REVIEW ARTICLES

OUR PAST MATTERS: MATERIALS AND INDUSTRIES OF THE ANCIENT NEAR EAST*

C. C. LAMBERG-KARLOVSKY
HARVARD UNIVERSITY

The volume under review contains a much needed synthesis of the major industries and technologies of the ancient Near East. Although the geographical emphasis is on Mesopotamia, the author's range extends from Anatolia to the Indus Valley and from central Asia to the Arabian Peninsula. The chronological focus is on the Bronze and Iron Ages within the above regions. The book is an indispensable guide to the archaeological discoveries, physico-chemical analysis, and textual references pertaining to the crafts of pottery, metal, glass, faience, and stone working, and to the role of bricks, mortar, and plaster in architectural construction.


ARCHAEOLOGISTS ARE PREDISPOSED TO DIGGING things up. In the early days of the discipline, success was reckoned by how many excavated objects were worthy of museum display. When Near Eastern archaeology was young, written texts and artifacts pertaining to the Bible were given a privileged place. At a later time objects were deemed especially significant if they contributed to the reconstruction of regional chronologies, diffusionary concerns, and typological classification. Later still the artifact was to play its fundamental role in the reconstruction of cultural history and the search for cultural processes. Only in recent years have archaeologists turned to material scientists in an effort to understand and reconstruct the properties and technologies that form the foundation of the object the archaeologist digs up. It is possible to point out, as Roger Moorey does in the book under review that Sir Austen Henry Layard in the mid-nineteenth century had already analyzed the glazed bricks he had recovered from Borsippa. Such examples remained rare, even idiosyncratic, undertakings until the middle of this century. It is only in the past three decades that a significant number of archaeologists have made a systematic effort to have their metals, ceramics, glass, ivory, and so on analyzed, as well as botanical and zoological remains.

Ancient Mesopotamian Materials and Industries: The Archaeological Evidence is an indispensable guide to the technological skills and industrial products of the ancient Near East. It is a work of exceptional breadth and exemplary scholarship. Although the technological base of the majority of materials discussed is firmly embedded in Mesopotamia, the author frequently discusses materials recovered from Palestine, Anatolia, the Iranian Plateau, central Asia, and the Indus Valley. This book, like Alfred Lucas' Ancient Egyptian Materials and Industries (1962), will long endure as a fundamental reference work for the study of ancient Near Eastern technologies.

The richness of detail and comprehensive coverage call for a brief review of what is included within each chapter. I shall then comment upon various aspects that I found of particular interest ("discussion"). It is important to note that within each chapter, when detailing a specific material and/or technology, the author covers a chronological range that traces the first (prehistoric) use of the material and/or technology through to its later methods of manufacture in the Late Iron Age.

A brief introduction (pp. 1–19) reviews evidence for the agricultural foundations. In this chapter the author touches upon the evidence for the earliest uses of irrigation, the plough and the seeder, the use of the shadoof
and the digging of wells, and the importance of storage facilities. In discussing Mesopotamia’s need to procure distant resources, the author outlines his theoretical position, one which recurs throughout the work:

In the ancient Near East, differences in technology were relatively small and the problems of long-distance travel unaided by water were so great that significant economic differentiation and exploitation were relatively rare. But, when they existed, their importance was proportionately greater. The contrast between Mesopotamia and her highland neighbors was not just one of unequal access to raw materials, but also of unequal degrees of socio-economic organization and complexity. The urban crafts and industries of Mesopotamia were as dependent on the highly organized labor of those who produced but did not participate in the consumption of what was traded as they were on sustained access to foreign materials. (p. 5)

In considering production and consumption, within the context of exchange, the author correctly considers reciprocal, redistributive, and commercial structures as co-existing systems within the Mesopotamian economy; to which might be added tribute and warfare. Fundamental to a consideration of Mesopotamian resource procurement is an understanding of land and water routes as well as the means of transport and the role of nomads. The author discusses each of these in turn, including the role played by the camel and the horse.

The introduction concludes with a consideration of “Crafts and Industry: Methods of Study.” One of the great strengths of this volume is the interplay of archaeological and textual data. Where relevant the author mines a wealth of textual information to shed light on specific aspects of distinctive technologies, geography, and social institutions. He buttresses the archaeological and textual evidence for reconstructing past technologies by bringing to bear ethnographic analogies, experimental archaeology, and scientific techniques for identifying and fingerprinting materials in order to determine their point of origin and/or manner of manufacture.

Discussion. Moorey would appear to agree with Kohl’s recent statement (1989: 234) that “Bronze Age technologies could not be monopolized but quickly diffused from one area to another or, in this sense, were transferable.” Kohl notes that the speed of diffusion is a relative phenomenon—but how relative? We note that the production of metal items (copper) began by 7000 B.C. but took about three millennia to diffuse throughout the Near East. Horses were domesticated in the Ukraine by the middle of the fifth millennium but only made their appearance in Mesopotamia in the mid-third millennium. Writing existed within “cores” of cultural complexity, while the immediate periphery remained illiterate for millennia. And etched carnelian beads appear to have remained a product of only the craftspersons of the Harappan civilization. Additional examples for the restricted geographical distribution of specific materials, their techniques of production, and their slow diffusion could be cited (Hodges 1964). Indeed technologies such as the production of carbon steel in Luristan toward the end of the second millennium appear to have been invented and then become extinct (Smith 1971). That some technologies may have been held as the secret knowledge of their producers is indicated by a colophon found in second-millennium texts: “Let the initiate show the initiate, the non-initiate shall not see it. It belongs to the tabooed things of the great gods” (cited in Saggs 1962: 471).

In Mesopotamia occupational skill in the craft, military, and scribal (administrative) spheres offered the individual social mobility. It is not unlikely that closely held technological knowledge would enhance one’s position, if not one’s wealth. Clearly “technology,” like its parent the “economy,” is embedded in society; technological systems and economic structures are given definition by the specific structural characteristics of the social order. Nevertheless, the origins of a technology may differ fundamentally from its later practice. Summarizing the views of Sasson (1968), discussing the “later practice” of the artisans of Mari, Moorey writes: “They were assessed for their technical rather than their imaginative skills. . . . Their work was not assessed for its artistic worth, but for the quality of its production, for its utilitarian and functional adequacy or inadequacy” (p. 15). Yet, these conditions were in direct contrast to the manner in which the crafts in Mesopotamia originated. Although Moorey does not consider the influential views of the late Cyril Smith (1981), his own beliefs appear to be in accord with them. Smith believed that technologies were born from “play”; artisans, initially attracted by the varying properties of materials, began to transform them in their desire to produce “aesthetic” items. Thus, behind the products of an evolved material science, e.g., metallurgy, rests the initial motivation of an artisan attempting to manipulate a material (stone/ore) in an effort to transform it into an aesthetic ARTifact: “The message is simple: time and again very subtle properties of matter have been discovered and exploited by artists and artisans long before rigorous science even took notice of them, much less explained them” (Smith 1980: 23).

