Mediterranean Containerization

by Andrew Bevan

The Mediterranean has long played host to unusually intense patterns of maritime-led exchange, involving both products made beyond the basin and local, culturally distinctive goods such as oils and wines that continue to be well-known markers of the region's economies and lifestyles today. Protecting these commodities, and sometimes highly emblematic of them, have been specialized physical packages, of which clay amphoras are perhaps the most well-known early examples. In contrast, modern steel shipping containers, occurring in unusual densities at the Mediterranean pinch points of globalized trade, represent only a latest phase of this cultural tradition. Mediterranean containers therefore have a continuous history spanning at least 5,000 years, one that, worldwide, offers a uniquely long, continuous, and detailed record of economic specialization. It is remarkable, then, that there has been as yet so little consideration of this tradition over its full time span. This paper makes the case for developing a more strongly longitudinal, comparative, and evolutionary perspective on these highly iconic material forms.

The Mediterranean basin offers perhaps our oldest, and certainly our most detailed, long-term record of trade in bulk and standardized goods. Associated with these exchanges from the outset have been some highly distinctive physical media for maritime shipping and terrestrial carriage: animal-skin bags, pottery jars, wooden barrels, glass bottles, woven sacks, wooden crates, and, more recently, cardboard boxes, tin cans, plastic packaging, wooden pallets, and steel shipping containers. In particular, it is the latter maritime suprapackage that has been lionized for its role in the process of twentieth-century globalization and, in the Mediterranean basin, for revitalizing an otherwise decaying economic theater. Yet, despite the popularity of *longue durée* studies in the Mediterranean, an exploding literature on the archaeology of Mediterranean amphoras, and the basin's role as a conduit for global shipping today, very little attempt has been made to consider this latest episode of containerized culture within a much longer tradition. This paper therefore highlights the Mediterranean as a uniquely privileged case study of such transport packaging behavior and, in the absence of any dedicated treatment to date, offers a detailed review of a 5,000-year container tradition (from the end of the fourth millennium BC to the present day). It also takes this opportunity to argue for a more strongly comparative and evolutionary assessment of transport containers, as carefully designed, mass-produced, widely disseminated, and highly iconic objects.

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Commodities and Context

Significant challenges face any such attempt to develop an ultralongitudinal perspective on Mediterranean container culture. For example, the sheer mass of Mediterranean evidence is daunting, as is its unevenness over time and space. There are difficulties associated with reconciling artifacts, documentary sources, and representational data and with sustaining meaningful longitudinal comparisons across seismic shifts in terrestrial and maritime travel technology (e.g., from sea travel by canoe to the early use of sailboats to more advanced sailing vessels—and ultimately to fossil fuel–driven ships). There are further risks associated with presuming that the Mediterranean as a whole will constitute a consistently meaningful unit of cultural analysis, given ample evidence that it resists this kind of easy lumping (Albera 2006; Chambers 2008; de Pina-Cabral 1989; Herzfeld 1980; Morris 2003; Purcell 2003). Even so, Mediterranean transport containers represent one of the most long-lasting and well-explored proxies for human economic interaction anywhere in the world, and, put bluntly, we should not be passing up opportunities to exploit its uniqueness as a long-term record.

In what follows, I focus on the packages used to transport well-known Mediterranean commodities with, for reasons that will become clear below, an overarching interest in liquid products such as oil and wine. By commodities, I mean those mass-produced, highly substitutable goods whose standardized qualities, forms, and packaging are meant to streamline commercial or highly bureaucratized transactions, often over long distances and across political borders. Commodities are thus cultural products that occupy one end of a spectrum of fungibility and alienability (e.g., Appadurai 1986; Fanselow 1990; Kopytoff 1986), and physical packaging offers an im-

 0011-3204/2014/5504-0002$10.00. DOI: 10.1086/677034

portant way to push such products further in either direction along this spectrum. For example, standardizing the appearance of packaged goods typically makes them more substitutable for one another but also offers a new medium for differentiating them (Bevan 2010; Foster 2007; Wengrow 2008). By transport containers, I further mean those specialized forms of packaging used to carry goods over considerable distances, typically in situations where ease of handling, protection of contents, and the transfer of logistical or marketing information are all major concerns and hence have had noticeable impacts on container shape, size, and composition (Lockhart 1997; Twede 2002).

Over at least the last five millennia, certain commodities have been defining features of Mediterranean economies and have moved around all or part of the region in comparatively large quantities. Olive oil and wine are perhaps the most famous, but to these we can add metals, cereals, salt, textiles, stone, fish products or indeed certain classes of people (tourists, slaves, economic migrants). The massive advantages of maritime travel, in terms of speed and cargo capacity, have long knitted together otherwise quite distant Mediterranean coasts and have encouraged unusual patterns of economic codependence (e.g., Braudel 1972; Broodbank 2013; Horden and Purcell 2000), as well as wider flows into, out of, or through the basin. Even a cursory glance at the physical appearance of Mediterranean trade goods, or the way they are treated in documentary sources, also makes it clear that, for thousands of years, they have been standardized, marked and packaged in ways that adapt them for long-range transactions and position them for certain kinds of producer, distributor and consumer.

How unusual is this Mediterranean transport container phenomenon compared to other parts of the world? There certainly are substantial and roughly contemporary Mesopotamian exchanges, such as those third-millennium BC products that flowed from lowland Mesopotamia through the gulf to as far afield as the Indus valley (and in reverse; Potts 1993). However, not only is the long-term history of this trade far less thoroughly explored at present, but on current evidence at least, it did not involve the same scale of package specialization and freight handling (for an exception, see Tomber 2007). Further east still, complex societies in India and China made substantial use of river-based transport, and engaged episodically but sometimes intensively in long-distance maritime travel. However, on present evidence at least, there is no salient tradition of specialized transport containers in these regions until perhaps the first millennium AD (see, e.g., Flecker 2010). Likewise, in the New World, despite plenty of long-distance trade, there is little sign that bulk commodity exchange occurred on the same scale, from so early on, or with the same investment in semistandardized containers (e.g., Yaeger 2010), these being features that become more visible after European contact. Ultimately, I will argue below that it was the bulk shipment of refined liquid products, especially wines and oils, that drove forward the early development of specialized containers in the Mediterranean, and in the absence of such liquid incentives, we do not find the same precocious tradition elsewhere.

Container Histories

3300–2000 BC

The earliest worldwide evidence for specialized transport containers can be linked to the appearance of urbanized, agrarian, highly bureaucratic societies in Mesopotamia and Egypt in the late fourth and early third millennia BC (fig. 1). It is no accident that in both regions, more advanced use of writing, converging systems of weighing and measuring, elaborate sealing practices, and semistandardized, added-value commodities (ingots of refined metal, bolts of textile, jars of oil, wine, and beer, to name but a few) emerge at roughly the same time. The appearance of plainer, similarly sized containers was therefore part of a wider mobilization of people and things in abstract bulk, offset as David Wengrow has argued (2008), by marking practices that facilitated accounting and quality assurance, but also reinvested packaged products with new charisma through the repetitive imagery of seals.

Although long distance trade is an important feature of earlier phases, and other episodes, of human history, it does not always occur in sufficient quantities or with sufficient regularity to require the development of specialized, mass-produced transport containers. Focusing on the Mediterranean evidence, there are several intriguing hints at early experimentation and false starts with developing specialist liquid transport vessels. Perhaps the most precocious so far is an assemblage of over a hundred large, handled "torpedo" jars used to carry oil to the Chalcolithic site of Gilat in the Negev (but with such jars remarkably rare elsewhere; Commenge, Levy, and Kansa 2006). By the later fourth millennium BC, a whole series of elongated, rope-slung jars also emerge as containers (probably enabling transport up and down the Nile), and various handless, loop-handled or ledged storage jars are visible as containers for liquids traveling to Egypt from southern parts of Israel-Palestine (fig. 2*A*; McGovern, Mirzoian, and Hall 2009).

The latter Levantine vessels were probably moved overland by donkey caravan or paddled along the coast and then upriver, and their forms do not as yet suggest high degrees of specialization for transport. Over the course of the third millennium BC, however, such vessels become more consistently invested with loop handles (for ease of manipulation by porters), larger in size (improving their freight efficiency), increasingly standardized (so they could informally be counted up as equivalents), more elongated (perhaps reducing breakage by increasing the surface area in contact between groups of vessels in transit), harder fired (for greater strength), and comb decorated (perhaps reinforcing the jar walls and/or improving their handling when wet; see, e.g., fig. 2*B*).

