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Anticipating the Silk Road; Some Thoughts on the Wool-Murex Connection in Tyre

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Lloyd Jensen concluded his 1963 essay on the “Royal Purple of Tyre” with the comment that a “bad-mannered sea snail could influence history out of all proportion to its lowly existence” (1963, p.118). The snail in question, the marine murex, is a carnivorous predator on other mollusks, drilling holes in their shells, secreting toxins to paralyze their muscles, then feeding on them. It is also the source of an exceptionally precious purple-to-crimson dyestuff, first extracted and processed in the Late Bronze Age (1550 to 1200 BC), most notably at Tyre and other cities of the Levantine coast. The inhabitants of these cities called themselves Canaanites but were renamed “Phoenicians” by the Greeks (perhaps from the Greek word for purple or red; see Aubet 1993, p. 7), and Punics by the Romans. Of central concern in what follows is the contribution of murex-dyed cloth to the Canaanites/Phoenicians becoming significant players in the “evolutionary action” (Kohl 2007, p. 258-59) of the ancient Mediterranean.

To approach this issue we need to take a leap of faith that textile rivalries influenced the interactions among centers of power in the late Bronze Age as they did in later centuries -- even though material evidence is lacking and textual evidence slim. Assuming competition among cloth traditions, it is relevant that, like most dyestuffs, murex purple adheres to protein more readily than to cellulose, and was therefore perfected in relation to wool, not linen – wool and linen being the only serious fiber alternatives for the Mediterranean and Middle East until Chinese silks and tropical cottons made their way west, and north, to join the fray. This being the case, it seems possible that the discovery of a fast and resonant source of red-to-purple dye catapulted some woolen textiles unto the same plain as the finest Egyptian linens, a category of luxury that, like gold and silver and precious stones, served to empower elites. For linen, the top of the line was characterized not only by fineness of thread and weave, but also by the quality of bleaching to a purer and purer white. For wool, fineness and redolent colors defined the apex of luxury -- above all, shades between purple and red. I will consider this contrast in analyzing how it was that the Canaanite cities of the late Bronze Age, although subjected to the hegemony of the land-based empires that surrounded them – Hatti, Babylonia, Assyria and, above all, Egypt – were able to launch an expansion of their own.

First, the Bad-Mannered Snails

According to Pliny’s first century AD *Natural History* (9.62.135), to dye 1000 pounds of wool, one needed perhaps 300 pounds of dyestuff, extracted from one of three varieties of the murex snail. Coastal residents gathered up thousands of such snails in the spring using baited wicker traps and, while the animals were still alive, laboriously removed a sack-like gland from the mantle cavity of the larger species while crushing the smaller ones -- in both cases to obtain the leuco-base of the dye. This, together with the crushed chromogenic tissues, was mixed with seawater, allowed to stand for three days, then simmered for nine. Yarns or lengths of cloth submerged in the resulting liquid – a clear, if greenish and foul smelling, bath – changed color upon exposure to light, transforming from green to

blue to purple to crimson red. The shade, Pliny suggested, varied with the species of shell, the segment of the gland extracted, and the length of time outdoors, not to mention the amount of dye in proportion to fabric (Cooksey and Sinclair 2005; Jensen 1963, pp. 108-110; Pliny; Steiglitz 1994, pp. 46-48).

Modern chemistry confirms Pliny's account. One test, set up to determine if tin were not also relevant, came up negative; other tests hypothesizing a role for sulphur, and for specially constructed fermentation vats, were likewise unconvincing (Koren 2005, pp. 139-40). Zvi C. Koren's "First Optimal All-Murex (experiment) in a Millennium and a Half," published in 2005, concludes that, just as in Pliny's recipe, no fancy equipment, mordants, or oxidizing substances were necessary – only a clay or lead vessel, the snails captured near the dyeing site, heat, and a natural alkaline like sodium carbonate, plant or wood ash, or lime. The salt water of the sea and the oxygen of the air sufficed to induce the required fermentative reduction and oxidation (Ibid, pp. 145-46). With regard to variations in hue and saturation Koren emphasizes a variable that the ancients may have taken for granted: the fiber to which the dyestuff is applied. Only wool, protein-rich, completely absorbed the color, leaving no residue on the container walls (Ibid, p. 143).

