TANAKH AND 'ŌDEM: TRACING INDO-LEVANTINE TRADE DURING THE LATE BRONZE AGE

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Abstract

This article explores the presence of carnelian (*'ōdem*) in the biblical narrative and its potential trade connections between the Indian subcontinent and the Levant during the Late Bronze Age (1550–1200 BCE). It examines the sourcing and trade networks that facilitated the circulation of carnelian across ancient civilizations, particularly in the context of the Israelites' wilderness period in the Sinai Peninsula.

The study investigates the linguistic and textual significance of *'ōdem* in the Tanakh, alongside archaeological and historical evidence supporting long-distance trade networks. It considers the possibility that high-quality carnelian, historically sourced from India (Gujarat), may have reached the Levant through established commercial routes. The research integrates textual, archaeological, and geological analysis to reassess traditional assumptions about ancient trade and resource acquisition.

Keywords: *Levant, Sinai, Tanakh, Carnelian, and Trade*

Contents

1. Introduction

Carnelian (*'ōdem* in Hebrew) lapis lazuli and other precious stones held immense value in antiquity, serving as markers of elite status and aesthetic refinement. Their presence in archaeological contexts throughout the Levant—discovered in burial chambers and residential structures—consistently indicates high social standing. Despite their cultural significance, the sourcing and trade networks that made these semi-precious stones available across ancient civilizations remain mysterious, presenting an ongoing archaeological puzzle.

1.1 Research context

During the Israelites' sojourn in the Sinai Wilderness—the region that gives the modern Sinai Peninsula its name—their God commanded the creation of an ornate priestly robe featuring a breastplate adorned with twelve precious stones. Among these gems was one whose Hebrew designation suggests 'red,' as mentioned in the Tanakh, most likely referring to carnelian (*'ōdem*). This raises intriguing questions about resource acquisition in such an isolated desert environment. Archaeological records indicate less natural deposits of carnelian in the Levant, suggesting trade connection as the major source. Thus, less access of local sources points to the existence of sophisticated long-distance trade networks connecting the Indian subcontinent to the eastern Mediterranean during the Late Bronze Age. Even if there are sites in the Levant that provide carnelian, the finest carnelian has historically been sourced from India, particularly from the state of Gujarat.

1.2 Problem statement

The ambiguity between the biblical account's *'ōdem* requirement and the apparent geographical isolation of the Israelites in the Sinai Wilderness necessitates a comprehensive investigation into previously underexplored possible trade connections between the Indian subcontinent and the Levant during the Late Broze Age.

1.3 Research Questions

Here are a few research questions:

1. How did the Israelites procure *'ōdem* while wandering in the wilderness?
2. Is it plausible they carried *'ōdem* from Egypt during their exodus, or did they engage in trade with passing merchants?
3. If there is a plausibility of purchasing *'ōdem* from the merchants, where did the merchants trade *'ōdem* from?
4. Furthermore, if Egypt served as the source, through what channels did the Egyptians themselves obtain *'ōdem*?

1.4 Research objectives

Here are the research objectives:

1. To analyse the linguistic and textual significance of the term ‘ōdem in the biblical account.
2. To evaluate archaeological and historical evidence for Late Bronze Age trade networks connecting the Indian subcontinent with the Levantine region.

1.5 Scope of the research

This research focuses on investigating the origins and acquisition pathways of carnelian—identified in biblical Hebrew as *'ōdem*—as described in the priestly breastplate worn by the Israelite high priest during their wilderness period in the Sinai Peninsula. The study operates within the broader historical timeframe of the Late Bronze Age (circa 1550–1200 BCE) and primarily concentrates on the geopolitical and trade dynamics that could explain how such a semi-precious stone may have reached the Israelites in a geographically isolated, resource-scarce desert environment. The geographical scope encompasses Indian subcontinent, particularly Gujarat, as the hypothesized primary source of high-quality carnelian and a potential trade partner via long-distance exchange networks.