Chapter one addresses “The Stoneworking Crafts: The Common Stones” (pp. 21–74). These include sedimentary rocks (limestone, marble, alabaster), metamorphic derivatives (dolomite, sandstone, steatite, chlorite, serpentine), and igneous rocks (basalt, diorite, dolerite, granite; i.e., the
hard dark stones). This chapter includes an extensive
discussion of sculpture and sculptors: including an historical
survey of the types of stone used for statuary, workplaces,
 quarries, and the methods employed in the production of
sculpture; stone vessels: their methods of manufacture
and types of stone utilized; tools and weapons: including
the flake-tool tradition, projectile points, hoes, an excellent
review of the production and exchange, analyses of
obsidian, and a brief review of the polished stone production
of celts, maceheads, mortars, weights, and so on.

Discussion. The chapters on “Stones and Stonework”
and “Stone Vessels” in Mesopotamia and the East by
Timothy Potts (1994) offer, in combination with the two
relevant chapters in this volume, a state-of-the-art review
on the use of stone in Mesopotamia. Both books em-
phasize that the Uruk IV–III Period witnesses an unprece-
dented variety of stones entering Mesopotamia for temple
use as vessels, statuary, and inlay. Precisely where these
stones came from remains unknown. At different times
northern Mesopotamia and Anatolia, the Iranian Plateau,
the Gulf (Dilmun and Magan), and the distant Indus Valley
(Meluhha) were centers from which southern Mesopo-
tamia obtained animal, vegetable, and mineral resources.
Throughout the past three decades, important research
has been devoted to identifying the cultural geography of
resource procurement; discussing the nature of the eco-

omic structure and institutions involved in commerce;
and relating changes in the geography of resource procu-
ment to the shifting socio-political conditions of core-
periphery relations. In this regard the works of Ratnagar
and Moorey in this volume are of special significance.

Although it is tempting to identify the colonies of the
“Uruk Expansion” as the agents responsible for the in-
creased shipment of exotic stones into southern Mesopo-
tamia, the archaeological evidence remains ambiguous.
Nevertheless, there are some suggestive correlations such
as the production of Late Uruk cylinder seals from a ser-
pentine that virtually disappears from seal production fol-
lowing the collapse of the Uruk settlements along the
Euphrates (Collon 1982). The increased use of stone in
southern Mesopotamia appears to be directly linked to
the increasing significance of the temple. An expansive
variety of objects, from vessels to statuary and inlay,
were produced from colored limestone, smoky quartz, ag-
ates, bituminous limestone, and lapis lazuli, among other
stones, and placed in temples as votive offerings. Temple
deposits comparable in richness to those of the Uruk do
not exist in the succeeding Early Dynastic Period and
may skew our appreciation of the types of stone and
products produced.

The archaeological evidence suggests that, from the
Late Uruk to the end of the Early Dynastic Period, light-
colored stones predominated in manufactured statuary,
wall plaques, rare royal monuments, maceheads, and even
cylinder seals. Toward the end of Early Dynastic II and
throughout the Akkadian and Ur III periods, there is a
significant shift to dark stones—diorites, gabbros, and
dolerites—that were used principally for the manufac-
ture of items for rulers and their high officials. These dark
stones, no doubt expressive of the elite status of their
owners are believed to have derived from the Gulf, al-
though it should be noted that they are also extensively
documented in the Makkran Range of southeastern Iran
(Snead 1970). The earlier lighter stones came from the
nearby chains of the Zagros Mountains. This recalls the
view of Mary Helms, whose important book (1988) on
the ethnography of trade points out that there is a uni-
versal attitude in which locally available products lack
the prestige, mystery, and magic of items imported from
great distances. Thematic in Moorey’s discussion is the
observation that archaeologists rarely offer precise min-
eralogical descriptions of the stones they excavate. This
obviously hinders identifications of provenience, while
the all-too-frequent casual guesses distort the picture.
Mineralogical analyses are the sine qua non for pro-
viding both the identity and provenience of the object.
Unfortunately, even when these are performed, confu-

cion abounds. No greater confusion exists than in the
terminology of steatite, chlorite, and serpen-
tine. Each is a complex silicate mineral, and each is distinguishable
under analysis. In mineralogical terms, Kohl (Kohl
and Harbottle 1979) has identified as chlorite the vessels
and seals produced and used at Yahya. For reasons left
unspecified, Pierre Amiet (1980) has termed this iden-
tification incorrect. He prefers the term serpentine to
chlorite. This incorrect substitution leads to confusion and
distorted perceptions. As Moorey correctly notes (p. 75),
serpentine is the dominant stone used in southern Mesopo-
tamia for the production of seals in the Late Uruk and
Akkadian periods. The source for the serpentine is be-
lieved to be Syria (Collon 1982). It can be noted here
that the presence of serpentine seals from Syrian sources
in the Late Uruk and Akkadian periods coincides with
periods of Mesopotamian expansion along the Euphra-
tes into Syria. In post-Akkadian and Ur III times, serpen-
tine is replaced by chlorite for the production of seals.
This suggests a shift from exploiting the Syrian serpentine
sources to utilizing the chlorite sources of eastern
Iran and the Gulf. The rather arbitrary designation by
Amiet of the chlorite materials from Yahya and eastern
Iran as serpentine, despite the analyses, simply results in
 lumping together the sources of Syria and eastern Iran
as serpentine. This, in turn, precludes the recognition of
important shifts in the procurement of different resources
from different geographical regions.
Moorey writes that “decorated vessels in chlorite/steatite have been the subject of unusually concentrated interest following excavations at Tepe Yahya, in south central Iran, between 1968 and 1973 [should be 1975]...” (p. 47). In discussing decorated vessels in chlorite/steatite, the author follows Amiet (1986) both in preferring the use of the phrase *série ancienne* to “intercultural style” (Kohl 1974) and in believing that the vessels have a “peculiarly Iranian character” (p. 47). He writes that “these decorated vessels had an ‘intercultural’ appeal, but the style in which they were carved has more specific origins” (p. 47). The “specific origins” for both Moorey and Amiet appear to be in southeastern Iran. However, the analyses of chlorite/steatite undertaken by the Yahya Project (Kohl and Harbottle 1979) indicate that there were several workshops producing this commodity and not only in Iran. Analyses indicate that the carved vessels recovered from the workshops at Yahya and from Tarut in the Persian Gulf come from distinctive sources. These sources differ again from those of the carved vessels found in Mesopotamia, e.g., Adab or Mari. Furthermore, the first important typological study of this style of carved vessels, undertaken by Moorey, was undertaken by Durrani (1964), who showed that specific iconographic features were characteristic of distinctive geographic areas. The discovery of the workshops at Yahya have skewed the evidence and given birth to the view that the carved chlorite/steatite vessels have a “peculiarly Iranian character.” It must be noted that there are virtually no carved chlorite/steatite vessels at Shahr-i Sokhta, Hisar, Malayan, Tal-i Iblis, or the entirety of northwest or central Iran. The phrase *série ancienne* has merit when dealing with chronological issues while “intercultural style” is useful when dealing with culture process. The fact remains that the analytical program to fingerprint carved chlorite vessels has shown that *this distinctive type of vessel was both produced and consumed within different cultures* extending from Yahya in southeastern Iran to Mari in northern Syria and from Gonur in Turkmenistan to Tarut in the Gulf. Pinpointing southeastern Iran as *the* region of “specific origins” for this category of vessel simply overemphasizes the importance of the workshop at Yahya and overlooks the complexity of its production, consumption, and distribution in different regions. Moorey does not doubt that the production of chlorite at Yahya was meant for distant markets, but he does not mention that Possehl (1986) has recently challenged this commonly accepted view. Possehl takes the position that chlorite at Yahya was produced exclusively for local and/or regional consumption. In good anthropological fashion he invokes gift exchange and the “kula ring,” the exchange of shell necklaces among the Trobriand Islanders of the Pacific, to explain the mechanism for the local distribution of chlorite at Yahya. I have recently addressed the implausibility of this perspective (Lamberg-Karlovsky 1993).