All of these changes can be seen as unevenly applied, but

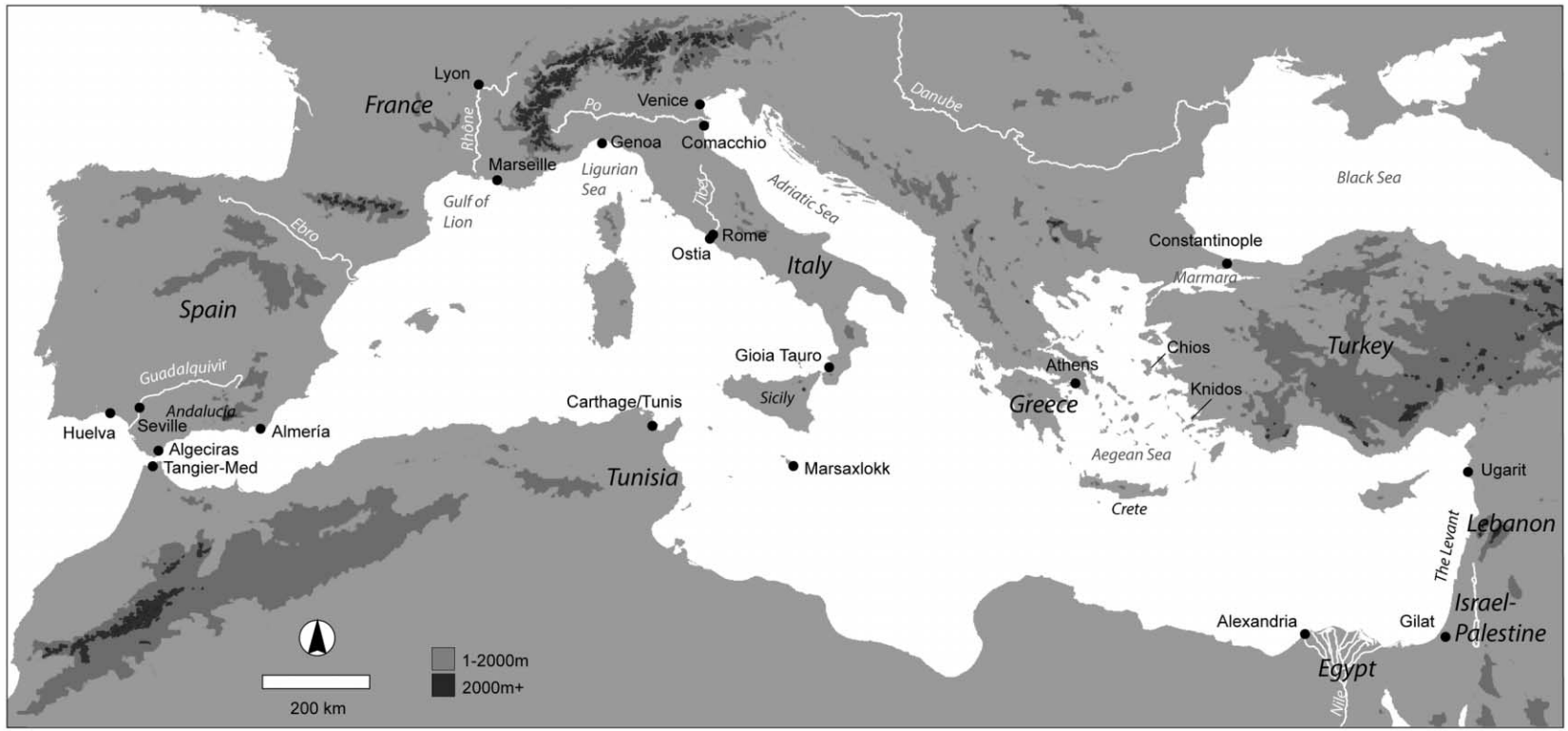

Figure 1. A map of the Mediterranean showing the locations of sites and regions mentioned in the text.

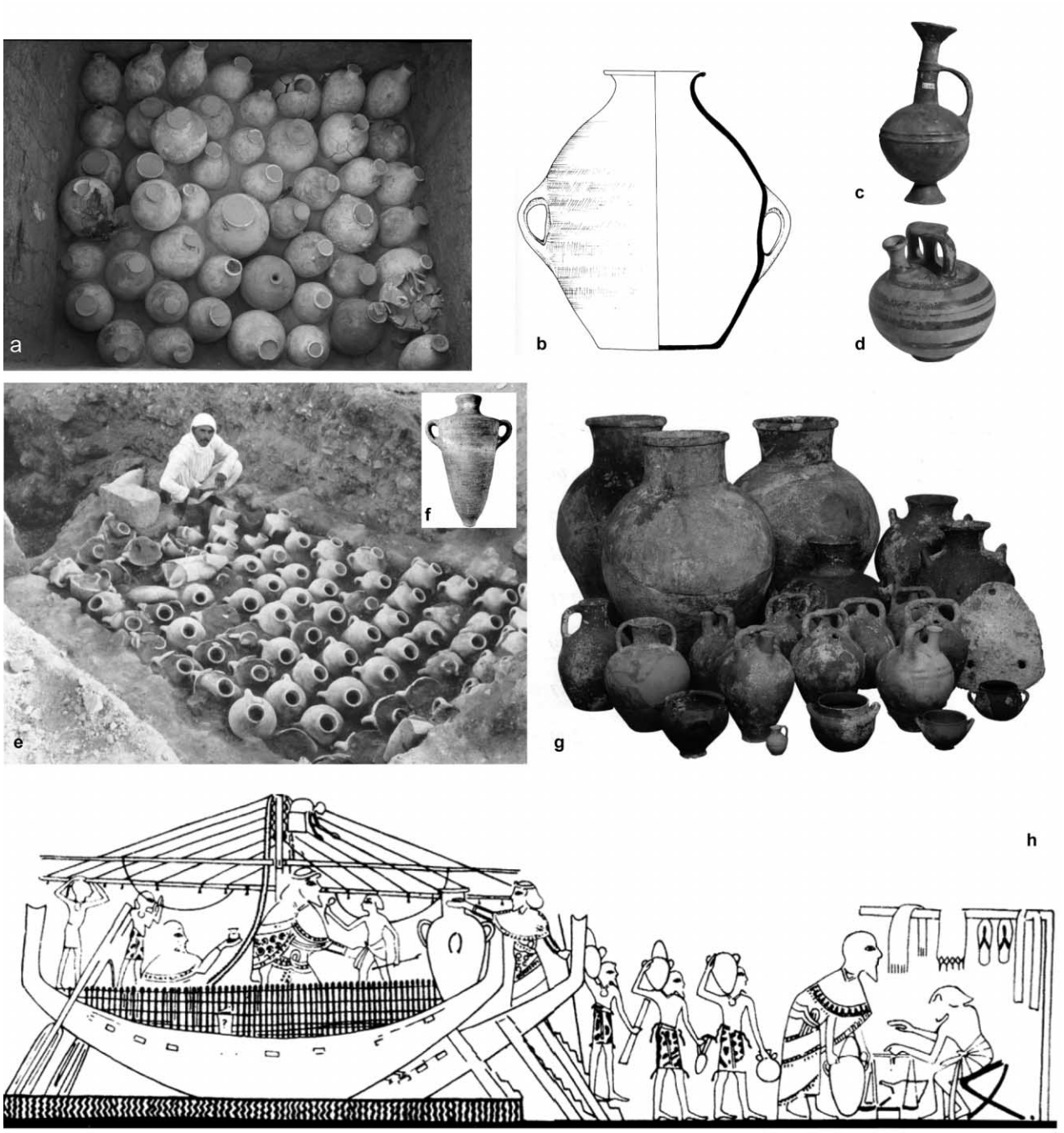

Figure 2. Bronze Age transport jars: *A*, in tomb U-j at Abydos (ca. 3300 BC; Dreyer 1998, pl. 8c); *B*, a "metallic ware" vessel (Tell Dan, ca. 2700 BC, courtesy of Raphael Greenberg); *C–D*, miniature juglets (Cypriot Base-ring juglet ca. 1500 BC and Mycenaean stirrup-jar ca. 1250 BC, courtesy of the British Museum); *E*, a deposit of 80 Canaanite jars at the northern harbor of Ugarit (late fourteenth century BC; Schaeffer 1949, pl. 9; Yon 2006, n. 30, used with permission); *F*, a single jar from the same deposit (approx. 52 cm tall); *G*, various container shapes from the Point Iria shipwreck, Greece (ca. 1200 BC; the tallest are approx. 30 cm; used courtesy of Yannos Lolos); *H*, Egyptian tomb scene showing the arrival of a Levantine merchant vessel (Thebes, ca. 1350 BC; Davies and Faulkner 1947, pl. 8).

incremental, efforts to adapt general purpose jars to the further demands of regular transport by sea (Greenberg and Porat 1996; Marcus 2002:409–411), with a similar process probably occurring in lowland Mesopotamia (Parr 1973:178–180). They are almost certainly connected with the development of sailing ships, with the latter probably being experimented with during the earlier part of the third millennium and becoming undeniably transformative of eastern Mediterranean long-distance exchange by the latter half (Broodbank 2010). However unpredictably seaworthy these early ships may have been, they still offered a longer range and much larger cargo capacities than paddled craft, at least for certain state-sponsored routes between the coast of northern Israel-Lebanon and the Nile delta.

2000–1000 BC

More famously perhaps, it is by the earlier second millennium BC that we see a distinctive new shape, referred to by modern commentators as the "Canaanite jar" (Grace 1956). These vessels were now often fashioned on the potter's wheel, which not only facilitated the production of greater numbers and more regular shapes, but also allowed the sides and base to be made into a single rough cone. Such pointed-base vessels were less vulnerable to breakage and could be stacked in intercalated layers in the holds of ships (with the bases of one layer sitting in the space between the vessels below), placed individually in stands, arrayed in groups on racks, leaned against one another on wharves and in warehouses, or half-buried in the ground. Moreover, this design could be carried in panniers, slung from ropes or hoisted onto the shoulder of a human porter, while the narrow neck could be closed with a stopper and sealed with clay or lime. Finally, the handles and base offered three reliable points by which the vessel might be carried or manipulated when pouring out its contents (fig. 2*H*; see also fig. 5*E* below; Grace 1949:175).