1.6 Significance of the research

The investigation into the possible presence of Indian-sourced carnelian (‘*ōdem*) in the Sinai region during the Israelites' wilderness period opens a new lens on the transregional trade connectivity of the Late Bronze Age, especially with the Indian subcontinent. The possible link between Indian carnelian mines, especially in Gujarat, and the Levantine region through the Sinai Peninsula suggests that Late Bronze Age trade may have been more sophisticated and far-reaching than often assumed. This could lead to a re-evaluation of ancient Indian-Ocean and overland trade corridors. It also challenges traditional assumptions of the Israelites’ isolation and instead situates them within broader intercontinental networks of commerce and interaction.

1.7 Operational definition of terms

Carnelian or *'ōdem* is a variety of chalcedony, which is microcrystalline quartz (SiO_2). Its chemical formula is silicon dioxide (SiO_2), the same as quartz. “Carnelian is also marketed under the alternative trade names of red chalcedony and red agate in the gemstone industry (Harrell, 2010, p. 73)”. The term ‘agate’ typically refers to banded varieties of carnelian, while ‘chalcedony’ often describes specimens that have been polished to enhance their distinctive red hue.

The **Tanakh** is the comprehensive collection of Jewish sacred texts, comprising three major divisions: Torah (Law), Nevi'im (Prophets), and Ketuvim (Writings)—the term ‘Tanakh’ being an acronym formed from the initial Hebrew letters of these three sections. This is recognized by Christians as the ‘Old Testament,’ though with some variations in arrangement and canonical boundaries.

The **Late Bronze Age** represents the final phase of the Bronze Age in the ancient Near East and eastern Mediterranean, characterized by extensive international trade networks, the rise of powerful territorial states, and significant cultural exchange. Scholars typically define this period as spanning from approximately 1550 BCE to 1200 BCE, though precise boundaries may vary slightly depending on the specific region under consideration.

2. Research methodology

Research methodology involves the systematic processes and techniques used to collect, analyse, and interpret data. Utilizing both primary sources, which offer firsthand information, and secondary sources, which provide context and analysis, ensures a comprehensive and well-rounded understanding of the research topic.

2.1 Primary sources – Textual and Philological

Primary biblical texts (especially the Hebrew term ‘*ōdem* in the Tanakh) will be analysed to identify the most plausible material equivalent for ‘*ōdem* and its cultural significance in the priestly context. The philological explanation is provided to ascertain the meaning of the Hebrew word for carnelian.

2.2 Secondary data analysis – archaeological reviews

A systematic review of excavation based on the excavation reports that identify carnelian beads, ornaments, or trade goods datable to the Late Bronze Age will be employed. Secondary data analysis based on geochemical analysis using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) and Scanning electron microscopy (SEM), and the conclusions arrived from the analyses are also utilized in this research.

3. Literature Review

This study employs an interactional literature review methodology to examine the temporal framework of the Late Bronze Age as the chronological context for the Israelite exodus from Egypt, consequently situating the fabrication of the priestly breastplate in the Sinai wilderness, with its significant carnelian component, within this period. The review synthesizes archaeological evidence documenting the exportation of carnelian from manufacturing centres in the Indus Valley civilization to diverse geographical regions including the Aegean basin, Greece, and Southeast Asia. Concurrently, the analysis acknowledges the presence of indigenous carnelian deposits within the Levantine region, encompassing Egypt, Jordan, and adjacent territories. This dual consideration of local availability and established long-distance procurement channels establishes the analytical foundation for the hypothesis that superior-quality Indian carnelian remained preferentially sourced for significant ritual applications despite the existence of more proximate, but qualitatively inferior, alternatives. The differential material properties between regional sources thus potentially served as a determinative factor in resource acquisition decisions for ceremonial contexts.

3.1 Late Bronze Age and carnelian in Sinai Wilderness

The ‘early date’ theory, which places the Exodus in the 15th century BCE (typically around 1446 BCE), stands in contrast to the ‘late date’ theory (13th century BCE, approximately 1250 BCE). The early date of the Exodus—1446 BC—does fall within the Late Bronze Age according to the Mesopotamian archaeological period classification, hence, this research discusses about the transregional carnelian trade during this period. Merrill argues that working backward from the well-established date of Solomon's reign (c. 970-930 BCE) places the Exodus around 1446 BCE. His chronological reconstruction meticulously accounts for the periods of judges and the united monarchy (Merill, 2008). Kaiser (1990) observes that Judges 11:26 provides additional chronological support, as Jephthah claims Israel had occupied Transjordan for 300 years, which aligns better with an early date exodus when placed within the broader biblical timeline (Kaiser Jr. & Wegner, 2017).