The discussion pertaining to pocketbook-shaped stone objects, referred to as “handled weights,” is given excellent treatment in the recent study of Muscarella (1993). Moorey mentions the existence of these “handled weights” in Uzbekistan but, since they remained largely unpublished, he can offer little specificity. In 1985 when Philip Kohl and I participated in the excavations at Sarazm, in Tajikistan, we noted the presence of over a dozen of these items of various size and different stone. I know of no other site from which so many have been recovered. The excavator, Abdula Isakov, placed them within Period III, the late third millennium.

This discussion of chlorite/steatite objects began by noting Moorey’s complaint that archaeologists fail to give precise mineralogical descriptions of stone objects. He wisely cautions the archaeologist against making facile and misleading identifications of minerals and urges identifications by mineralogical analysis. Turning to other types of stone, at Yahya what the excavators invariably identified as “alabaster” turned out on analysis to be calcite. When laboratory analyses are undertaken the results can reach beyond the expected and even the comprehensible. In our excavations of the neolithic mound of Tepe Gaz Tavileh, undertaken by Martha Prickett on behalf of the Tepe Yahya Project (Prickett 1986), we recovered from a context dated to ca. 4800 B.C. a sizable crystal. Dr. Carl Francis of the Harvard University Geology Museum identified the object by spectroscopy as danburite, an exceedingly rare colorless crystal (Francis 1991). There are no known sources for danburite in the Near East; for nearby sources one must travel to eastern Siberia or perhaps Madagascar—certainly not to New York State, where deposits are also known.

The author concludes this chapter with an excellent discussion of obsidian. He reviews the different models offered for its trade and exchange and summarizes the results of the different analytical studies that have been undertaken. The rather cursory treatment of stone tools such as arrowheads, blades, burins, and sickles, is not due to the author’s disinterest but to the fact that archaeologists working on Bronze Age sites in Mesopotamia rarely give this category of artifact the attention it merits. Certainly there is not a single in-depth study of a Mesopotamian stone tool-type that compares with Avi Gopher’s study of the arrowhead in the Levant (Gopher 1994).

Chapter two reviews “The Stone-working Crafts: Ornamental Stones” (pp. 74–110). In this chapter, stones used for seals, beads, amulets, and pendants are discussed. A historical survey of the use of ornamental
stones includes a study of amber (and other resins), agate, alabaster, ammonite, anhydrite, aragonite, azurite, basalt, beryl (aquamarine, emerald), calcite, cherrony, chalk, coral, conundum (emery), quartz, citrino, carnelian, chalcedony (agate, jasper), cairngorm, bloodstone, flint, onyx, ruby, sapphire, diamond, diorite, feldspar, garnet, granite, grindstones (nephrite, jadeite), gypsum, jet, lapis lazuli, limestone, malachite, marble, pearl, rock crystal, steatite, chlorite, serpentine, and turquoise. Listing the various types of stones discussed serves to indicate the thoroughness of this study. The detail offered on each of the stones varies according to its popularity and importance to Mesopotamia. Thus, each of the entries pertaining to lapis lazuli, carnelian, and turquoise merits several pages, while the entry concerning the diamond simply notes that drill bits of diamond were first used in the Sassanian period and procured from India. This chapter concludes with a discussion of the manufacturing techniques for the production of cylinder seals and a brief review of bead production in the Indus Valley and the presence of beads in Mesopotamia.

Discussion. In discussing the trade of lapis lazuli Moorey writes: "... Lapis was travelling overland in the third millennium B.C. through Iran [and] evidence for local use is instructive. The largest quantities may be those from the virtually unpublished graves at Shahdad" (p. 89). But what is the actual "evidence for local use"? What strikes me, in fact, is the rarity of lapis lazuli on the entire Iranian Plateau. Shahr-i Sokhta and Hisar are almost alone in exhibiting both an abundance and a manufacture of lapis artifacts. Lapis is rare at Malayan, although raw lumps are reported, and at Susa, and all but absent from Bampur, Yahya, Tali-i Ibis, Sialk, Tureng Tepe, Shah Tepe, Godin Tepe, and other sites. In fact, there is not much lapis lazuli at Shahdad. In the catalogue of finds from the 382 excavated graves at Shahdad (compiled by Mansour Sajjadi from the field records of the excavator; Ali Hakemi has kindly made a copy of this compilation available to me), there are only ten graves that contain lapis lazuli. Of these, nine contain lapis necklaces, the tenth only a few beads. The necklaces contain a maximum of twenty-three lapis beads (grave 65). Thus, less than three percent of the graves at Shahdad contain lapis lazuli in the form of beads strung on necklaces. The cruciform shapes of many of the beads at Shahdad have direct central Asian parallels (Sarianidi 1986: 135). The raw lumps of lapis recovered from fourth millennium Djebel Aruda in Syria and fourth millennium Mehrgarh in Pakistan indicate both the widespread and early use of this mineral.

It appears, however, that the availability and/or popularity in the use of this stone varied. Lapis, originating in Afghanistan, with minor sources in Pakistan, was imported to Mesopotamia in a semi-processed state. It remained throughout the third millennium a highly prized stone. Pettinato writes (1981: 186), that at Ebla, in Syria of the mid-third millennium, "the ratio between lapis lazuli and silver is 3.1 to 1." Yet this represents relative popularity. And the popularity of lapis lazuli in Mesopotamia, Syria, and central Asia contrasts with its relative rarity on the Iranian Plateau. Even more surprising is the paucity of lapis lazuli recovered from sites of the mature Indus civilization. It is difficult to account for this asymmetry of distribution. How much is the result of distinctive patterns of cultural fashion, archaeological methods of recovery, or our inability to understand the mechanisms of trade and/or exchange? How do we account for the fact that two contemporary production sites, one involved in the manufacture of lapis and the other of chlorite vessels, each lacks the other's commodity? There is virtually no chlorite at Shahr-i Sokhta and no lapis at contemporary Tepe Yahya.

While an asymmetry of trade characterizes the distinctive nature of broad geographical regions, a sharing of technology unites distant places. Thus, microlithic phanite borers of identical type, used for the coring of beads, have been recovered from Shahr-i Sokhta, Yahya, Harappa, Mohenjodaro, Susa, Mehrgarh, Mundigak, and Altyn Depe, and would doubtless be identified in Mesopotamia if archaeologists excavating there would attend to their stone tool industries.