The Phoenicians

Thanks to the middens of snail shells deposited by the murex dyeing process, it is possible to unravel how this industry began, who benefited from locational advantages leading to short term monopolies, and who was left out. Most scholars credit the Late Bronze Age Canaanites renamed Phoenicians with having founded the first serious murex dyeworks, but there are competing hypotheses, some of which dovetail with the polemics surrounding Martin Bernal's (1987) *Black Athena*. Stieglitz, for example, wants to privilege early Minoan fishermen, whose pottery fragments and murex remains suggest a royal purple industry on Crete before 1750 BC (Stieglitz 1994, p. 49; see also Reinhold 1970, pp. 12-13; Reese 2007, 2010). He acknowledges, however, that murex snails are edible. Found in small quantities in the earliest Minoan sites, they could be "associated with the diet and not with the dye" (Ibid). In *Prehistoric Textiles* Barber (1991, pp. 228-29) proposes as the first murex dyers *both* the Minoans in East Crete and the Western Semites of the Levantine Coast, circa 1500 BC. But Barber adds that the archaeology of Palestine shows the Canaanites already dyeing cloth with murex in the *first* half of the second millennium BC. Barber is, moreover, adamant that smashed shells indicate dye extraction; people would not have gone to such lengths merely to eat a snail (1991, p. 228).

Attempts to link murex dyeing to Bronze Age Egypt -- one of them the work of an Austrian Egyptologist so enthused by purple he sought to establish a discipline of *Pourprology* (see Reinhold 1970, pp. 13-14 and n. 2, 3) -- have been decisively discredited. For although Canaanites are depicted in purple robes in Egyptian wall paintings dating to the 15th century BC, murex did not exist in the civilizational centers of the Nile until Ptolemaic times. The vast inventory of temple gifts accumulated by Ramesses III (1186 to 1155 BC) is lacking in the color, undoubtedly because linen, the favorite cloth of the Egyptians, was unsuited for purple dyeing (Ibid; Barber 1991: p. 15, p. 210). As Herbert Volger writes in an article on "the craft of dyeing in Ancient Egypt," because "the technique of mordanting cellulose fibers with metallic salts was still unknown ... the most praised (dyestuff) in ancient times, the snail's purple, was absent." Tellingly, the opening to color of the Greek and Roman period was associated with "a considerable change of fibers ... from linen to wool" (Volger 1982, pp. 159-62; see also Barber 1991, pp. 224-27).

Nor was this a shift easily accommodated in Egypt, notwithstanding the many advantages of wool. Whereas flax requires fertile, well-watered soils, and hence competes with food crops, sheep can exploit marginal grasslands that are dry for much of the year. Moreover, while the grass grows itself, flax depends on plowing, sowing, weeding, pulling and retting. Overall, it is also more labor intensive to obtain linen from flax than wool from sheep (even before the Iron Age invention of shears, and even though woolen cloth has to be fulled). Alas, the vast steppe lands of Mesopotamia and Western Asia have no counterpart in Egypt, where the fringe of alluvial cultivation gives way to desert (see Liverani 1997, pp. 536-37). Conversely, although flax once grew all over, to be superseded by sheep, the Nile Valley with its deep loose soils and rhythms of irrigation offered the best conditions (Van De Mieroop 2007, pp. 157-58). Appropriately, Egyptians embraced white – the more carefully bleached, starched and pleated, the better. Occasionally clothes, like sails, were painted but the pigments were fugitive and had to be redone. Color emanated rather from the glorious gold, cloisonné, lapis, and semi-precious stones of beaded collars and jewelry.