3.2 Carnelian is not widely distributed

Carnelian is found only in specific geographical locations rather than being widely distributed. The development of high-quality specimens requires specific geological conditions, including silica-rich hydrothermal solutions, abundant iron compounds, slow cooling for proper crystallization, and extended periods of geological stability. The stone's distinctive reddish-orange coloration derives from iron oxide (Fe_2O_3) impurities embedded within its silica structure—these iron compounds oxidize during formation, with higher concentrations producing more intense hues.

“… globally carnelian occurs most commonly in weakly to unmetamorphosed volcanic rocks, with a large number of occurrences in basalt of varying geologic ages. Carnelian is also present in sedimentary rocks, such as the Miocene conglomerate of the Babaguru Formation in India and the Proterozoic Salmi Formation in Karelia, Russia which is composed of material eroded from the underlying Deccan and Priozersk basalts, respectively, and also in stream gravels derived from erosion of these host rocks (Volkert, Gorring, Peck, & Stanford, 2023, p. 1).

These specialized requirements explain why significant carnelian deposits are limited to specific regions like Gujarat in India, parts of Brazil, Uruguay, Madagascar, certain areas of the Middle East, and South Africa. The relative rarity of these perfect formation conditions contributed to carnelian's historical value and its limited availability in ancient trade networks.

Over time, many carnelian deposits undergo significant weathering and erosion processes, causing the stones to dislodge from their original volcanic settings. These dislodged specimens frequently collect in alluvial deposits like riverbeds and streambeds, creating secondary sources that have historically been easier to access and mine. This natural redistribution explains why many ancient carnelian artifacts originated from alluvial deposits rather than primary volcanic formations, despite the stone's igneous origins.

3.3 Geochemical analysis evidences export from India to Southeast Asia

Research was conducted on beads in Cambodia and Thailand. "… geochemical analysis using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) was undertaken on 73 beads from 10 Iron Age sites in Cambodia and Thailand and 64 geologic samples from four sites in India, Iran, and Thailand. The results show that many of the beads were produced from raw material derived from the Deccan Traps, India and that there is not yet strong evidence for bead production using a Southeast Asian source (Carter & Dussubieux, 2016, p. 321)."

The above research is about a geochemical analysis of Iron Age agate and carnelian beads from Southeast Asian archaeological sites. Using laser ablation-inductively coupled plasma-mass spectrometry on samples from Cambodia, Thailand, India, and Iran, researchers determined that most beads originated from India's Deccan Traps rather than local Southeast Asian sources, despite previous theories suggesting local production development. The study found no conclusive evidence of chronological changes in geological sourcing patterns, reinforcing the importance of LA-ICP-MS technology for accurately determining silicate artifact provenance in archaeological research.

3.4 Indus Aegean Interaction

"Over the past several decades the study of beads in South and West Asia has been transformed from simply being a list exotic finds from specific region, to a more robust analysis of regional technology, trade and socio-ritual symbols (Ludvik & Kenoyer, 2024, p. 19)." Based on carnelian bead styles, morphometrics, raw materials and technological features of the *chaîne opératoire*, Ludvik and Kenoyer examined the "… evidence for heads in the 3rd millennium BC Aegean that were produced in styles linked to the workshop tradition of the Indus civilization of ancient South Asia (Ludvik & Kenoyer, 2024, p. 20)." "By studying head assemblages in and at different sites and larger regions, it is possible to document specific workshop styles, including both local Mediterranean styles as well as Indus workshop styles (Ludvik & Kenoyer, 2024, p. 20)".

In the context of the comparative analysis of the Indus style beads in the Aegean, "The evidence from carnelian bead styles and use … supports the interpretation that indirect contact between the Indus and the Aegean represents a pattern for far-reaching exchange networks and modes of expression common to the larger areas of 3rd millennium BC West and South Asia (Ludvik & Kenoyer, 2024, p. 20)." "This study has demonstrated that 3rd millennium BC trade networks brought carnelian beads that can properly be described as 'Indus-style' into the Aegean world (Ludvik & Kenoyer, 2024, p. 20)."