With reference to lapis lazuli, Michèle Casanova has recently made the interesting observation that lapis production in central Asia utilized rudimentary techniques compared to Mesopotamia (Casanova 1994: 137–46). While much attention is paid to the social role of the crafts and the nature of craft specialization, we remain largely ignorant of techniques of production. Mark Kenoyer and his colleagues (Kenoyer 1992; Kenoyer, Vidale, and Bhar 1994; Kenoyer and Miller 1995) are making commendable efforts to replicate the ancient production techniques of the Indus civilization. His experimental studies have offered valuable insights into the technology of production of shell, ceramics, carnelian beads, and metals.

Moorey offers a concise and valuable review of the manufacturing techniques of seals. To this study must now be added the recent work of Sax and Meeks (1995), who detail the methods of engraving quartz cylinder seals. Moorey emphasizes cylinder seals while giving stamp seals secondary notice. It is the latter category, however, that has been highlighted in the recent excavations of neolithic Sabi Abyad (Akkermans and Verhoeven 1995), in northern Syria, as well as in the re-analysis of the older excavations at Tal-i Bakun, in southwestern Iran (Alizadeh 1988). On both sites a number of stamp seals and sealings has been recovered. The evidence
from Sabi Abyad indicates that rudimentary levels of administrative monitoring, through the use of the stamp seal for the sealing of jars and doors, was already evident in the sixth through fourth millennium in northern Mesopotamia. An Iranian counterpart is apparent at the nearly contemporary site of Tal-i Bakun. The functionally comparable and contemporary, although distinctive, types that characterize the Sabi Abyad and Tal-i Bakun seals and sealing evidence remind us of a very early example of Amiet’s insightfully discussed (1979) “ethnic duality” and reciprocity that characterized the relationship between Mesopotamia and Susiana in later periods. Lastly, the appearance of seals and sealings at these two sites are unexpectedly early and indicate a previously unsuspected degree of cultural complexity.

I take the opportunity to publish here an unperforated seal from the site of Sarazm in Tadjikistan (figure 1). The seal was recovered from a late fourth- or early third millennium context and is of an opaque, uniformly brown stone (no mineralogical analysis!). It is unique as the earliest and the most easterly of seals in central Asia. Of equal significance, but also little known, is a seal without good context but of a style belonging to the BMAC (Bactrian-Margiana Archaeological Complex or Oxus civilization of central Asia) which illustrates horse and rider (figure 2). The seal should date between 2000–1800 B.C. and thus be among the earliest illustrations of horse riding. For the publication of this seal and others illustrating horse riding in Bronze Age central Asia, see Saranidi (1986a: 43).

Chapter three (pp. 111–40) concentrates upon products manufactured of bone, ivory, and shell. Wherever possible the author attempts to discriminate between antler, horn, hippopotamus ivory, wild boar’s tusk, and elephant tusk. Artifacts produced from ostrich eggshell, tortoise shell, and mother-of-pearl are relatively rare and briefly noted. As pointed out by the author, shell is one of the most durable of natural materials and abundantly present throughout Mesopotamia. Until quite recently shell was rarely reported; it was recovered from excavations in a cavalier manner and few specialists were concerned with its study. The use of shell as inlay, votive offerings, lamps, seals, beads, bangles, and so on are all duly noted, as are the most common types of shell (marine and freshwater) recovered from the regions of the Gulf, Red Sea, Indian Ocean, and the Mediterranean.

Discussion. The author is usually so thorough that it is surprising to find a material or industry of relative significance left unmentioned. In this spirit I mention the interesting seals made from shell of the conidae species, found in the Gulf and the Indian Ocean. These distinctive seals, dated to the late third and early second millennium, were recovered from the cemeteries excavated at Harad and Isa towns, Hili, Ali, and Umm Jidr in Bahrain and the United Arab Emirates (al-Khalifa 1986). Seals of this type are known exclusively from burial contexts, and, like the better known Persian Gulf seal type, their counterparts in sealings are all but nonexistent, suggesting a different function for the seal in the Gulf than in Mesopotamia.

With reference to the Gulf, mention must be made of the recent discovery of an ivory comb by Daniel Potts (1993) at Tell Abraq in Umm al-Qawain (United Arab Emirates). The comb, manufactured of elephant ivory (personal communication from D. Potts), contains an incised floral and dot-and-circle motif that the excavator convincingly parallels to Bactrian counterparts in central Asia. Since elephants were not indigenous to central Asia (Bactria), the ivory must have been imported, perhaps from the Indus Valley. The only reported “ivory” from central Asia are two incised “sticks” from Alty
Depe (Masson 1988: pl. XIX.2) which have not, in fact, been analyzed. They are regarded as ivory because similar artifacts from Harappa (Vats 1974: 23) are said to be of ivory. However, like their counterparts at Altynteppe, those in the Indus have never been analyzed either. There are countless examples of constructing a house of cards based on eye-ball identifications that would collapse if analyses were undertaken. There is a certain parallel between an antiquities dealer making up a provenience and an archaeologist making up the identification of an artifact. Both are intentionally fabricating an historical datum to fulfill their wishes.

Two recent studies by Christopher Edens (1987, 1992) deserve mention for their special importance when considering the use of shell in Mesopotamia. In his excavations on the island of Khor Ile Sud, Edens recovered literally tons of shell from mounds situated adjacent to a second-millennium site. The shells were identified as *Thais savignyi*. These molluscs, readily obtained from the Gulf and Indian Ocean, are not edible but were most definitely utilized by the local inhabitants. Through extensive experimentation, Edens was able to demonstrate that a specific organ of the mollusc was extracted and utilized for the production of a purple dye (Edens 1987: 203–58). In a subsequent article—a rarity in shell studies—he attempted a quantitative analysis of the export of shells (*Turbinella* [Xancus] *lambdis*) from the Gulf to Mesopotamia, where they were used for the production of so-called “lamps” (Edens 1992). Not very surprisingly, he found that the quantitative shifts in the supply and demand of this commodity were influenced by changing political conditions in Mesopotamia.

In discussing *Turbinella pyrum*, Moorey is entirely correct to point out that the presence of this large shell does not necessarily imply contact with the Indus Valley, where it was the shell most commonly used for the production of bangles and rings (Kenoyer 1984). The recent excavation of a Harappan shell-working site in the Gulf of Kutch provides an important opportunity to understand the techniques used to manufacture different items of this shell (Hedge et al., 1990).

I take this opportunity to publish a drawing of a burial recovered from Sarazm, Tadjikistan (figure 3). The illustration indicates that the woman (in her early 20s) was buried wearing two shell bracelets of *Turbinella pyrum*. Dozens of lapis lazuli and carnelian beads run along the outer seam of her arms and legs, gold beads run down her back (perhaps as today, where braids were held together and decorated with beads), while lapis lazuli, carnelian, and cerargyrite beads appear to outline her elaborate headdress. Finally, a bronze mirror, a female figurine, and a sheep or goat burial are placed alongside the body. This rich burial dates to the very end of the fourth or early third millennium (Isakov 1993: 28–35). Thus, it dates to centuries before the existence of the mature Indus civilization and attests to the wealth of resources being exploited in central Asia, including the use of *Turbinella pyrum* from the Indian Ocean. In the later excavations at Gonur Depe in Turkmenistan, Daniella Bar-Yosef has identified, among a rich variety of shells, the presence of *Lambis truncata* from the Indian Ocean and *Nessarius gibbosulus* from the Mediterranean (Hiebert 1994).

