennium BC, "both texts and objects reveal the presence of iron" in Mesopotamia,⁴ from where the Jaredites departed. Just possibly they brought with them to the New World technical knowledge of that metallurgy. Sporadically throughout the Bronze Age (about 3500 BC–1000 BC) in the Near East, wrought (non-meteoritic) iron objects were being produced,⁵ along with continued use of the meteoric type.⁶ Yet details of the history at that time are poorly known. The find of an iron artifact from Slovakia dated to the 17th century BC leads one researcher to lament "how little we actually know about the use of iron during the second millennium BCE."⁷

Steel is "iron that has been combined with carbon atoms through a controlled treatment of heating and cooling."⁸ Yet "the ancients possessed in the natural (meteoric) nickel-iron alloy a type of steel that was not manufactured by mankind before 1890."⁹ (It has been estimated that 50,000 tons of meteoritic material falls on the earth each day, although only a fraction of that is recoverable.)¹⁰ By 1400 BC, smiths in Armenia had discovered how to carburize iron by prolonged heating in contact with carbon (derived from the charcoal in their forges). This produced martensite, which forms a thin layer of steel on the exterior of the object (commonly a sword) being manufactured.¹¹ Iron/steel jewelry, weapons, and tools (including tempered steel) were definitely made as early as 1300 BC (and perhaps earlier), as attested by excavations in present-day Cyprus, Greece, Turkey, Syria, Egypt, Iran, Israel, and Jordan.¹² "Smiths were carburizing [i.e., making steel] intentionally on a fairly large scale by at least 1000 BC in the Eastern Mediterranean area."¹³

From this history, incomplete as it necessarily is, we see that the blade on the “sword of Laban” (1 Nephi 4:9; 2 Nephi 5:14) was an outcome of a long process of technological development and is historically credible as steel. However it was that Nephi became schooled in making steel, he knew enough to be a transfer agent through which that technology moved to the New World.

In America there is little archaeological evidence for metallurgy in the Book of Mormon period. Fragmentary evidence is available for certain metallurgical activities in Peru as early as 1700 BC, but it took many centuries there before the craft noticeably flourished. It may be that that area was an intermediate source for some of Mesoamerica’s metallurgy. Orthodox archaeologists insist that no metals were used in Mesoamerica before

about AD 900. However, scores of specimens have been identified that seem to date earlier.¹⁴

Decisive data for an earlier date come from words for metal (or for bell)¹⁵ that appear in five proto-languages that have been reconstructed from surviving daughter tongues:

Proto-Mayan. Descended from Proto-Mayan (estimated at 2200 BC), Proto-Tzeltal-Tzotzil, with a word for metal, dates to about AD 500.¹⁶ Yet Huastecan, a Mayan language, also has such a word¹⁷ and is considered to have split from the main Mayan group by 2000 BC.

Proto-Mixtecan. A reconstructed Proto-Mixtecan word for metal, or bell, has been dated to about 1500 BC.¹⁸

Proto-Mixe-Zoquean. A widely cited study identifies Proto-Mixe-Zoquean as probably a (or *the*) tongue spoken by inhabitants of the Olmec area before

1000 BC,¹⁹ and this proto-language included a word for metal.

Proto-Huavean and Proto-Otomanguean. Words for metal in these two proto-languages are of uncertain date but in any case date to before AD 900.²⁰

In recent decades, the continued discovery and analysis of metal artifacts both in the Near East and in Mesoamerica have changed our picture of technological history. The expectation that the history will change further in years to come is entirely realistic. Those who try to relate the Nephite record to archaeological and historical facts with regard to metals have improved the strength of their position with recent finds. It will be important to clarify that relationship as the years go on by being critically and reliably informed about new discoveries. Incomplete scholarship will not help those who love truth. 📖

raphy, *My Burning Bush*. The full text is available for free at www.hiltonbooks.com.