"Comparative analysis of Indus-style beads in both the Aegean and the Levant reveals that the same varieties of Indus style beads were imported into both regions. The close stylistic, morphometric, and technological similarities in these beads is a strong indication that they derived from similar or even the same Indus-related workshops (Ludvik & Kenoyer, 2024, p.

32)" The documented Indus-Aegean interaction paradigm provides a substantive analytical framework for comprehending the extensive demand for Indus-manufactured carnelian artifacts throughout the eastern Mediterranean basin. This established commercial relationship serves as a theoretical foundation upon which to construct the hypothesis that carnelian distribution networks extended beyond the geographical parameters of the Aegean region. The archaeological evidence for these interregional exchange systems supports the postulation that carnelian trade networks permeated more distant Mediterranean territories, including the Levantine corridor. This spatial extension of commodity circulation reflects the operational capacity of Bronze Age commercial infrastructures to facilitate the movement of high-value, low-volume goods across substantial geographical distances, traversing multiple cultural and political boundaries while maintaining product desirability and economic viability.

3.5 Indus Greece Interaction

"Recent investigation of materials from the enigmatic Cycladic sites of Kavos and Dhaskalio have greatly expanded our understanding of the Early Bronze Age Aegean world. Here the authors examine six carnelian beads from these sites to reconstruct their production sequence and possible regional origin (Ludvik G. et. al., 2025)." A very sophisticated method was used to analyse the beads. Ludvik et. al. (2025) say, "Analysis of microscopic indications of bead production methods allowed a high-resolution reconstruction of the technologies involved at each step. Scanning electron microscopy (SEM) was employed to examine silicone impressions of drill holes made from these beads."

Through comparative analysis with experimental reproductions and known drilling techniques, the study established regional origins for the artifacts. Their findings reveal a complex pattern of interregional exchange, with most beads likely imported from distant sources. The research highlights one particularly significant discovery: a carnelian bead from Dhaskalio exhibiting distinctive Indus Valley manufacturing characteristics in both drilling technique and morphology. This evidence of Indus Valley craftsmanship in the Aegean substantially reconfigures scholarly understanding of the extensive trade networks and cultural connections linking these distant Bronze Age societies, suggesting more extensive maritime connectivity than previously recognized.

3.6 Jordan and locally available carnelian

The carnelian beads found at the Fifa Cemetery in Jordan date back to the Early Bronze Age IA (c. 3700–3400 BCE), as mentioned in the article. These beads were discovered in tombs excavated between 1989 and 1990 and were part of burial practices during that period. "Between 1989 and 1990 the Expedition to the Dead Sea Plain excavated a group of 15 tombs at the Early Bronze Age IA (c.3700–3400) cist-tomb cemetery at Fifa, Jordan. These tombs contained a variety of grave goods including beads made from carnelian (Hirsch, Janz, & Dubreuil, 2024)".

According to the article, previous scholarship has suggested that carnelian beads found in the Early Bronze Age Levant originated in Egypt. However, the study presents an alternative argument, proposing that some or all of these beads may have been produced in Northwestern Arabia or Eastern Jordan. The researchers examined morphometric and manufacturing data to assess where the beads were created, suggesting a broader scope for the origins of carnelian beads beyond Egypt.

The article presents several pieces of evidence suggesting that carnelian may have been locally available in Northwestern Arabia or Eastern Jordan rather than exclusively imported from Egypt: The study found that the carnelian beads from Fifa were created using knapping and progressive stages of abrasion, followed by pecking perforation. These techniques are consistent with bead-making traditions observed in nearby regions, suggesting local production. The researchers compared the shapes, sizes, and perforation techniques of the Fifa beads with those from known production centres. The similarities with beads from sites like Jawa and Tayma—which are closer to Jordan—support the idea that carnelian bead production may have occurred in these areas. This strengthens the premise that carnelian was locally available in the Levantine region.