Canaanite jars have been found in substantial groups in shipwrecks and as harbor finds (fig. 2*E* and *F*) and, in many ways, mark the start of an "amphora" tradition that continues for several millennia hereafter. However, their modern role as the poster children for Mediterranean Bronze Age trade ignores not only the much earlier container evidence discussed above, but also an array of other transport jars that developed during the second millennium BC. For example, Canaanite jars from a fourteenth-century BC Uluburun shipwreck off the south Turkish coast were also accompanied by huge Cypriot jars that were far too big for one person to move around and may have been semipermanent within the ship's hold (approx. 350 L, whether meant for liquid commodities, dry cargo, drinking water or all of these; Pulak 1998, fig. 17). Likewise, another shipwreck possessed the same Cypriot behemoths, but also Cretan coarseware stirrup jars and yet another distinctive Greek mainland type (fig. 2*G*; see also Haskell et al. 2011 on stirrup jars, and Broodbank 2000:322–353, for earlier "duck vases"). This range of Bronze Age transport jars often carried oil and wine, but also played a clear role as multipurpose containers for pottery, resins, orpiment, glass beads, and metal scrap to name just those that have been identified so far.

Four further observations are worth stressing briefly as points of comparison for later periods. First, Bronze Age commodities were already being traded in units that clustered loosely around agreed weight or size standards, but also retained links with traditional rule-of-thumb measures, such as the donkey load or the animal skin (Sherratt and Sherratt 1991:362–363). For example, the Canaanite jars from the Turkish shipwreck mentioned above group roughly around capacities of 6.7 L, 13 L, and 26.7 L in a 1:2:4 ratio (Pulak 1998:201–202). One of these is most likely the generic "jar" measure referred to in contemporary Levantine documents (Zamora 2003) while the largest could still have been handled by a human porter or placed on one side of a donkey when full (though the weight would vary according to contents). Second, Bronze Age transport jars were labelled in interesting ways: a few were given marks that assisted with their distribution en route, while others preserve ink labels referring to their contents (oil and wine being commonplace), capacity, or owner. Further seal impressions were made in the clay closing the vessel mouth, while linen wrappings, wooden tags and other last minute additions to the product offered further opportunities for both administrative and consumer information to be included, even if these survive only very rarely in the archaeological record.

Third, the second-millennium BC evidence also suggests incipient traditions of sub- and micropackaging. An example of the former is the fact that textile bundles were sometimes sealed in a coarse outer wrapping, within which were individually wrapped and sealed bolts or finished garments (Bevan 2010:57–61). Micropackaging, in contrast, is best exemplified by an incredibly diverse Bronze Age tradition of juglets that provided highly decorated, person-scale counterparts (fig. 2*C* and *D*, typically < 0.5 L; see also Bevan 2010:61–68) to the bulk oil containers, the contents now enhanced with extra aromatics, narcotics, or other additives. This downscaling of oil containers, from bulk to beautiful, not only probably involved rebottling and added value, but also opportunities for careful marketing, import substitution and no doubt more fraudulent adulterations. Fourth and finally, there are a few late and perhaps unusual instances of the import and export of large quantities of cereals in the holds of ships (Knapp 1991), arguably an early example of the huge, annual cereal transfers that would later underwrite the viability of Classical, Roman, and Medieval Mediterranean cities. Indeed, all of the above Bronze Age features—metrical convergence, product labeling, subpackaging, small-scale repackaging, and bulk cereals—should be kept in mind as harbingers of some extremely long-lived Mediterranean phenomena.

1000–200 BC

By the latter part of the Bronze Age, there were therefore clear signs of an array of specialist transport packaging, and especially of different regional liquid container types made of clay. The production areas for such amphoras spread slowly out from a limited core of third-millennium interactions between the Egyptian and Levantine coast to the southern Aegean by the earlier second millennium BC. By the fourteenth to twelfth centuries BC, containers were appearing in small numbers as imports in the central Mediterranean and northern Aegean, and there are fledgling signs of local versions (e.g., Stefanovich and Bankoff 1998, figs. 29–30). This tradition almost certainly continued throughout the following period of socioeconomic contraction and more limited archaeological evidence. Phoenician city-states along the central Levantine coast were making use of specialized jars again in the tenth century, and it is likely the tradition simply continued in lower quantities across this chronological gap (Pedrazzi 2007; Sagona 1982). Several shipwrecks attest large cargoes of clay amphora (fig. 3*A*) and certain eighth- to seventh-century types were again sufficiently standardized to suggest linkages with known Levantine wet and dry measures (Docter 1988:90). The resinous linings of many of these vessels protected wine from spoiling and emphasize the central role of this particular product for export (fig. 3*B*).

From the Levantine coast and as part of the wider expansion of Phoenician seafaring activities into other parts of the Mediterranean, the practice of using containers spread west again. In the central and western Mediterranean, imported transport jars appear almost as soon as they are archaeologically visible in their Phoenician home regions, for example in Crete, Sardinia, or at Huelva in Andalucía by the ninth century BC (González de Canales, Serrano, and Llompart 2006:17–19; Ramón Torres 1995; Shaw 1989). In the Aegean, wine and olive oil transport containers also appear (Catling 1998; Johnston and Jones 1978) and show a similarly rapid involvement with Greek overseas trading and colonial ventures in the central and western Mediterranean. Phoenician and Greek imports quickly provided models for local containers in the west during the eighth to sixth centuries BC (Sourisseau 2011) and, however locally patchy, this wider uptake marks a crucial moment in the history of the region: when maritime-led, containerized exchange in classic regional products such as wine and olive oil becomes Mediterranean-wide, distinguishing the whole area from often less integrated economies beyond.

Thereafter, some of the most interesting developments in liquid container shapes are found in the eastern and northern Greek islands. From the later fifth century BC onward, a handful of Aegean island centers begin to stamp a small design into the handles of their amphoras before firing and this practice thereafter expands to a much larger group of production centers across the Aegean, Sicily, southern Italy, and the Black Sea (e.g., Vandermersch 1994). The stamps often carried a recognizable symbol or an explicit statement of provenance, as well as further information about the date of production and the manufacturer (fig. 3*C* and *D*), and they seem to have guaranteed a certain capacity, albeit following multiple local standards that varied over time (Grace 1949). Developments in mathematics from at least the third century onward may well have prompted both experimentation and greater standardization in transport containers (e.g., Archimedes's solids of revolution; also Lang 1952), and regardless, both documentary and archaeological evidence imply deliberate contemporary innovation in amphora design (e.g., Athenaeus's *Deipnosophistai* 11.784c). By and large, Greek transport jars also took forms that linked them to the commercial identities of particular city-states and contemporaries sometimes referred to particular jars as "Thasian," "Rhodian," "Knidian," and so on (although less place-specific jar styles and acts of imitation were also common; Lawall 2011). Strong procedural links existed between stamped standardized containers and other mass-produced, stamped goods such as bricks, tiles, and coins. For example, the island of Chios regularly stamped its amphoras and the Chian amphora form was often depicted on Chian silver coins: the iconic interplay between these two forms of state-authenticated product is emphasized by the further use of the coin designs themselves as amphora stamps (fig. 3*E* and *F*; also Papadopoulos and Paspalas 1999).

Small decorated oil juglets in pottery, glass, stone, and metal indicate the continued small-scale bottling of elaborate oils during this period. A few larger amphoras were also lavishly decorated, especially those filled with the sacred olive oil of Athena that were awarded exclusively to the victors of the Panathenaic games, and thereafter probably circulated on the commercial market (Valavanis 1986). While wine and oil were common contents of contemporary amphoras, both documentary and microresidues also suggest their primary use for other products (honey, nuts), and the recirculation of amphoras for various secondhand roles (e.g., Foley et al. 2012; Yardeni 1994). Animal-skin bags clearly also continue to be used as storage containers and probably for short-distance overland transport (for small versions, see Immerwahr 1992), but it remains unlikely that they were heavily employed as maritime containers. Cereals became a very commonly traded commodity, from perhaps the fifth century onward, and seem to have been carried in stackable, sealable sacks (*phormoi*; Johnstone 2011:35–61).

200 BC–650 AD

The massive expansion of Roman political and economic influence in the last two centuries BC represents an important change in the dynamics of Mediterranean trade and also an opportunity to compare, on the one hand, the large-scale containerized demands of a basin-wide empire operating over a coherent fiscal space (at least in principle, and for the only time in the region's history), with on the other, the small-

Figure 3. First-millennium BC amphoras: *A*, a typical seabed "amphora mound" (Ashkelon, mid-eighth century BC; left to right is stern to bow); *B*, a close-up of a Phoenician "torpedo" amphora from the same shipwreck, lined with pine resin and probably holding wine (both images courtesy of H. Singh and J. Howland, WHOI, IFE, and Ashkelon excavations); *C–D*, a wine amphora from Knidos with a stamp referring to an annual administrator and a manufacturer (mid-second century BC, courtesy of the American School of Classical Studies: Agora Excavations); *E–F*, a silver coin from Chios (with a sphinx and a Chian amphora, courtesy of the Fitzwilliam Museum Cambridge) and the same design for an amphora stamp (courtesy of the American School of Classical Studies: Agora Excavations).