[Out of the Dust]

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1. See James H. Hunt, *Mormonism: Embracing the Origin, Rise and Progress of the Sect* (St. Louis: Ustick & Davis, 1844), 22.
2. See Gordon H. Fraser, *What Does the Book of Mormon Teach? An Examination of the Historical and Scientific Statements of the Book of Mormon* (Chicago: Moody, 1964), 60–61.
3. Nikolass J. van der Merwe and Donald H. Avery, “Pathways to Steel,” *American Scientist* 70 (1982): 146.
4. Peter Roger Stuart Moorey, “Early Metallurgy in Mesopotamia,” in *The Beginning of the Use of Metals and Alloys: Papers from the Second International Conference on the Beginning of the Use of Metals and Alloys, Zhengzhou, China, 21–26 October 1986*, ed. Robert Maddin (Cambridge: MIT Press, 1988), 31.
5. See Van der Merwe and Avery, “Pathways to Steel,” 146.
6. See Jane C. Waldbaum, “The First Archaeological Appearance of Iron and the Transition to the Iron Age,” in *The Coming of the Age of Iron*, ed. Theodore A. Wertime and James D. Muhly (New Haven: Yale University Press, 1980), 72–73.
7. James D. Muhly, “Mining and Metalwork in Ancient Western Asia,” in *Civilizations of the Ancient Near East*, ed. J. M. Sasson et al. (New York: Scribner, 1995), 3:1517.
8. Lenore O. Keene Congdon, “Steel in Antiquity: A Problem in Terminology,” in *Studies Presented to George M. A. Hanfmann*, ed. David Gordon Mitten et al. (Cambridge: Fogg Art Museum, Harvard University, 1971), 18–19.
9. Robert James Forbes, *Metalurgy in Antiquity: A Notebook for Archaeologists and Technologists* (Leiden, The Netherlands: E. J. Brill, 1950), 402.
10. See Harvey Harlow Nininger, *Find a Falling Star* (New York: Paul S. Erikson, 1972), 238.
11. See Congdon, “Steel in Antiquity,” 24–25; D. Davis et al., “A Steel Pick from Mount Adir in Palestine,” *Journal of Near Eastern Studies* 44/1 (1985): 42; and Muhly, “Mining and Metalwork,” 3:1515.
12. See Patrick E. McGovern, “The Innovation of Steel in Transjordan,” *Journal of Metals* 40/7 (1988): 50; Jane C. Waldbaum, *From Bronze to Iron: The Transition from the Bronze Age to the Iron Age in the Eastern Mediterranean* (Göteborg, Sweden: Paul Åström, 1978), 54; and Robert Maddin et al., “How the Iron Age Began,” *Scientific American* 237 (1977): 122.
13. Tamara S. Wheeler and Robert Maddin, “Metallurgy and Ancient Man,” in *Coming of the Age of Iron*, ed. Wertime and Muhly, 116.
14. See John L. Sorenson, *Metals and Metallurgy Relating to the Book of Mormon Text* (Provo, UT: FARMS, 1992), 58–60.
15. While it is theoretically possible that presence of a name does not require physical presence of the object so labeled, in this case from where else could the names for metal have been borrowed?
16. See Terrence Kaufman, *El Proto-tzeltal: Fonología Comparada y Diccionario Reconstruido* (México: Universidad Nacional Autónoma de México, Centro de Estudios Mayas, 1972), 118.
17. See Marcelo Alejandre, *Cartilla Hausteca con Su Gramática, Diccionario, y Varias Reglas para Aprender el Idioma* (México: Oficina Tip. de la Secretaría de Fomento, 1890), 80, 88.
18. See R. E. Longacre and René Millon, “Proto-Mixtecan and Proto-Amuzgo-Mixtecan Vocabularies: A Preliminary Cultural Analysis,” *Anthropological Linguistics* 3/4 (1961): 22.
19. See Lyle Campbell and Terrence Kaufman, “A Linguistic Look at the Olmecs,” *American Antiquity* 41/1 (1976): 88.
20. See Roberto Escalante, “El Vocabulario Cultural de las Lenguas de Mesoamérica,” in *La Validez Teórica del Concepto Mesoamérica: XIX Mesa Redonda de la Sociedad Mexicana de Antropología* (México: Sociedad Mexicana de Antropología, e Instituto Nacional de Antropología e Historia), 156–58.