3.7 Egypt and locally available carnelian

The book *Egypt in the Eastern Mediterranean During the Old Kingdom: An Archaeological Perspective* was written by Karin N Sowada and it discusses carnelian as one of the materials exchanged between Egypt and the Near East during the Old Kingdom (Dynasties 3–6). The book review quotes: “Egyptian imports found in the Near Ease included: ceramics, minor objects made of stone, mace heads, shells, stone vessels, faience and carnelian beads, stone palettes, and cylindrical seals (Wodzinska, 2011, p. 14)”.

Regarding Egypt's source of carnelian, the article challenges the assumption that all carnelian artifacts originated in Egypt. It suggests that some carnelian items found in the Near East may have been produced locally rather than imported from Egypt. This indicates that Egypt may have obtained carnelian from multiple sources, including trade with neighbouring regions.

Additionally, external sources mention that Egypt had at least one known carnelian mine during the Middle Kingdom, but the source of carnelian before this period remains uncertain. Egypt may have acquired carnelian through trade with regions such as Mesopotamia, the Levant, or even further afield. This again supports the premise that carnelian was locally available in the Levantine region.

3.8 Goods exchange in Southern Levant

The book *Early Bronze Age Goods Exchange in the Southern Levant* discusses carnelian in the context of minerals and exchanged commodities during the Early Bronze Age. “This work attempts to plot patterns of their movement between archaeological sites and to by

doing so to trace likely links and circuits between sites and regions. It also attempts to periodize the links identified within the EB Age, according to geographical areas. It further attempts to define the types of exchange relations according to available data (Milevski, 2011)".

It includes a section on carnelian beads, their distribution, and their role in trade networks. The book also provides a distribution map of carnelian beads, indicating their presence at various archaeological sites. The book examines how goods were exchanged within the Southern Levant during the Early Bronze Age, emphasizing the role of local trade networks and regional interactions. It explores how commodities like pottery, flint tools, metals, botanical goods, faunal commodities, and minerals—including carnelian—were circulated between settlements. The study also discusses transportation methods, including the use of donkeys for overland trade and possible maritime exchanges along riverine and coastal routes.

4. Indo-Levantine trade connectivity – Tanakh and carnelian

This investigation posits the existence of an Indo-Levantine commercial network through which *'ōdem* (carnelian) was exchanged as a significant commodity. The research methodology incorporates textual analysis of carnelian references within the Tanakh, complemented by philological examination to substantiate the identification of the Hebrew term *'ōdem* as carnelian. While the literature review acknowledges potential indigenous carnelian deposits, the ritualistic significance of the High Priest's breastplate would likely have necessitated premium-quality specimens that exceeded the characteristics of locally available materials. Consequently, this study advances the hypothesis that the carnelian specifically utilized in the ceremonial breastplate described in the Tanakh was predominantly sourced from the Indian subcontinent, acquired through either direct mercantile engagement with Indian traders or via intermediate commercial entities operating within established long-distance exchange networks.

4.1 Carnelian and Tanakh

The breastplate of the High Priest (חושן המשפט, *hoshen ha-mishpat*) described in the Hebrew Bible constitutes one of the most detailed accounts of gemstone use in ancient religious contexts. According to Exodus, this sacred vestment contained twelve precious stones representing the twelve tribes of Israel. Carnelian, traditionally identified as one of these stones, has attracted significant scholarly attention regarding its identification, symbolism, and archaeological correlates.

The primary biblical references to the High Priest's breastplate appear in Exodus 28:15-30 and 39:8-21. The King James Version translates the Hebrew term אֹדֶם (*'ōdem*) as 'sardius,' while more modern translations often render it as 'ruby' or 'carnelian.' The stone is consistently listed as the first stone in the first row of the breastplate: "And thou shalt set in it settings of stones, even four rows of stones: the first row shall be a sardius [*'ōdem*], a topaz, and a carbuncle: this shall be the first row (Exodus 28:17) (King James Version: Reference Bible,

2017).” Ezekiel 28:13 also mentions *'ōdem* among precious stones, reinforcing its significance in ancient Israelite material culture.