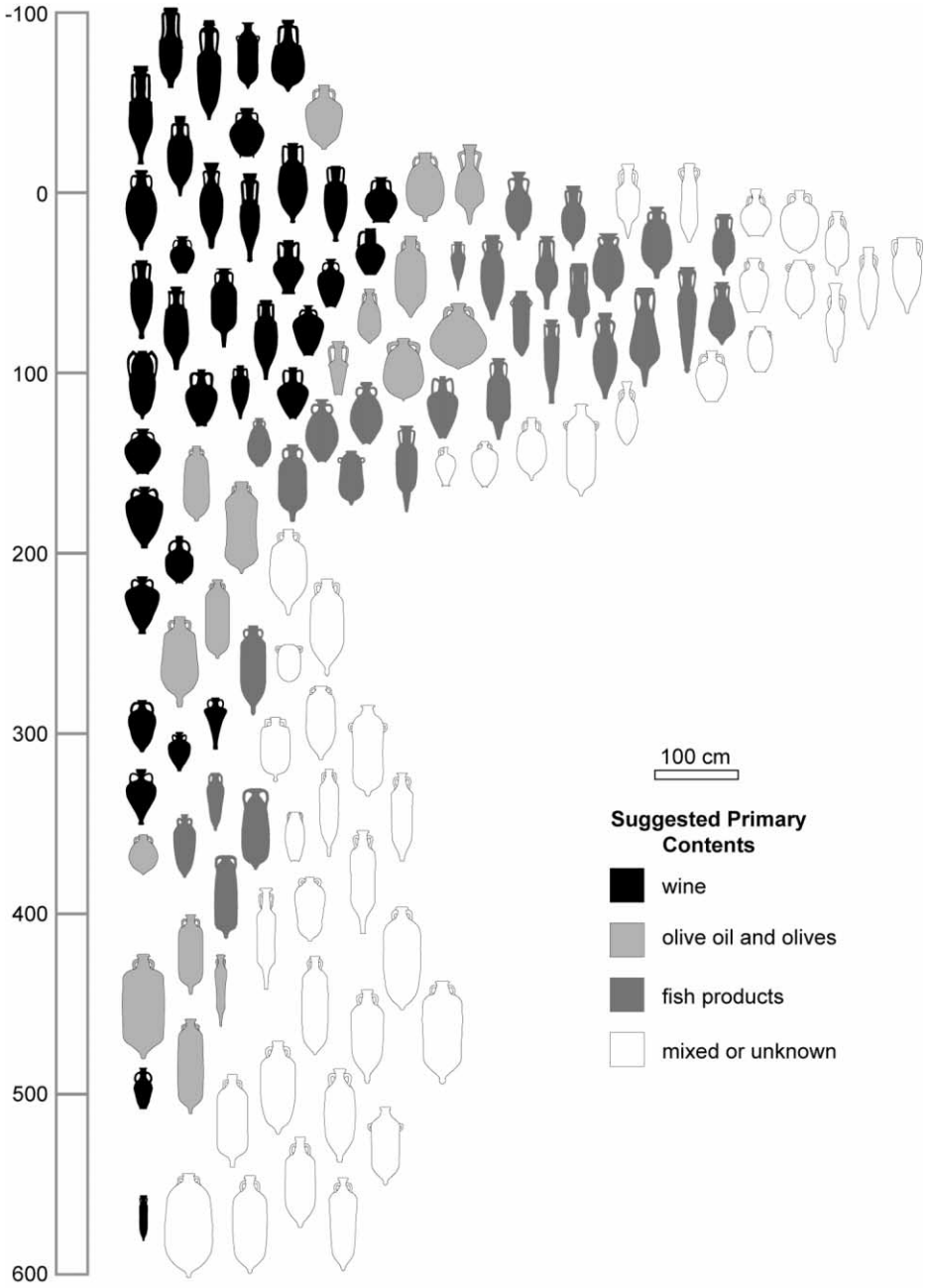

Figure 4. An impression of amphora diversity across the western Mediterranean during the Roman period (digitized from the type drawings in the University of Southampton's "Roman Amphorae: A Digital Resource," http://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/; eastern Mediterranean amphoras are not included here, but see Eiring and Lund 2004). Amphora types are plotted in the middle of their suggested date range. Type frequencies and suggested contents reflect both real chronological differences and investigative biases.

scale but persistent priorities of everyday, regionalized commerce (e.g., Bowman and Wilson 2009). Various aggregate measures suggest that the last century BC and first couple of centuries AD constituted a peak of overall Mediterranean economic activity that was not thereafter matched for volume and diversity until the later Middle Ages (see fig. 9*B* below). It is thus unsurprising that the number of amphora types explodes at this time (fig. 4). Amphoras used not just for wine, olive oil and fish-based commodities, but also for a wide variety of other wet and dry goods. Despite considerable regional and chronological variability, there were also important efforts at standardization, such that the *amphora* be-

came a fixed unit of volume (approximately 26.2 L) and a reference container of this exact capacity was kept in the temple of Jupiter in Rome (*De ponderibus* 61). The same unit was also used to refer to the size of Roman ships, beginning or consolidating a tradition of rating cargo vessels by their container capacity that has lasted in some form up to the present day (Lane 1964).

One bulk alternative to moving liquid products in amphoras was to repurpose large clay jars (*dolia*) that were otherwise used for wine fermentation and storage. Some of these jars could store thousands of liters and, from the mid–first century BC to the second century AD, they were experimented with as semipermanent cisterns in the holds of northwestern Mediterranean ships (fig. 5*C*; Marlier 2008). An unusual hull design enabled these *dolia* ships to accommodate their onboard cisterns, and perhaps even to travel some way upriver without transhipping their cargoes. *Dolia* were also too unwieldy and vulnerable to be moved overland and, instead a common Mediterranean solution continued to be animal-skin bags (e.g., Marlière 2002:13–25). The largest Roman liquid unit was a wine or oil skin made out of a whole ox hide (*culleus*, approximately 520 L), which could be transported on the back of a wagon (fig. 5*B*). Indeed, the traditional Roman punishment for patricide was death by containerized transport, with the convicted sewn up in a *culleus* with various live animals, drawn by oxcart to the river or sea and then drowned (Radin 1920). The redistribution of cereals around the Mediterranean, a fact of urban life since the end of the Bronze Age, now explodes in scale due to the considerable demands of the Roman military and the free supplies made to certain citizens of Rome and later Constantinople. While cereals might occasionally be carried in amphoras and on- or off-loaded in sacks (fig. 5*G*; Minaud 2004), they were also often shipped loose in the hold or compartmentalized within a ship's bulkheads (e.g., Justinian's *Digest* 19.2.31, albeit a late source).

Against this backdrop of both long-established traditions and novel experiments should be set the appearance of the first wooden barrels. The barrel was, from its earliest known incarnation, a container constructed of staves of a straight-grained wood (e.g., pine, larch, or oak) held together by hoops (made of more flexible wood species or metal). Such a vessel could be made watertight by a careful concave design and by lining with pitch. It could be rolled along ramps and other flat surfaces, hence avoiding unnecessary lifting, and it could be set in a stable position on one of its two flat ends or on its sides via the use of chocks. Its wooden, multipart structure allowed it to be disassembled for reselling or convenient relocation elsewhere.

Barrels have a rather murky history prior to the first century BC, but the early evidence maps closely onto the forest- and river-rich regions inhabited by Celtic-speaking tribes in southern France, southern Germany, northern Italy and northern Spain (Marlière 2002:170–176). They seem to have been used extensively in the making, storage and transport of beers, but were also experimented with for transporting wine, in tandem with the expansion of Roman influence and drinking habits northward. Aside from various brief mentions by Roman writers, a large number of actual Roman barrels are preserved in first-century BC/AD Roman military camps along the German frontier where they were reused as expedient well linings (fig. 5*D*). These containers held bulk orders of wine for Roman soldiers, and at least initially, the supply chain probably involved transfers of the contents of amphoras and *dolia* at Mediterranean coastal ports or inland at a places such as Lyons, for northward distribution by barrel and riverboat (fig. 5*A*; Tchernia 1997).

Academic debate over barrels in the Mediterranean and along its coastal fringes has swung from (*a*) a general disregard, and hence uncritical acceptance of amphoras as an unbiased indicator of Roman trade, to (*b*) suggestions of a barrel revolution by the third century AD and an archaeologically invisible iceberg of barrel-borne goods. In fact, there is an unusually good case here for greater subregional and chronological nuance. On the one hand, the use of barrels for liquid processing, storage and transport certainly did expand southward into the Mediterranean region during the first few centuries AD, with a visible drop in amphora types at places such as Ostia and the increasing mix of amphoras and barrels as packaging in representational art (fig. 5*A*; Marlière 2002: 190–192). Indeed, while the number of archaeologically recovered barrels is far smaller due to a decline in expedient military well making (Marlière 2002:174), the range of representations and ancillary evidence such as branding irons and hammer stamps (fig. 5*F* and *H*) grows, suggesting, if anything, a wider range of contexts for this container form. The absence of evidence for *dolia* ships after the early third century may also reflect this expansion of barrels. At Rome's river port, a late third-century AD inscription records fees for unloading and storing wine barrels from barges by crane, while by the early fifth century, the minimum size of these Tiber barges was set at 20 barrels (McCormick 2012, n. 116).