Not surprisingly, it takes a more extensive discussion to review “The Ceramic and Glassworking Crafts,” the subject of chapter four (pp. 141–216). This chapter is a marvel of concise synthesis, particularly with regard to the manufacture of pottery. The author reviews the evidence for kiln construction and, more thoroughly, the evolution of pottery manufacture. He emphasizes techniques of production that led to traditions of manufacture culminating in recognizable styles, styles both aesthetic, in terms of their type and appearance, and technological, in terms of their methods of manufacture and decoration. Where laboratory analyses have been undertaken, the author reviews the evidence. Thus, the important technical analyses of Van der Mynors, Kamilli, van As, Thuessen, and Matson, to mention but six, are all judiciously reviewed.

The most common material studied by the archaeologist is pottery, and each of us may feel especially expert in dealing with this category of artifact. Nevertheless, reading this chapter on pottery will be instructive to even the best informed on this most common of commodities. Glass, faience, and blue frit (Egyptian Blue) (as well as methods of glazing and techniques of coloration) become more common in the second millennium and later. Manufacture based on these items involves skills both related to and different from those of the potter. The author offers a historical sketch of the development of each of the above industries and summarizes the results of important analytical studies such as the analysis of Egyptian Blue from sites in Mesopotamia and glass from Nuzi and Nimrud. Lastly, the well-known collaborative study on ancient Mesopotamian glass, initiated by A. L. Oppenheim (1970), is revisited with commendable results. In that volume Oppenheim translated a number of texts believed to refer to the production of glass. The challenge has always been the interpretation of these texts and the meaning of specific words. R. H. Brill wrote that “there is sufficient ambiguity in the translations of the texts to leave room for the possibility that the materials being prepared were glassy faience, Egyptian Blue, or some related but not yet clearly defined material” (Oppenheim 1970: 108). In spite of this
Fig. 3. Burial of young female (ca. twenty years old) from Sarazm, Tajikistan. Over the entire burial were paste microbeads (depicted as small solid beads). Lines of beads made of lapis, carnelian, turquoise, and shell (depicted as open beads) were found along the limbs and above the head, outlining the dress and the headdress of the figure. Carnelian beads were found strung along the feet and along the fingers of the hands, and were also found in a pattern extending from the feet to the animal bones. Gold beads (depicted as solid beads) extend from the back of the head down the back, as if part of a braid. To the upper left of the body were found: a copper mirror (1), terracotta figurine (2), bone needle (3) and an ochre colored clay bead (4). Remains of a young sheep or goat (5) were found at the lower right. At the back of the head were found three ochre-colored clay beads (6), a stone whorl (7), and one of several step-shaped bone beads or amulets (8). At the chest was a shell gorget (9) and many beads including one silver bead (10). At the wrists of both arms were large carved bracelets made of Turbinella pyrum (11).
cautionary note, Moorey believes that the texts pertain to the production of glass. He reviews the most recent contributions pertaining to these texts, their interpretation, and the meaning of specific words. These texts conform to a specific genre of Mesopotamian literary tradition: the preparation of textual lists. They were written by scribes, and they fulfill their lexicographic purpose, but they are also wholly inadequate to the needs of the student of the technology of glass production. As Moorey notes: “literary tradition is a notoriously inadequate source for the history of technology” (p. 211).

Discussion. The use of fired clay prior to the production of pottery is given little notice. Thus, the role of clay (and stone) geometric tokens in the evolution of writing is left unmentioned. The importance of geometric tokens, often encapsulated in bullae, and their role in early communication systems was first recognized by Amiet (1966: 70) and later greatly embellished by Schmandt-Besserat (1992). The argument is familiar to all Near Eastern archaeologists and need not be reiterated here. Suffice it to say that this hypothesis, which traces the evolution from token to tablet, is neither as direct nor as simple as has been suggested (see Oates 1993 for a critical review).

One of the most valuable aspects of this chapter is the author's informative treatment of the technical differences—the definitions—of faience, frit, glaze, and glass. The complexity of these products recalls a comment made by Cyril Smith (1980: 27): “A glazed pot could provide the material for a three-year course in solid-state physics.” Pamela Vandiver's important work (1987) documenting the earliest vessels of clay in the Near East as built up “sequential slab construction” is reviewed. This is one of many instances where an understanding of the topic would be enhanced by the inclusion of a drawing. Given the wide scope of the book and the numerous crafts and techniques discussed, there is a paucity of illustration. Whether it is “sickles” or “ploughshares” of stone, “etched carnelian beads,” examples of design that distinguish the “intercultural style” from the “série récente,” “bimetalism” or the nature of “sequential slab construction,” the reader is left without visual aid as to what is meant. This would not necessarily hamper the specialist, for whom the book is largely written, but could frustrate the novice. In discussing “sequential slab construction” the author passes over two extraordinary aspects of this technique: the exceptionally long duration of the technique and its wide geographical distribution. This method of pottery production was first discovered by Vandiver (1986) in her study of the fifth and fourth millennium ceramics at Tepe Yahya. This led her to document the presence of “sequential slab construction” throughout the Near East, from the eighth to the end of the fourth millennium, at Ganj-i dareh, Seh Gabi, Hajji Firuz, Tepe Sabz, Tepe Yahya, and other sites in Iran; Jarmo, Sarab, and Hassuna, in Iraq; Jericho in the Levant; Mehrghar in Pakistan; and Merimde and Mostagedda in Egypt, to mention but a few. In the seventh millennium the technique was known from Mesopotamia to Baluchistan, indicating the existence of a shared technology that had diffused over an exceptionally large area. In fact, the presence of this technology remains one of the best demonstrations that these distant regions already shared a network of technological skills in the seventh millennium. The fact that this type had a wide distribution was recognized by Dyson (1966) almost thirty years ago and was described by him as the “soft ware horizon.”

In discussing the trade in Ubaid pottery between Mesopotamia and the Gulf, Moorey re-addresses the earlier work of Joan Oates et al. (Oates, Davidson, Kamilli, and McKerrel 1977). That work, as Moorey observes, indicated that the Ubaid pottery recovered from sites located along the northeastern shores of the Arabian Peninsula were exported from Mesopotamia. The statistical re-analysis of the earlier data base undertaken by Michael Roaf and Jane Galbraith (1994) substantially tempers the certainty of the earlier conclusions. At a later date there is little doubt that the Gulf was importing pottery from at least two regions, Mesopotamia and southeastern Iran. Moorey refers to pottery from the Sumerian workshops reaching the sites of the Umm an-Nar culture in the Gulf. To the Mesopotamian pottery exports mentioned by Moorey must be added those sent from southeastern Iran to the Gulf, the black-on-grey Emir wares, also recovered from Umm an-Nar sites in the Gulf (Wright 1989). Lastly, the recent argument for the domestic context of pottery production at Kurban Höyük and its surrounding neighborhood is noteworthy (see Wattenmaker 1994) and complements Moorey's views of the centralised modes of production.