4.2 Identification of *'ōdem* in the Tanakh

The precise identification of *'ōdem* presents considerable challenges, as noted by multiple scholars. Propp emphasizes that the identification of biblical gemstones involves significant uncertainty, noting that *'ōdem* likely refers to a reddish stone, with carnelian being the most probable candidate based on etymological connections to the Hebrew word for ‘red’ (Propp, 2006). According to Houtman, the term *'ōdem* derives from the root אדם ('dm), meaning ‘to be red,’ suggesting a reddish gemstone. He argues that carnelian, due to its prevalence in the ancient Near East and distinctive red coloration, aligns most closely with the biblical description (Houtman, 2000). Harrell et al. conducted comprehensive mineralogical analysis of ancient Near Eastern gemstone terminology, concluding that *'ōdem* most likely refers to carnelian, though they acknowledge that red jasper remains another possibility (Harrell, Hoffmeier, & Williams, 2017).

4.3 Preference of carnelian from India

“Carnelian itself is a red-orange microcrystalline variety of chalcedony originating from various deposits in Afro-Eurasia, many of these located in South Asia (Ludvik & Kenoyer, 2024, p. 20)”. “While red-range carnelian is found in many world regions, the quality of carnelian needed to produce specific head shapes and sizes is found in relatively limited resource areas in Afro-Eurasia, a feature well documented ancient authors such as Pliny and confirmed through later sourcing studies (Ludvik & Kenoyer, 2024, p. 20).” The aforementioned explanation and comprehensive literature analysis for this research confirm the indigenous presence of carnelian deposits within the Levantine region. Consequently, substantive argumentation must be established to posit that the carnelian referenced in the Tanakh originated from non-local sources.

A primary consideration supporting the hypothesis of Indian provenance centres on the ritualistic context in which the carnelian is described in the Tanakh. “The red colour of carnelian has always been responsible for the belief that it possesses the magic property of being good for the blood and so prompting fertility (Arkell, 1935, p. 302)”. The ceremonial application would likely have demanded superior-quality specimens exhibiting optimal colour saturation, translucency, and structural integrity—characteristics predominantly associated with Indian carnelian deposits, particularly those from the Gujarat region. This ritualistic requirement for premium materials would potentially justify the significant investment in long-distance procurement despite the availability of local, but potentially inferior, alternatives. Ludvik and Kenoyer have rightly noted: “For many parts of the 3rd millennium BC world, then, good quality carnelian was a nonlocal material that was considered a valuable and essential import that was needed for its symbolic and ideological value (Ludvik & Kenoyer, 2024, p. 20)”.

4.4 Potential Indo-Levantine trade connections during Late Bronze Age

Carnelian only begins to play a prominent role in the Near East in the third millennium BCE, as a result of complex polities emerging in the Indus Valley with direct access to the rich carnelian deposits in Gujarat, north-western India (Roux, 2017). The raw material extracted there was used to produce technically complex and highly distinctive adornment elements which were exported in significant numbers to Mesopotamia and beyond (Inizan, 2000). "The Indus civilization of modern Pakistan and western India has long been identified as a major producer of distinctive carnelian heads (Ludvik & Kenoyer, 2024, p. 20)." "Based on some of the references in Mesopotamian texts, the ancient Indus region during the Bronze Age was known as Meluhha and carnelian was one of the important commodities that was obtained from this region (Ludvik & Kenoyer, 2024, p. 20)".

Archaeological and textual evidence substantiates the existence of the Meluhha trade network, which facilitated commercial exchange between Harappan and Mesopotamian civilizations during the third millennium BCE. Given the established infrastructural and institutional frameworks of these interregional commercial systems in the Early Bronze Age, there exists a significant probability that such trade connections persisted through subsequent periods. This continuity hypothesis suggests a high likelihood of sustained carnelian exchange networks extending into the Late Bronze Age, maintaining the flow of this valued lithic resource along established commercial corridors. The documented longevity of ancient Near Eastern trade systems and the continued value attributed to specific exotic commodities support the inference that carnelian procurement channels between the Indian subcontinent and Eastern Mediterranean remained operational, though potentially through modified intermediary mechanisms reflecting the geopolitical transformations of the second millennium BCE.

The carnelian trade continued beyond the Indus Valley Civilization and played a significant role in Indo-Levantine connections during the second and first millennia BCE.