On the other hand, however, our present evidence only suggests that Roman barrels made a significant impact (*a*) on certain northern and western Mediterranean river routes (e.g., the Rhône, Tiber, Danube, Po) and (*b*) across certain central-western maritime networks: the Gulf of Lion, the Ligurian Sea, and the northern Adriatic (e.g., Tchernia 1986:286–288). In contrast, from an *eastern* Mediterranean perspective, there are in fact few if any signs of many barrels until well into the Medieval period (see below). Moreover, even in the western Mediterranean, the Roman barrel was a container that remained particularly closely associated with wine (and beer, though the latter was not popular so far south), with amphora forms devoted to olive oil and fish products still very visible (fig. 4). Likewise, while one or two barrels carrying salt, fish or recycled glass offer rare underwater cameos (McCormick 2012:15), these appear within otherwise amphora-dominated shipwreck cargoes and the wider dominance of barrels as multipurpose shipping containers seems unlikely.

Figure 5. *A*, funerary relief showing wicker-covered and plain amphoras (top row), as well as a barrels being hauled up a tributary (Durance?) of the Rhone (first to second century AD; courtesy of the Museo della Civiltà Romana); *B*, funerary relief showing an oxcart and ox hide container (late third-century AD Italy; courtesy of the Museo della Civiltà Romana); *C*, reconstruction of a *dolia* ship based on shipwreck evidence (late first century BC; courtesy of the Centre Camille Jullian, Maison Méditerranéenne des Sciences de l'Homme); *D*, a large barrel found in a well in a Rhineland military camp (late first century BC; courtesy of Gabriele Röder-Campbell); *E*, a porter carrying an amphora between ships (late second century AD; courtesy of Simon Keay); *F*, part of a barrel, retaining a branded name on it, which has been reused as an amphora stopper (first century AD; Desbat 1991, fig. 5, with permission); *G*, a fresco of dockworkers loading grain sacks onto a boat and the contents of these being measured by an official on board (second to third century AD; courtesy of the Vatican Museum); *H*, a branding iron for barrels (Marlière 2002, fig. 100).

The specific question of barrels merely emphasizes a wider point, which is that, by the mid-third century, there were increasing differences between the trade flows and containerized practices of the western and eastern halves of the Mediterranean respectively. These and other sociopolitical fault lines become formalized from the late third century onward by the splitting up of the Roman empire into two largely independent administrative parts, and increasingly visible thereafter, even if cross-regional trade continued. For example, the eastern Mediterranean world of the fourth to early seventh centuries AD offers no evidence of barrels but instead, a dizzying array of regional amphora types (e.g., Reynolds

2010, fig. 13), only a few of which achieve geographically extensive distributions (such as the celebrated wines of Gaza: Mayerson 1992). A variety of circumstantial evidence (Christian references on amphora graffiti, a possible priest's name on the largest steelyard from the Yassi Ada shipwreck, the location of amphora deposits and oil/wine production inside apparent ecclesiastical structures on Samos; see van Alfen 1996:211–213) also suggests a growing role played by the church in organizing production and distribution, at least in certain cases.

650–1500 AD

The disappearance of the most widely disseminated Late Roman amphora types by the middle of the seventh century AD has long been associated with the expansion of Islam into the Mediterranean, contemporary political disruption and economic downturn (Wickham 2006:693–824). While a decline in overall trade at this time seems undeniable, the replacement of amphoras by other container forms is, again, often overemphasized by suggestions that barrels prompted an early Medieval "container revolution" (Lane 1986:233–234). As we have already seen, barrels had been used in certain northwestern parts of the Mediterranean since the first century BC, and while their popularity expands over the next 1,500 years, the overall process in no way constitutes a single, basin-wide change.

In fact, a seventh- to eighth-century northern Adriatic port center such as Commachio still provides evidence for considerable trade carried in amphoras (Gelichi and Hodges 2012) and seventh- to eleventh-century shipwreck evidence from the Aegean and Marmara seas provides yet further vivid evidence for the continuation of local amphora traditions (for what follows, see Günsenin 1998; van Alfen 1996; van Doorninck 2002). The latter small (5–15 L) vessels often exhibit many stylistic subgroups, signs of heavy reuse and mixed contents (although wine remains prominent) and it is tempting to contrast this with the supersized versions, more limited fractioning and (perhaps, but see fig. 4) tighter style-content links visible in the Roman period. Regardless, they match other early Medieval evidence for lower overall levels of Mediterranean trade, smaller cargo ships, greater regionalization and smaller urban populations, as well as (*a*) the altered economies of the Byzantine state (e.g., McCormick 1998) and (*b*) probably increasing involvement of ecclesiastical estates (see above).

From the mid-seventh century AD onward, the rapid fragmentation of the Mediterranean, not only into eastern and western spheres but also into northern Christendom and southern Islam (very approximately), was matched by further fragmentation in the techniques by which large cargo was handled. Amphoras continued to have an important place in Byzantine exchanges as well as in certain parts of southern Italy (as above, also Arthur and Auriemma 1996). Hundreds of barrels, on the other hand, are found at northwestern European ports during the seventh to ninth centuries (e.g., van Es and Verwers 1980), and we have a few hints that they continued to be important in the Mediterranean northwest as well. Standing in further contrast are the southern portions of the Mediterranean controlled by emergent Islamic states. These were often wood-poor environments where there was always less incentive to use barrels, but Muslim prohibitions on wine consumption, while by no means absolute in practice, may also have reduced the local emphasis on viticulture (Zug Tucci 1978), removing one of the driving forces behind the fresh manufacture of either amphoras or barrels. Instead, there seems to have been a greater reliance on baskets, animal skins and ordinary clay jars (Goitein 1967, nn. 7–8), while increased use of camels rather than wheeled carts may further have discouraged the use of barrels (Bulliet 1990). Moreover, those few places in the Islamic Mediterranean where amphora production clearly does continue often exhibit monastic connections (Gascoigne and Pyke 2010; Reynolds 2010:130–133; although see also Louhichi 2001), suggesting that this tradition sometimes survived via some very specific social and economic networks (probably associated with Christian consumption of wine).

While there were no doubt slow shifts in container use within this prevailing pattern of regional diversity during the seventh to thirteenth centuries, it is the fourteenth century that marks a period of more rapid change. In effect, it was the stitching together of the northern Mediterranean with northern Europe that was crucial. On the one hand, influential city-states such as Genoa and Venice were located in northern Italian regions with a tradition of barrel use since earlier Roman times (see above) and good access to the necessary wood resources for staves and hoops (e.g., Appuhn 2000). Their involvement in Aegean and Adriatic trade leads to amphoras disappearing from these areas almost entirely (Jacoby 2011). On the other, the linkages established by northern Italian merchants with England, Flanders and the Atlantic seaboard (Lewis 1976), along with the increasingly role of Basque sailors and ships (the *coca* or Mediterranean version of the "cog") in western Mediterranean trade (Heers 1955; Renouard 1968: 277) encouraged greater convergence of maritime practice.

Ultimately, barrels and cog-like ships were two key emblems of growing linkages with north European economies (Lucassen and Unger 2011). However, certain acts of conquest further expanded the areas within which barrels were a dominant container form in the Mediterranean (see also fig. 6*B*). For example, after the Venetian recapture of Crete and the latter's integration into Venetian Levantine trade routes, the wines of the island became incredibly popular, not least because they offered a handy, heavyweight commodity for Venetian ships to pick up on return westward voyages. Cretan wine thus began to be shipped in barrels, either using containers brought from Venice or manufactured on Crete with staves imported from Venice, Constantinople, and Thessaloníki (Jacoby 2011:142). In fact, the large Cretan wine barrel (the *botte d'anfora*, whose size is debated but was probably