The author's informative treatment of faience, glazes, Egyptian Blue, and glass suggests that certain technologies were differently distributed. This may result from either a limited number of skilled artisans capable of manufacturing the artifact and/or a limited number of elite parties able to afford the luxury. Throughout the third and second millennia the sites of the Iranian Plateau, the Gulf, Baluchistan, and central Asia are relatively devoid of the above materials. Clearly, there were centers involved in the production of these items that served the regional elite, and these were valued items of regional trade. The scatter of faience beads in the Gulf, as far south as Oman (de Cardi et al., 1979), appears in the first half of the third millennium and predates the later and more extensive Indus-Gulf trade. A
major program of analytical work on faience, in an effort to trace centers of production and networks of trade and exchange from Egypt and the Aegean to the Indus Valley, would prove a most rewarding exercise.

A central motivation for the production of glass was to produce an artifact that imitated a stone. Valued stones, such as lapis lazuli, turquoise, and carnelian, were imitated in glass and passed off as the more valuable items, as is a zircon for a diamond. Deceit and imitation were, in the past as today, stimuli for invention and discovery. Oppenheim (1970: 19–20) even found a Sumerian word, AN.ZAH, that refers to the glass imitation of a precious stone. However, as Moorey points out, philologists differ as to the meaning of this word.

Moorey discusses the recent discovery of cobalt blue glass ingots recovered by George Bass from the late fourteenth-century B.C. shipwreck at Ulu Burun in southern Turkey. The experimental laboratory work undertaken by Dayton (1993) involving the production of cobalt blue glass was not yet available to the author. Dayton suggests that the initial production of cobalt blue glass took place in Europe, in the region of the silver-cobalt-nickel-arsenide belt of the Erzgebirge in Saxony. Dayton has shown that the byproduct of the smelting of these ores was a cobalt blue glass and silver. He argues that the cobalt blue glass ingots recovered from the cargo of the Ulu Burun shipwreck were produced from the ores of the Erzgebirge. On this ship the presence of amber beads, silver bracelets, eighty-four oxhide copper ingots, as well as ingots of tin, suggest seafaring merchants—but from where and headed in which direction? Moorey cautiously avoids ascribing to them an ethnic identity. Dayton sees them as Mycenaean while others have suggested they were Canaanites. Nothing recovered from the ship contributes to this discussion.

The author writes: “If one thing emerges clearly from this preliminary survey, it is the prevailing confusion in the popular terminology for ancient glazed and related materials” (p. 168). There are a number of items referred to throughout the book that cross the boundaries of ready definition. An early example that might have found a place in this chapter, or perhaps in another chapter depending upon what one thinks they are, are the plaster beads from the Pre-Pottery Neolithic B cave of Nahal Ḥemar in Israel. Kingery writes: “... the most spectacular beads have a coating of emerald-green copper silicate monohydrate (CuSiO₃·H₂O) diopside crystals” (1988: 446), a coating placed over the heated asphalt covering of the bead. Is this a glaze? If not, what?

The author’s contributions to the study of metal artifacts and metallurgical technology are well known. Chapter five, “Metalworking” (pp. 216–302), reviews the repertory of objects, their uses, and the methods of production of the principal metals employed in Mesopotamia: copper, iron, lead, gold, silver, and tin. In discussing them, the author reviews each of the following topics: ancient textual references, modern regional sources, scientific source detection, and methods of refining and assaying. There is also a review of the inventory (with respect to ornaments, weapons, seals, tools, foundation deposits, and architectural decorations) and techniques of production (casting, filigree, cloisonné, wire production, joining, granulation). The author reproduces a number of select analyses of gold objects, including a number of artifacts from the royal cemetery at Ur, as well as the remarkable electroplated ring-ingots from the Chalcolithic Period of Palestine (ca. 4000–3500 b.c.). Similarly, he reproduces analyses of silver objects from the royal cemetery, Kish, Brak, Tell el-Der, and Telloh.

In reviewing the base metals, the author begins by eliminating the use of arsenic as a metal in Mesopotamia, while correctly emphasizing the early importance of the use of arsenical copper ores. A review of the textual evidence touches upon those regions from which Mesopotamia received copper ores: Dilmun (Bahrain and the eastern shores of the Persian Gulf), Magan (Oman), Meluhha (Baluchistan and the Indus Valley), and, later, Alašiya (Cyprus) and the Nairi-lands (eastern Anatolia). The author’s commendable review of both the technology of metal production and the repertory of metal objects, from the prehistoric period to the Achaemenid, ca. 300 B.C., is necessarily selective. Nevertheless, it offers an admirably coherent narrative of the practice and the development of the metallurgical craft. This picture is complemented by a review of the archaeological evidence for workshops and manufacturing equipment. Readers familiar with Moorey’s earlier study of this topic (1985) will recall the publication of an extensive list of metallurgical analyses. This useful guide is not republished here; the author inexplicably states that “analyses done before about 1980 now have little more than a historical value” (p. 276).

As an exemplary archaeologist, the author divides the use of iron into three stages: ca. 3000–1250 B.C.; ca. 1250–850 B.C.; ca. 850–350 B.C. The first is characterized by confronting technological concerns: the experimental use of iron, culminating with the perfecting of iron smelting. The second stage involves an increased knowledge and use of iron but knowledge that is differently distributed. Thus, before the eighth century, the Assyrians and Babylonians had little if any iron. Yet at Hasanlu in northwest Iran, there was a very considerable number of iron tools and weapons. The final stage, reached in the second half of the first millennium, involves the dissemination of the technological skills es-
sential for the production of iron and, perhaps more importantly, the transformation of economic dependency from bronze to iron.

The author concludes this chapter on metalworking with a consideration of tin. As is well known, the source of tin in the Near East is a much debated, and at times acrimonious, issue. Moorey reviews the archaeological evidence for the use of tin, the textual sources that refer to it, and the geological evidence for its presence or absence. His conclusions are as brief as they are sound: in the third millennium tin came from the east through Iran to Mesopotamia, Anatolia, and Syro-Palestine. Afghanistan is the likely source of this tin. Later texts from Hittite and Assyrian towns identify eastern Turkey as a source of tin. Recent research indicates that Anatolia may already have been an important tin source in the third-millennium. Reports of rich tin deposits and ancient mining operations south of Bursa in Turkey continue to be enthusiastically promoted (Yener and Vandiver 1993) and vigorously denied (Muhly 1990).

Discussion. Throughout Mesopotamia, Anatolia, the Iranian Plateau, the Indus Valley, and central Asia, metallurgical industries were based on copper. Arsenical ores were exploited early. The alloying of copper with tin was principally a late third-millennium innovation. Gold and silver were early items of luxury. In a word, the technological base was relatively uniform over a very extensive area. What differed were the styles of objects produced, the distribution of resources, and the manner by which distinctive regions procured their metal. Metal as stored wealth—for such it was, whether copper or gold—traveled as tribute, booty, taxes, gifts, and trade. The shifting patterns by which a site or region obtained its metal depended upon many factors: chief among them were political conditions, resource availability, technological developments, the availability of craftsmen, and social alliances. In discussing the role of each of these, the following commentary builds upon Moorey’s observations.