Ancient India was famous for its carnelian, which is for the most part a manufactured, not a natural, product. The red in the stone emerges when chalcedony is heated. It can be produced through forest fires and volcanism, but this is thought to be rare. Chalcedony is a highly siliceous stone, which could go by the generic title 'agate.' It is associated with the Deccan trap of Gujarat and the Deccan and is still found in abundance in many of the riverbeds of Saurashtra (Possehl, 2012, p. 762)."

The evidence of trade between India and the Levant can be substantiated from carnelian found in Tutankhamun's tomb. Carnelian was used in several pectorals found in Tutankhamun's tomb. These pectorals—elaborate chest ornaments—often featured a combination of precious and semi-precious stones, including carnelian, lapis lazuli, turquoise, and gold.

4.5 *'ōdem* in Sinai wilderness possibly from India

Harrell et al. (2017) have rightly described below the almost impossibility of acquiring these gemstones as the Hebrews were wandering in the Sinai Peninsula. They say:

The wanderings of the Hebrews after their exodus from Egypt, according to the Torah, took them through the Sinai Peninsula and thence through the lands of Edom, Moab and Ammon in western Jordan (Exod 15:22; Num 36:13) It seems highly unlikely that the Israelites were unaware of the gemstones mined in these regions at the time of their passage … The Israelites would also have passed through areas with deposits of other gemstones and they may have noticed these although no ancient mines have yet been identified (p. 10).

The question as to where they might have got the gemstones from, unless one assumes that the *Tanakh* contains stories. The word *ʾōḏem*, however, clearly derives from the root Hebrew אֹדֶם meaning "red" or "redness," which surely is suggestive of the color of the stone (p. 10)."

Carnelian of good color, however, is rare in nature and it is now becoming increasingly apparent that its rich orangy-red to red color in ancient seals and jewelry is the product of heat treatment of originally drab-colored (e g , light yellow or brown) chalcedonic quartz. This treatment also has the advantage of making the stone easier to knap and drill. This process has certainly been employed in modern times for beads manufactured in the Khambhat (Cambay) area of Gujarat state, western India, and there is evidence that heat treatment was also practiced by the ancient Indus Valley or Harappan civilization (mid-third to early second millennium BC) of northwestern India and southern Pakistan (Harrell et al., 2017, p. 11).

Harrell and colleagues (2017) compare the carnelian trade to that of lapis lazuli as early as the fourth millennium BCE. They state:

Given that lapis lazuli was transported from its source in northeast Afghanistan to all parts of the Near East as early as the fourth millennium BC, it is conceivable that some carnelian or, at least drab chalcedonic quartz that was later heat-treated, came from distant Asian sources such as the famous agate deposits in India's Gujarat state (Harrell et al., 2017, p. 12).

Geological and archaeological evidence suggests that the carnelian used in key ancient artefacts, like as the breastplate described in the Tanakh and the jewellery discovered in Tutankhamun's tomb, originated in India, notably the Gujarat region. While for the 3rd millennium the diffusion in Mesopotamia of the notorious "etched carnelian beads" from the Indus valley via a maritime trade network cantered around the Gulf allows a feasible reconstruction of the circulation of this semi-precious stone, it is accepted that during the earlier periods carnelian reached Mesopotamia via land routes through northern and southern Iran, similarly to lapis lazuli (Wilkinson, 2014).

5. Conclusion

The study presents compelling evidence that the carnelian referenced in the Tanakh may have originated from India, particularly Gujarat, rather than exclusively from local Levantine sources. The ritualistic significance of carnelian in the High Priest's breastplate suggests a preference for high-quality specimens, which aligns with the superior carnelian deposits found in India.

Additionally, the research highlights the Indus-Levantine trade connectivity, demonstrating that carnelian was exchanged through long-distance trade networks. Archaeological findings and historical records support the hypothesis that Indian carnelian reached the Levant via established commercial routes, possibly through Mesopotamia and Egypt.

By integrating textual, archaeological, and geological evidence, the article redefines the scope of Late Bronze Age trade, emphasizing the economic and cultural interactions between the Indian subcontinent and the Eastern Mediterranean. This challenges conventional views on ancient trade and underscores the sophistication of intercontinental exchange networks.