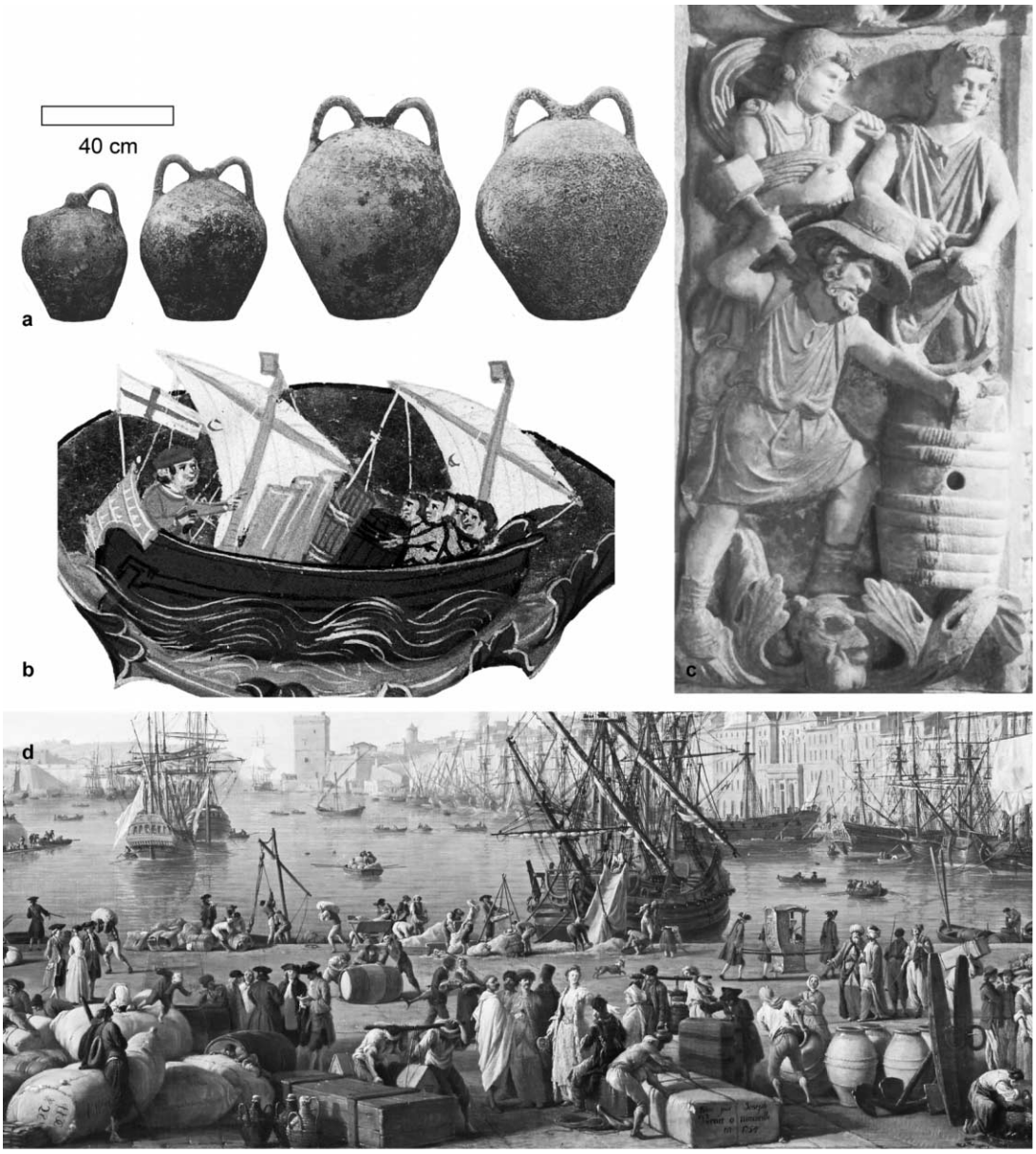

Figure 6. *A*, amphoras from a thirteenth-century AD shipwreck in the Sea of Marmara (Günsenin 2001, fig. 5, with permission); *B*, a Crusader ship hastily leaving port, depicted with a barrel still being loaded off the yard arm (1321–1324 AD, Secreta Fidelium Crucis 17v; courtesy of the Bodleian Library); *C*, relief sculpture of a cooper out of a wider set of thirteenth-century Venetian trades (Rosen 2008, fig. 26, with permission); and *D*, Claude-Joseph Vernet's depiction of the docks at Marseilles in 1754 (copyright Musée National de la Marine/A. Fux).

about 600 L; Tucci 1967) becomes enshrined as a principal unit by which the capacity of Venetian ships was rated, even if in practice there was a wider range of physical barrel sizes (e.g., fig. 6*C*). Likewise, in the Mediterranean southwest, barrels seem to have been adopted for ship ratings and as containers for certain products after the fourteenth-century reconquest of southern Spain, even if clay jars clearly remained very popular (Lister and Lister 1987, figs. 19a–c, 48a–c, 55; Renouard 1968:277; Tucci 1967).

Hence, the zone of barrel use spreads south and east during this period to areas where this practice was not well established, and where a substantial traffic in new, used or disassembled barrels was often necessary to make up for inadequate local resources. Our last good archaeological snapshot of an amphora-dominated cargo comes from a thirteenth-century shipwreck in the Sea of Marmara (fig. 6*A*) and a further final glimpse comes from a thirteenth-century Cypriot document (possibly compiling earlier sources) that still men-

tions rating the holds of Byzantine ships in stacks of standard-size clay jars (Harpster and Coureas 2008). After this, amphoras do continue to be mentioned in the historical evidence and to turn up in archaeological assemblages, but are rarely a major feature. Written records also give us a fairly good sense of the range of fourteenth century and later packaging now used, at least for Christian portions of Mediterranean trade (for what follows, see Balard et al. 1994:101–110; Plana i Borràs 2001; Zug Tucci 1978). Wine was largely carried in barrels, southern Italian fish products in barrels, Italian olive oil in barrels, but oil from most other places in clay jars. Honey was carried in barrels or skins, sugar and cinnamon in boxes or barrels, cereals occasionally in jars, sometimes loose or in hemp sacks. Salt and powdered spices were also shipped in sacks. There are plenty of cases of multiple bagging of items, their combination in larger wrapped bundles, and/or their further packing into barrels. Certain specialty packaging was typical of certain Mediterranean regions, with specific barrel styles and sizes associated with individual Italian city-states, certain oil jars with the port of Seville, or date palm-lined, leather satchels with Alexandria. Indeed, the Alexandrine satchel (*sporta*, sometimes also translated as "basket") plays a starring role in the origin myth of the Venetian state, being used to smuggle the relics of St. Mark out of Egypt under a layer of pork that the local Muslim customs authorities (apocryphally) did not wish to check by hand (Limentani 1972:18–21; occasionally reimagined as a Venetian barrel in what appear to be more recent accounts).

1500–1850 AD

The key broadscale shift from the start of the sixteenth century was the reorientation of large parts of the Mediterranean economy to trade with the New World and East Indies. Barrels continued to be an important container form for these ocean-going ventures, and Portuguese exchanges with the East Indies probably eventually led to their local uptake in southern and eastern Asia at least for certain purposes (Barker 1994). In contrast, the Spanish containers used for provisions to the New World were more diverse. In the first half of the sixteenth century, wine was shipped in barrels, but empty clay jars often accompanied these in order to receive the contents on arrival, while the barrels were returned across the Atlantic. From the later sixteenth century onward, clay jars become more dominant on these voyages, being used to carry the possessions of passengers on board and export the necessary components for Spanish emigrant communities to replicate a Mediterranean diet in the New World (e.g., olives, olive oil, wine, vinegar, and honey, but also tar, pitch, cereals, biscuit, pork fat, and soap: Ashdown 1972; Lister and Lister 1987:80–82, 128–137). This revitalized role for clay containers might seem surprising, but reflects their continuing attractions for cool, longer-term storage (especially of oils) and the fact that these shipments left from Seville in southern Spain (which was wood-poor, with a long tradition of amphoras).

The eighteenth and early nineteenth century are an interesting period of flux in the Mediterranean, with early signs of stronger product differentiation among traded commodities, some attempts to modernize production methods (e.g., Mazzotti 2004), and the emergence of one or two new container forms such as the wine bottle. Glass bottles have a much longer history stretching back to the Bronze Age (and pottery or metal subpackaging of wine into smaller units is known from equally far back) and including the traffic in Medieval medicines (Spufford 2002:269–271), but the higher temperatures achieved by coal-fired kilns in the late seventeenth and early eighteenth century now allowed these glass vessels to be made into more robust forms and in greater quantities (Dabas and Orsini 2005). Not only did this herald greater emphasis on labelled micropackaging of wines but also their suprapackaging thereafter in crates and other containers.

Joseph Vernet's depiction of the docks at Marseilles in 1754 vividly captures the bewildering array of barrels, clay jars, large wrapped bundles and boxes that comprised Mediterranean container traffic in this period (fig. 6*D*). Indeed, from 1720 onward, Marseilles emerges as a particular important transshipment port for a range of products, but especially olive oil and oil-based soaps (Boulanger 1996). Most of the incoming and outgoing olive oil passing through Marseilles was carried in barrels made of oak with chestnut or birch hoops (typically 320–640 L, but with small sizes as well). However, local oils reached the port in skins loaded on the backs of donkeys, while finer oils were carried overland in wicker-covered, glass bottles packed in wooden crates. Likewise, as with the Spanish New World trade, ceramic jars were sometimes preferred for longer-distance, overseas exports and almost always for subsequent storage, to the extent that they were often shown on the trade signs of oil merchants in London (Ashdown 1972).

1850 AD to Present

There is no doubt that the Industrial Revolution had a dramatic effect on global production and trade, and we can also rightly speak of an accompanying revolution in transport containers that improved the efficiency with which commodities were moved from place to place. Driven by the late eighteenth- to mid-nineteenth-century invention of spinning and weaving machines, as well as increased use of south Asian fibrous plants, sacks now became a cheaper, more disposable option and by the end of the nineteenth century they were replacing casks for many forms of dry storage and transport (Twede 2005; also Stewart 1998). The use of metal in packaging was also developing rapidly, with, for example, iron tanks slowly replacing barrels for the water storage on board ship (Morriss 2007) and canned goods becoming more common. By the early twentieth century, plywood boxes (e.g., those made to fit onto railway boxcars), cardboard crates and various plastic containers were also becoming more important, and together, cans, sacks, bottles and boxes all facilitated the subpackaging

of small units into larger containers. The small units then became an obvious target for marketing information as they could be easily decorated and carried amounts that were appropriate for regular, individual consumption and, as a result, an intensified tradition of branded micropackaging emerged during the late nineteenth and early twentieth century (e.g., Wilk 2006:90–99).