Many scholars have pointed out that both the textual and archaeological evidence indicates that, throughout the second half of the third millennium, Mesopotamian metal was largely imported by ship from the Gulf; whereas in earlier periods metal came from highland Iran and Syro-Anatolian sources (D. Potts 1990: 113–25). Table 1 shows the geographical sources from which

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Table 1
Origins of Third Millennium Metals According to Cuneiform Sources

<table>
<thead>
<tr>
<th>ECONOMIC TEXTS</th>
<th>ROYAL TEXTS</th>
<th>LITERARY TEXTS</th>
<th>LEXICAL TEXTS</th>
<th>ADMINISTRATIVE TEXTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>Dilmun</td>
<td>Kimaš</td>
<td>Dilmun</td>
<td>Diľmun</td>
</tr>
<tr>
<td></td>
<td>Magan</td>
<td>Dilmun</td>
<td>Magan</td>
<td>[Za]rḫa</td>
</tr>
<tr>
<td>Meluḫḫa</td>
<td>Magan</td>
<td>Meluḫḫa</td>
<td>Meluḫḫa</td>
<td>Šarsîr</td>
</tr>
<tr>
<td>Tin</td>
<td>Simaški/</td>
<td>Aratta</td>
<td>Diľmun</td>
<td>Anšan</td>
</tr>
<tr>
<td></td>
<td>Zabšali</td>
<td>(unspecified)</td>
<td></td>
<td>Dilmun?</td>
</tr>
<tr>
<td>Meluḫḫa</td>
<td>Ebîḫ (Hamrîn)</td>
<td>(unspecified)</td>
<td></td>
<td>BAR-gungunnu</td>
</tr>
<tr>
<td>Silver</td>
<td>Simaški</td>
<td>Dilmun</td>
<td>Šarsîr</td>
<td>Der</td>
</tr>
<tr>
<td></td>
<td>[Mar]daman</td>
<td>Meluḫḫa</td>
<td>Šarsîr</td>
<td>Urúa</td>
</tr>
<tr>
<td></td>
<td>Ḫa[bara]</td>
<td>Aratta</td>
<td>Išaniktî</td>
<td>Elam/Susa</td>
</tr>
<tr>
<td>Silver Mtn.</td>
<td>“15 cities”</td>
<td>(unspecified)</td>
<td>Kusu</td>
<td></td>
</tr>
<tr>
<td>Gold</td>
<td>Dilmun</td>
<td>Elam</td>
<td>(Ḫ)arali</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Magan</td>
<td>Pararḫum</td>
<td>Hûblîl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mt. Ḥaḫḫum</td>
<td>Meluḫḫa</td>
<td>Zaršašum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meluḫḫa</td>
<td>(unspecified)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simaški (booty)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Mar]daman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adamdun</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Awan (booty)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ḫa[bara]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a Compiled from T. Potts (for complete references, see T. Potts 1994: 148, 156, 162, 165).*
copper, tin, silver, and gold are said to come according to third-millennium Mesopotamian texts.

Several interesting features are apparent in this compilation: (a) the consistent mention of Dilmun (the islands in the Persian Gulf), Magan (Oman), and Meluhha (the Indus Valley) in virtually all of the texts as regions from which all types of metal were obtained; (b) the complete absence of identifiable Syro-Anatolian sources for any of the metals; (c) the concentration of texts, not unexpectedly given their biases, that detail the sources of gold for royal use; (d) the relatively small number of resource areas mentioned; and (e) while the precise location of the vast majority of metal sources remain unknown to us, those mentioned, Elam, Aratta, and Maršaši/Parâšsum, Susa-Awan-Adamdun, Zabšali-Simaški, and Ḥarali, are geographical regions either known to be, or suspected of being, to the east of Mesopotamia, on the greater Iranian Plateau.

Receiving far less comment is the difference in metal use and style that characterized Mesopotamian, Iranian, and central Asian metallurgy in the second half of the third millennium. In Iran and in central Asia there are far more extensive deposits of metal artifacts (axes, decorative items, and vessels) placed in graves than in Mesopotamia. The Iranian and central Asian bronzes evince a predilection for elaborate zoomorphic reliefs placed on the butts of axes, on the heads of pins, and on vessels (for extensive illustrations of the above, see Sarianidi 1986 and Ligabue and Salvatori 1989). Mesopotamian objects of these types generally lack the same degree of elaboration.

One can account for the differences in the style of metal production and the shifting patterns of trade by detailing the political relationships that characterized the lowlands (Mesopotamia) and the highlands (Iran) throughout the second half of the third millennium. From at least the beginning of the Akkadian Dynasty to the end of the Ur III Period, political interaction between these regions was characterized by constant conflict, including war. Timothy Potts (1994: 174) has recently suggested that there were no political boundaries separating Susa from Mesopotamia, since Mesopotamia controlled Susa throughout most of the Akkadian and Ur III periods. He further contends that the presence of central Asian metal types (and other central Asian artifacts) at Susa, and their conspicuous absence further to the west in Sumer, can be accounted for by different trading patterns. But it is more plausible that it was precisely political factors that brought Bactrian objects to Susa during the early Ur III Period. It was at this time that Puzur-Inšušinak was able to establish a period of Susa independence, to conquer the kingdom of Simaški to the east, and to extend his influence eastward to distant Shahdad, where a characteristic “linear Elamite” inscription was discovered in tombs that contained an extensive inventory of central Asian bronzes and other artifacts (Hiebert and Lamberg-Karloffsky 1992). The “linear Elamite” script is directly associated with the Elamite revival initiated by Puzur-Inšušinak. It is not unlikely that the central Asian artifacts at Susa, so ably documented by Pierre Amiet (1986; see also Tallon 1987), date to the period of Puzur-Inšušinak, when Susa was free of Mesopotamian dominance, and Elam looked to the east. It is not unlikely that Puzur-Inšušinak, like earlier Akkad and later Ur III kings, maintained a diplomatic alliance with Maršaši, a kingdom possibly located in the vicinity of Shahdad in southeastern Iran (Steinkeller 1982).