References

Arkell, A. J. (1935, Jul-Dec). Some Tuareg Ornaments and Their Connection with India. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland, 65*, 297-306.

Carter, A., & Dussubieux, L. (2016). Geologic provenience analysis of agate and carnelian beads using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS): A case study from Iron Age Cambodia and Thailand. *Journal of Archaeological Science: Reports, 6*, 321-331.

Harrell, J. A. (2010). Archaeological Geology of Hosh-el- Guruf, Fourth Nile Cataract, Sudan. *Gdańsk Archaeo- logical Museum African, 7*, 71-84.

Harrell, J. E., Hoffmeier, J. K., & Williams, K. F. (2017). Hebrew Gemstones in the Old Testament: A Lexical, Geological, and Archaeological Analysis. *Bulletin for Biblical Research, 27*(1), 1-52.

Hirsch, J., Janz, L., & Dubreuil, L. (2024). Carnelian Beads from the Early Bronze Age Fifa Cemetery, Jordan: Aspects of Technology, Use, and Exchange. *Journal of Archaeological Science: Reports, 58*, 1-15.

Houtman, C. (2000). *Historical Commentary on the Old Testament: Exodus Chapters 20-40* (Vol. 3). Leuven: Peeters Publishers.

Inizan, M. L. (2000). Importation de cornalines et agates de l'Indus en Mésopotamie. Le cas de Suse et Tello. Cornaline de l'Inde. *Des pratiques techniques de Cambay aux technosystèmes de l'Indus*, 475-501.

Kaiser Jr., W. C., & Wegner, P. D. (2017). *A History of Israel, Revised Edition: From the Bronze Age Through the Jewish Wars.* Nashville: Broadman & Holman Academic.

King James Version: Reference Bible. (2017). Nashville: Thomas Nelson.

Ludvik, G. E., & Kenoyer, J. (2024). Indus-Aegean Interaction in the 3rd Millennium BC: A Comparative Analysis of Indus Style Beads in the Aegean, the Near East and the Indus. In M. N. Pareja, & R. Arnott (Eds.), *There and Back Again: Afro-Eurasian Exchange in the Neolithic and Bronze Age Periods* (pp. 19-35). Oxford: Archaeopress Publishing Ltd.

Ludvik, G., Kenoyer, J. M., Vergeraki, E., Boyd, M. J., & Renfrew, C. (2025, April 10). New evidence for long distance interaction at Keros: Carnelian bead analysis using scanning electron microscopy. *Journal of Archaeological Science: Reports, 64*, 105-120. doi:https://doi.org/10.1016/j.jasrep.2025.105120

Merill, E. H. (2008). *Kingdom of Priests - A History of Old Testament Israel* (2nd ed.). Michigan: Baker Academic.

Milevski, l. (2011). *Early Bronze Age Goods Exchange in the Southern Levant: A Marxist Perspective.* London and New York: Routledge - Taylor and Francis Group.

Possehl, G. L. (2012). India's Relations with Western Empires, 2300 – 600 BC. In D. T. Potts (Ed.), *A companion to the archaeology of the Ancient Near East.* John Wiley & Sons.

Propp, W. H. (2006). *Exodus 19-40: A New Translation with Introduction and Commentary.* Yale: Anchor Bible - Yale University Press.

Roux, V. (Ed.). (2017). *Cornaline de l'Inde. Des practiques techniques de Cambay aux techno-systèmes de l'Indus.* Paris: Maison des Sciences de l'Homme.

Volkert, R. A., Gorring, M. L., Peck, W. H., & Stanford, S. D. (2023). Characterization and Origin of Basalt-Derived Carnelian in theMesozoic Newark Basin, New Jersey, USA. *Minerals, 13*, 1-22.

Wilkinson, T. (2014). *Tying the Threads of Eurasia - Trans-regional Routes and Material Flows in Transcaucasia, Eastern Anatolia and Western Central Asia, c. 3000-1500 BC.* Leiden: Sidestone Press.

Wodzinska, A. (2011). Review of 'Egypt in the Eastern Mediterranean During the Old Kingdom: An Archaeological Perspective". *fournal of Ancient Egyptian Interconnections, 3*(1), 13-15.