Industrialization was comparatively late and patchy in the Mediterranean with, for example, steamships only appearing in the basin from the 1870s and only very slowly supplanting traditional craft (Armstrong and Kunz 2002; Panopoulou 1995). Barrels continued to be important while amphora-like clay jars remain a patchy feature of Mediterranean life well into the twentieth century AD, albeit with the latter usually traded empty (e.g., as water carriers) rather than as commodity packaging (Mallowan 1939; Nicholson and Patterson 1985). In the olive oil trade, different Mediterranean regions focused on different sectors of the market (just as they had in the eighteenth century and earlier periods; Mueller 2012; Ramon-Muñoz 2000), with southern France and Italy producing high-cost export oils, packaged in small glass bottles or tin cans and with increasing emphasis on branded labeling into the early twentieth century. In contrast, Turkey, Greece and Tunisia (and to a lesser extent Spain) focused on cheaper bulk products. Wine also moved in a variety of ways (barrels, bottles) and with varying regimes of rebottling often reflecting different levels of perceived value. By the late nineteenth and early twentieth century, refrigeration gradually increased the range of goods that could be transported long distances, while faster ships meant that traditional packaging was sometimes now sufficient to move fresh cargoes without spoiling (e.g., fig. 7*A*). Mechanization not only expanded the range of available transport modes, but also enabled more efficient transitions between them (e.g., spanning truck, railways, barge or ship), with the development of forklifts and wooden pallets driving new shapes and sizes of package (Rodrigue and Notteboom 2009).

In some ways, the impact of pallets by the latter half of the twentieth century foreshadows the subsequent impact of the shipping container as, in each case, they heralded dramatic decreases in both the workforce and the time required to move goods around. In a narrow sense, containerization refers to the organization of modern long-distance freight via standardized steel boxes. When these are combined with specialized boats, port facilities, logistical infrastructure, customized trucks and trains, such boxes can provide considerable economies of overall speed, scale, dock labor, and waiting times in port (fig. 7*B*; Merckelbagh 2009:178; but see Hummels 2007). The first concerted experimentation with shipping containers began in America in the later 1950s (often ascribed to the innovative entrepreneur, Malcolm Maclean; Levinson 2006), gathered pace from the mid 1960s, and became a key driving force in the massive expansion of overseas trade during the 1970s and 80s. Since the 1990s, the size of container ships has continued to grow, alongside wider processes of globalization, and a series of international standards have been applied to the containers they carry (about dimensions, shapes and stacking mechanisms) such that both shipping accounts and ship ratings are often now quoted in "twenty-foot equivalent units" (TEUs; Henstra, Ruijgrok, and Tavasszy 2007). Most containers are made of corrugated steel for extra strength and less weight, have wooden floors and are often made watertight via a rubber lining. They carry marks identifying the box itself, its manufacturer, its customs clearance and, only very rarely, company brand names.

In the Mediterranean, it was only really in the 1980s that containers made a substantial impact, but by the end of the decade these new transport priorities had led to a revitalization of the basin as a global thoroughfare, driven in particular by the growth of Far Eastern markets and their links

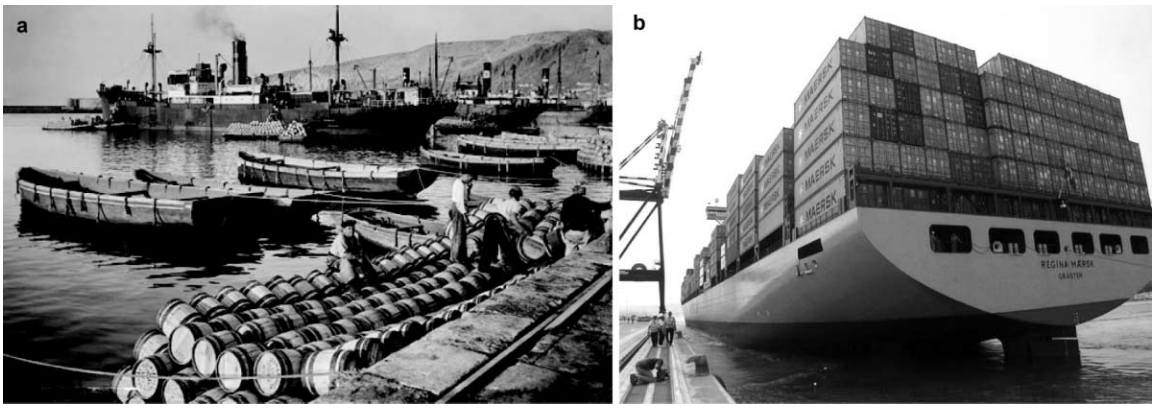

Figure 7. *A*, barrels of fresh grapes being loaded onto steamships at the Spanish port of Almería ca. 1920 (copyright Colección Roisin, IEFC ACM-9–1060; see also López and Picón 2006); *B*, one of the world's largest container ships docked at the southern Italian port of Gioia Tauro (courtesy of Pino Masciari).

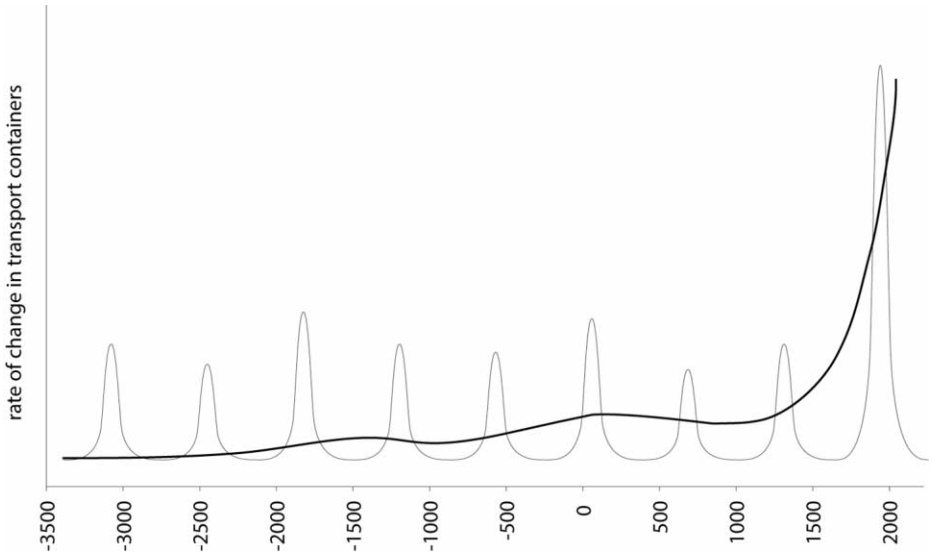

Figure 8. An implicit traditional model of change in Mediterranean container traditions over time (thick line) and a suggested alternative (thin line) in which there are pronounced higher and lower tempo changes. The vertical scale offers only a very schematic model.

to Europe (for what follows, see Medda and Carbonaro 2007; Ridolfi 1999). As many as 1,000 container ships now pass through the straits of Gibraltar each day (Nespola 2009:41) and the Mediterranean experiences the densest bundling of container traffic of almost anywhere in the world. Here, as elsewhere, container traffic is rationalized as a series of long distance routes between "transshipment" ports that reallocate containers from massive specialized ships (e.g., up to 15,000 TEUs) to smaller ones (roll-on, roll-off ferries) with the latter then feeding more traditional Mediterranean ports within the same region (Blumenhagen 1981; Ducruet and Notteboom 2012). In this new world, those ports that focus on container ships have become particularly desocialized spaces, quarantined from traditional urban areas and serviced by a dramatically reduced dockside workforce (Driessen 2005; also Herod 2001:70–101). In response, the cramped old ports of the Mediterranean have sought fresh life in "authentic" but niche economic activities and careful management of heritage resources to enable tourism. Different subregions also stand to gain or lose from containerization in different ways with, on the one hand, the greater integration and infrastructure of the European Union favoring global flows into north Mediterranean ports but, on the other hand, the detour-minimizing agendas of the largest ships favoring a straight-line trip through the basin, and hence new southern ports such as Algeciras, Gioia Tauro, Marsaxlokk, and Tangier-Med (Fremont 2010). The impact on traditional Mediterranean commodities has been uneven: for example, olive oils are today moved via a full range of transport options from shipment in massive, undifferentiated bulk via tanker, to the filling of plastic "flexi-bags" housed within standard steel containers (16,000 L or more), to subpackaging in cans, plastic and glass bottles (Kirk and Hartley 2008; Mueller 2012:199–200). Mediterranean wines continue to be shipped for the most part in 6- to 12-bottle cardboard boxes, stacked on pallets within shipping containers (a TEU could thus hold 9,600 bottles or 7,200 L), In contrast, their lower-priced rivals from the New World and Australasia are often now transported in flexi-bags and bottled on arrival.

Costly Transactions and Evolutionary Trajectories

In what follows, I would like to build on the above summary to think about the evolutionary dynamics of transport containers, their relationship with various kinds of institution (social, economic, political, religious), as well as their changing impact on the costs of transacting exchange across and beyond the Mediterranean basin. It is tempting to read the Bronze Age arrival of the amphora, the Roman to Medieval rise of the barrel, the later nineteenth- to early twentieth-century industrialization of packaging and, finally, the advent of the modern shipping container as an onward-and-upward tale of technological advance (e.g., fig. 8, thick line). Certainly, there is undeniable improvement in ship technologies over the same time span—from paddled canoe, to square-rigged sailing ships to brailed multimast, multideck vessels, to the cog and caravel, to the steamers, gas-turbine vessels and modern megaships—and we might anticipate that container technologies would exhibit a parallel trend toward higher capacity and greater efficiency. In one sense, this proves to be true. For example, the containers used for port records and ship

ratings, from the amphora to the barrel to the TEU, have involved a successive upsizing of the main unit of freight capacity on the order of 1:20:600+. Moreover, the amphora could typically carry between 1 and 4 L of cargo per kilogram of empty container (Lane 1986:234; Marlière 2002:12; Peacock and Williams 1986, table 1), whereas the ratio for barrels is between 4 and 9, and modern containers are roughly in the 7–10 range. There are obviously further efficiencies with the way each of these container types might be arranged in the hold, with stacks of barrels wasting less intervening space than intercalated amphora, and the box shapes of modern containers an even better fit, at least for appropriately designed ships. Small details of container design sometimes suggest that individuals were deliberately pushing existing designs as far as they would go: for example, certain third- to fifth-century AD amphoras with cylindrical shapes, tucked-in handles, and extremely thin walls may well have been meant to compete with the flexible handling and efficient tare weights of contemporary wooden barrels (fig. 4; Marlière 2002:190; McCormick 2012:8).