Which returns us to the Canaanites. Of all the snail shell middens, the most impressive belonged to Sidon, Tyre, and other cities of the Levantine Coast. Besides their proximity to both shallow and deep-water varieties of murex, these cities, with their sheltered harbors (Tyre was built on a chain of rocks just off the coast), were ideally placed for participation in the expanding maritime circuits of the Aegean and eventually the Western Mediterranean. None of them in fact became a territorial state. Rather, they evolved as competing “city-state” beachheads. Referred to as “kingdoms” and ruled by “kings,” they also nurtured the ambitions of explorers, colonizers, shipbuilders, fabulously wealthy merchants, and probably also pirates and privateers (see Bikai 1994; Sherratt 1998).

Such a seaward and commercial orientation was in part dictated by the narrowness of the coast, which, although fertile, and suitable for irrigation, was circumscribed by mountains ascending within sixty miles or less of the shore, discouraging overland expansion. Nevertheless, the Canaanite kingdoms made excellent use of the timber resources of their hinterland, building ships of the famed Lebanese cedars and exporting timbers to the wood-deprived super-powers, Egypt in particular (Aubert 1993, p. 16; Bikai 1994, p. 33; Van De Mieroop 2007: p. 16). Most important, these coastal cities were termini for an enormous volume of wool, plucked from flocks in Syria’s upland pastures, sorted (by color, among other things, white fleece being selected for dyeing), cleaned and moved southward through the valley of the Orontes River (see Sherratt 1983, pp. 99-100). Just where along this itinerary wool was spun into yarn, and yarn woven into cloth, is unclear; thousands of rural households must have been involved. It is well established, however, that from the late second millennium BC, the inhabitants of Tyre, Sidon, and Byblos (the principle port for trade with Egypt) applied their skills as accomplished murex dyers to both yarn and cloth, launching a novel textile (Barber 1991, pp. 229-30; Van De Mieroop 2007, pp. 161-63).

In addition to their technical and manufacturing achievements in purple dyeing, the citizens of Tyre and other Levantine cities are renown for metallurgy and shipbuilding, for well-crafted furniture, and for maritime exploits in oared triremes, some designed for commerce, others for war. Most remarkable was their westward-reaching network of colonial outposts, spawned after 1100 BC in coastal sites with favorable harbors and access to strategic resources, above all metals and murex. Cadiz in Spain, Valletta in Malta, Bizerta in Tunisia, Cagliari in Sardinia, and Palermo and Motya in Sicily are famed Phoenician colonies, although none became as large and important as Carthage, founded near the Tunisian coast in 814 BC. In the 7th and 6th centuries BC, Phoenician ships breached the Straits of

Gibraltar, arriving on the shores of Morocco, the Canaries, and, some speculate, possibly Portugal and possibly even Cornwall (Aubet 1993; Barber 1991, pp. 229-30; Harden 1963; Waldbaum 1978).

Eventually the Phoenicians lost altitude. In 574 BC, Nebuchadnezzar destroyed Tyre from a reborn Babylonia while a century later, Dionysius of Syracuse adjusted the mole joining Motya to Sicily so as to drive his invention, the catapult, across it, initiating hostilities. In 332 BC, Tyre was taken again, by Alexander, who constructed a causeway from mainland to island to facilitate the invasion. Most dramatically, between 202 and 146 BC, the Romans conquered, then obliterated Carthage -- payback for the Phoenician General Hannibal's having moved tank-like elephants over the Alps from Spain in the preceding (218 BC) Punic War. Eastern Phoenicia had already become Greek through Alexander's fourth century conquests; now Western Phoenicia became Roman, and the Phoenicians' accomplishments -- save for the alphabet, which, as traders, they had perfected -- fell into a kind of oblivion. Tellingly, Greek texts represented this Levantine people as pirates and cunning navigators who corrupted others into lives of extravagance and greed. As Aubet notes (1993, p. 3), the Phoenicians' impressive integration of Iberia and North Africa into the Mediterranean world is hardly ever acknowledged. Oddly, neither their champion Bernal nor his critics (see Lefkowitz and Rogers 1996) acknowledge the textile tradition which, as suggested below, was a well-spring of their dynamism.