There was no need for Moorey to dwell on the impact of central Asian artifacts on Mesopotamia, for they are all but absent there save for a compartmented stamp seal recovered from Mari, a shaft-hole axe from Ur, and a handful of more generalized metal objects, as likely local products as imports from Iran or central Asia (for a discussion of these see T. Potts 1994: 168–76; and Amiet 1986: 141–60). The arrival of central Asian objects on the Iranian plateau, the Gulf, and the Indus Valley is an entirely different matter. Central Asian artifacts of metal, stone, and ceramic can be documented from Susa to Shahdad and from Hissar to Tepe Yahya. The mechanism by which they arrived at their destinations could have included trade or exchange, tribute or booty, or the movement of populations. There can be little doubt that exotic artifacts, recovered from distant places and singular in kind, like the ivory comb from Tell Abraq (D. Potts 1993) or the central Asian seal from Harappa (Vats 1974: pl. xcI, no. 255) were items of trade and/or exchange. On the other hand, the central Asian artifacts recovered from the tombs of Shahdad, Khinaman, Sibri, and other sites suggest the presence of peoples from central Asia in a foreign land. It is unlikely that booty and/or tribute would be disposed of in a tomb: one of the principal functions of this category of goods is display and public propaganda. The widespread occurrence of a variety of central Asian commodities recovered from individual tombs at Shahdad, Khinaman, Sibri, and Khurab, as well as numerous artifacts on such sites as Susa and Hissar, suggest both an extensive trade as well as the presence of central Asians on the Iranian plateau (Hiebert and Lamberg-Karloffsky 1992).

It is of interest that there is an asymmetry in the nature of this interaction. There is an abundance of central Asian artifacts scattered all over the Iranian plateau in many contexts; yet, there is hardly a single identifiable artifact from the Iranian plateau in central Asia.
This is parallel to the interaction between Mesopotamia and the Indus Valley. A wide variety of Indus artifacts is found in Mesopotamia; the texts even indicate the presence of a Meluḫšan colony in Sumer (Parpola, Parpola, and Brunswig 1977). Yet, there is not a single object of uncontested Mesopotamian origin recovered from the Indus Valley. One the other hand, sites in the Gulf contain abundant materials from the Indus Valley, Mesopotamia, the Iranian Plateau, and an ever increasing scatter of central Asian artifacts. We can observe the archaeological pattern, but we are still far from understanding the political, economic, and social foundations behind such patterns.

The sixth and final chapter (pp. 303–62) is a welcome addition to the literature. It deals with “The Building Crafts,” a subject much ignored by archaeologists following their exposure of architecture. The author begins with the fundamental unit of architecture, the mud-brick. We know virtually nothing of the kilns constructed for brick manufacture in Mesopotamia. Nevertheless, the emergence of the brick, its firing in kilns, its standardized dimensions, and its glazing are the principal milestones in the history of the brick. Each of these stages is documented in the archaeological record: sun-dried bricks are evident in the ninth-millennium community of Nemrik, fifty-five kilometers northwest of Mosul in Iraq; fired bricks are reported, although by no means common, at a number of Ubaid sites (e.g., Eridu and Gawra); standardized dimensions are introduced in the manufacture of bricks in the Samarra culture (Tell es-Sawaat, Baghouz) and more commonly utilized throughout the Ubaid Period; and the production of glazed brick can be documented by the mid-second millennium on a number of sites, such as Nuzi, Tell Rimaḫ, Nineveh, and Tchoga Zanbil.

The author warns us that “few aspects of the technology of the ancient Near East have generated more false assumptions and confusions than the production of glazed materials” (p. 312). This was readily apparent in the earlier chapter on glass, and the author sets us aright with reference to the production of glazed bricks and their colorants. As noted above, the physico-chemical analysis of glazed brick was already undertaken in the middle of the nineteenth century in connection with the excavations of A. H. Layard (1853). Unfortunately, the analyses erroneously reported that the glazes of Neo-Babylonian/Achaemenid (?) brick recovered from Borsippa were tin glazes.

Wall paintings are treated to a historical survey with an emphasis on pigments and techniques rather than upon style, design, and iconography. Among a wide sampling of wall paintings discussed are those from Çatal Hüyük, Tell Uqair, Mari, Nuzi, Aqar Quf, and paints placed over Assyrian and Achaemenid sculpture.

The role of plasters, mortar, and bitumen are reviewed prior to the final sections that offer historical surveys for the use of stone, wood, and reed in construction. Of special merit is the attempt to identify the specific types of stone, wood, and reed utilized, by examining both the archaeological and textual evidence. The recent attention given to identifying charcoal, wood, and the contents of dung adds further to our understanding of the resources exploited (Miller 1990: 70–79). The reader may be surprised by the great variety in the types of wood employed in Mesopotamian construction. No doubt much of this wood was of local production (see Steinkeller 1987) as well as imported from a number of more distant places, including Dilmun, Magan and Meluḫša (Ratnagar 1981: 78–156).

Discussion. In recent years archaeologists have been much concerned with the origins of the state and its associated phenomenon, the emergence of settlement and bureaucratic hierarchy. The terra-cotta cone, a solid clay peg inserted into the plaster face of mud-brick walls and whose colored or plain ends formed geometric patterns, has played a special role in these theoretical discussions. Terra-cotta cones are taken to be diagnostic of the Uruk Period, ca. 3500 B.C., when they were used to decorate the walls and half-columns of temples and when the process of state formation is believed to have taken place. When such cones were found in surface surveys in Mesopotamia and Susiana, they were believed to date the occupation of the settlement, at least in part, to the Uruk Period; to indicate the presence of “administrative outposts of larger centers” (Johnson 1973: 105); and to suggest the presence of “architectural complexes” which are “usually identified as temples” (Adams 1981: 77). Such sweeping generalizations are tempered by the recognition that there is a far greater indeterminacy in the role of the terra-cotta cone; they have, in fact, been recovered from good Early Dynastic contexts at Abu Salabikh (Postgate 1984: 108), while at Hassek Hüyük they were inserted into a small portable shrine within a small community containing a half dozen houses (Behm-Blancke 1989)—hardly an “administrative outpost.” Terra-cotta cones are both more and less significant than indicated by theories pertaining to state and bureaucratic origins. This recalls a statement recently made by the geneticist Richard Lewontin: “If scientific advance really came from theorizing, natural scientists would have long ago wrapped up their affairs and gone on to more interesting matters” (Lewontin 1995: 69)—and so would archaeologists!
This book will raise the consciousness of archaeologists in several respects. It will raise the standard of archaeological reporting by requiring analyses rather than cavalierly identifying a plaster as lime or gypsum, or loosely considering frit, faience, and glaze as variations on a single theme, or believing all greenish stone to be turquoise. We are indebted to the author for reminding us that precision in vocabulary and definition is central to a consistent understanding of material culture. Anyone who has carefully read this book will be impressed by the need for more analytical work in defining the nature of the material recovered from excavation. The book will endure for decades as an authoritative and comprehensive study of the major industries represented in the archaeological record. One is reminded, however, of those industries that do not survive an archaeological context and thus lack extended commentary: textile manufacture, weaving and dying, leather production, woodworking, basketry and matting, musical instruments, and transport vehicles (e.g., wagons and boats), to name but a few of the more obvious industries and technologies of which we know too little.

I end with a consideration of the quotation by Sir Thomas Browne with which this review began. Roger Moorey has dealt with the "created world" recovered by the archaeologists and in so doing has offered more than a parenthesis, an exclamation point at least—one that will endure for decades. It is to be hoped that Moorey will put out a supplement to this work every ten years, and that he will produce at least ten such supplements! It will give all of us interested in the ancient Near East, technology, and society something to look forward to and learn from while helping to sustain the long life of a scholar of great erudition and creativity.

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