Textile Rivalries

Bronze Age elites coveted the most highly reputed items of cloth and clothing, in part to adorn themselves and their surroundings, in part to store as treasure, and in part for grand distributions aimed at winning allies, sealing treaties, building clienteles, and embarrassing rivals. As such they call to mind John Murra's brilliant 1962 analysis of cloth and its functions in the Inka state. In addition to marveling at the vast surpluses of peasant cloth mobilized through the Inka tribute system, Murra explored the political uses of exquisitely fine tapestries, woven at court by captive women. Strong cotton warps acquired through exchanges with the coast were crossed with softer alpaca wefts obtained from the highlands and dyed in brilliant colors including red. Kings deployed these sumptuary cloths as diplomatic instruments in newly incorporated peripheries and forbid their wear or display in the absence of royal sanction. An "initial pump primer of dependence," suggests Murra, cloth of this extraordinary sort was hoarded by the lords of the provinces, symbolizing at once their obligations to Cuzco and Cuzco's bestowal of citizenship in return.

Which raises the question what makes a textile so extraordinary as to be an accessory to power? For the Eastern Mediterranean in the Bronze Age, two modalities vied for high value attention: chromatically exciting woolens, and linens of the purest white. Among the woolens, hues from red to purple stood out -- a very early manifestation of the desire for red that would characterize textile history for centuries to come (see Barber 1991, pp. 224-25). Consider, for example, the lengths to which later cloth artisans would go in order to achieve this color. During the Middle Ages, West African weavers enlivened their narrow-strip cotton textiles with magenta ravelings from Mediterranean silks, imported through the trans-Saharan caravan trade. In the 19th century, Pueblo producers of cotton blankets, Maori producers of linen, and Mayan producers of cotton huipil blouses enthusiastically embraced red-dyed woolen yarns supplied by European colonizers, enlarging the size and complexity of the embroidered or decorated areas of their respective cloths (Schneider 1987). The courtly Inka tapestries referenced above added wefts of alpaca to the much stronger cotton warps precisely to be able to include a spectacular red derived from cochineal, the New World's murex. Based on a survey of 17th century colonial documents,

Elena Phipps found red (blood red, crimson, and dark pink) to be the most prominent color in descriptions of Inka royal garments, “embodying nobility and religious significance” (2005, pp. 54-56).

It is possible that when a bad-mannered sea mollusk became joined to wool in the second millennium BC, a kind of magic was unleashed, enabling the transformation of an ordinary textile into something integral to the power and ambitions of merchants, warriors, kings, emperors, and gods. If so, an effect may have been to leverage the zones of wool in relation to the zones of linen. The greatest linen zone did not, of course, stand still. Under the New Kingdom, Egyptians increased their weaving efficiency by adopting upright looms and added a second layer to their pleated clothing. White continued to be their sartorial trademark -- color and pattern having been, to quote Egyptologist Adolf Erman, “excluded from finer stuffs.” Cloth makers boiled stalks of flax, beat them with hammers, combed out the impurities, and endlessly bleached and washed the woven product. All their skills, Erman writes, were “lavished ... to prepare the finest and whitest linen” – so much so that the limbs of men of rank “could be seen gleaming through” their garments (Erman 1971, pp. 448-50).

Nevertheless, Egyptians doing business in Byblos, Tyre, Sidon, and Ugarit were encountering an alternative: glorious purple-dyed wool – the “merchandise par excellence” of these cities’ trading house magnates (Mazar 1992; Moorey 1975, p. 54). Wall paintings in imperial Thebes depicted Phoenicians not as “barbarians” – a category reserved for the less urbanized Libyans and Nubians – but as “civilized” persons bedecked in narrow, richly embroidered robes of alternating blue and crimson coloration. Tyre, although part of Egypt’s Syro-Palestine province, and an exporter of enormous quantities of an un-elaborated primary product – timber – to Egypt, appears in Egyptian documents of the late Bronze Age as a monarchy of prestige and political influence, worthy of attention (Aubet 1993, p. 20). I suggest that textile rivalries mattered to this success. Thanks to the molecular binding of wool with the glandular excretions of a “bad-mannered sea snail,” the cloth tradition of Tyre was as astonishing as the Egyptians’ own – a reality that may have compromised Egypt’s ability to inspire awe and create dependent followings through the flaunting, bestowal, and gifting of precious cloth.

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