However, despite these raw efficiencies, it is difficult to demonstrate a steady decline in freight costs prior to the last two centuries (Menard 1991). For example, it is also necessary to take into account the repeated costs associated with making, maintaining and recirculating containers. Amphoras involved investment in a quintessentially Mediterranean medium, clay, that could be made almost anywhere by local potters (with Mediterranean countries having some of the densest aggregate accumulations of discarded pottery of any landscapes in the world). Multiple reuse was common (Abdelhamid 2013), but at times so too was large-scale discard, as at Monte Testaccio. In contrast, barrels required woods found mainly in the northern Mediterranean and northern Europe, leading to some clear regional winners and losers when this method became dominant, and demanding a long-distance trade in empty barrels, staves and hoops to support their widespread use. Modern steel shipping containers (as well as other heavily processed packaging) are almost all imported into the basin, mostly from the Far East. Hence, both barrels and steel shipping containers have high up-front costs that only offer clear economic advantages over their contemporary alternatives at high unit volumes or when encouraged by economic and political hegemonies stretching beyond the Mediterranean region.

Furthermore, while amphoras might break catastrophically but rarely, barrels needed constant maintenance and coopers were often part of a ship's crew so that they could make repairs en route. Barrels have also been notoriously leaky for most of their history, particularly for contents such as olive oil that is prone to expand at hotter temperatures and ooze out between the staves (Boulanger 1996:26). New barrels also soaked up some of their contents, wasting cargo and leading to residues that were difficult to remove. A good example is a fourteenth-century merchant manual's warning that Tunisian authorities would decant imported Italian oils into local clay jars on arrival at port, and at the same time, would check that incoming barrels had not previously been used for carrying other products (especially wine or pork fat that might contravene local religious prohibitions; Zug Tucci 1978:328).

Different container forms can also be better or worse at streamlining shifts from one transport mode to another. The Mediterranean basin and its terrestrial fringes have long been navigated by human porters, donkeys, horses, camels, oxcarts, rafts, riverboats, barges, harbor lighters, and large seaworthy ships, to name just the most prevalent in the preindustrial period. In more recent times, it has been knitted together by road, rail, plane, ferry and oceangoing ship. The break bulk and other costs associated with moving from one of these modes to another have always been considerable. A holy grail of modern transport logistics has thus been "seamlessness," in which changes of transport mode (and indeed exchanges across political borders) become so trouble free that they need not affect the choice of the most efficient path from producers to distributors to consumers (Henstra, Ruijgrok, and Tavasszy 2007:3–5). Steel shipping containers have been an effective solution to the challenges of intermodal transport over the last few decades, encouraging particularly strong links between shipping and trucking sectors in the Mediterranean, but also the resurgence in some areas of riverine barges. In earlier periods, transport containers have also sought to enable efficient transactions spanning these intermodal seams. For example, since the Bronze Age, metal ingot sizes, amphora capacities, and textile lengths have often clustered around the 25–45 kg that human porter could typically carry over the distances and tempos typical of dockwork (Bevan 2010; see also Ayoub and Mital 1989), and that sometimes might be carried on one side of a donkey. In certain regions, greater use of camels or wagons may have encouraged slightly different customary sizes and shapes (e.g., for amphoras, see Artzy 1994; McCormick 2012:12; Peña 1998), but many of the same exigencies remained. In principle, barrels offered an advantageous roll-on, roll-off transition from docked ship to shore to wagon, but in practice, the movement of such containers typically involved more cumbersome or infrastructure-heavy methods such as harbor lighters or cranes (Unger 2006). More dramatic still are the potential intermodal synergies of modern shipping containers, but the necessary up-front (fixed) costs to make this happen are enormous, involving new port facilities, ships and logistical frameworks.

Container forms, sizes, labels and standardization have also reflected important episodes of social consensus (as with any technology, see Lemonnier 1993; MacKenzie 1996; Pinch and Bijker 1984), and put simply, the geographic catchment, style, and effectiveness of transport containers has always been locked in a close dynamic with the geographic scale, effectiveness, and character of the institutions that promoted them, whether the latter are individual producers, family firms, city-states, major empires, military sectors, religious organizations, ethnic diasporas, or craft guilds. Hence we have the distinctive, heavily authenticated amphora of tiny Greek city-states,

the oversized oil amphoras, early barrels and meticulous bureaucracies of Roman state distributions, the sometimes more ad hoc and church-led arrangements of the Byzantine era, the Venetian wine barrel as a projection of the Republic's wood resources and savoir faire abroad, the Seville oil jar underpinning the Mediterranean diet of Spanish emigrants to the New World, or the origin myth of the modern shipping container with its emphasis on individual American entrepreneurship. We can thus talk usefully of further "institutional" costs associated with how packaged goods have navigated the seams between different kinds of institution ("transaction costs" in the narrow sense; North 1991; Williamson 1996) and it is worth stressing three points in this regard. First, transport containers have also always coevolved with an information technology of marking practices, ensuring date, quality, origin, and so on, and invoking institutional authority of one kind or another (Antonelli and Ilbert 2012; Meneley 2008*a*; Wengrow 2008). The careful countermarking of the Roman oil amphoras that make up Monte Testaccio are a good example, attesting both to the massive volumes associated with guaranteed distributions of cereal, wine, and oil to the city of Rome and to the military and institutional challenges posed by the involvement of different state and private actors (Mattingly and Aldrete 2000; Remesal Rodriguez 1998). Second, there is always an important discussion about "adverse selection" (Akerlof 1970) and institutional trust lying at the heart of decision making about commodity aggregation: at one extreme, single-source packaging enables fairly strict quality control (e.g., *mis en bouteille au domaine*), while, at the other, multiorigin shipments in bulk enable much greater scale economies (e.g., reduced transportation costs, often longer shelf life, better recycling). Third, and finally, containers often get stuck not just at intermodal transport seams in their journey but also at political seams: these moments of containers in suspension are ripe for the breakdown of trust and for political intervention. Classic examples are the dumping of British East India Company tea chests into Boston Harbor and Venice's smuggling of St. Mark's relics out of Alexandria in a cargo satchel (see above). A recent Mediterranean example is the complaint by Palestinian olive oil manufacturers that their products suffer from extra fees, delays, and restrictions on full loading of shipping containers as they pass through Israeli ports (Meneley 2008*b*; also Mueller 2012:199–200).

Ultimately therefore, there are wider trade-offs and a wider political economy associated with the choice of different container strategies. Likewise, instead of telling a simple tale of onward-and-upward progress, Mediterranean container strategies have changed in episodic bursts, without this automatically implying wholesale replacement (e.g., of amphoras by barrels) or always leading to greater efficiency. What seems clear is that ship size and design, the overall volume of economic exchange, the size and structure of human communities, and the relative popularity of different packaging forms in the Mediterranean have always been locked in complex coevolutionary feedback to the extent that we should anticipate boom-and-bust trajectories as much as or more than we should unidirectional change. The schematic summary shown in figure 8 suggests, on the basis of the long-term narrative offered above, that episodes of change have occurred with impressive regularity over several thousand years, and in future we should gather the necessary evidence to consider whether they are linked with other perceived economic and population cycles (see Braudel 1992:71–88; Goldstein 1991; Korotaev, Malkov, and Khaltourina 2006; Turchin and Nefedov 2009).

The finer details of how transport container shapes develop over time also benefit from being treated as an evolutionary phenomenon, and the amphora record is particularly well-preserved for this purpose. To take just one example, several commentators have mentioned in passing that certain amphora styles become slimmer and taller over the course of the first millennium BC (e.g., fig. 9*A*), usually without offering further discussion. In fact, even if we take an exceptional crude and aggregate indicator of shape change, such as the changing ratio of jar height to maximum diameter, it is clear that the favoring of steadily taller shapes is an almost basin-wide phenomenon over the period 750 BC–AD 0 (fig. 9*B*, phase A). This trend can be compared to other suggested proxies for long-term, macroeconomic activity (fig. 9*C*), and anticipates by a century or more a peak period to either side of 0 AD. However, this first-millennium BC elongation of amphora design is neither accompanied by a consistent change in average capacity nor does it bring any automatic freight efficiencies. Taller amphoras are harder to make, but the pattern seems unlikely to be due only to more specialized potting skill. Instead, one possibility is the changing influence of certain primary cargoes and their transport idiosyncrasies. For example, there is some evidence that wine amphoras were typically made taller because contact with the surface of the vessel was mediated by a pitch lining (so minimizing this contact via a spherical shape was not necessary, in contrast to oil amphoras) and because taller shapes would limit the oxidation that would otherwise occur due to air trapped below or leaking into the vessel mouth (see also Macrobius *Saturnalia* 7.12.13–15). Hence, it is at least possible that an increasingly dominant role for the long-distance wine trade may have encouraged steadily more elongated shapes during this period. A further possibility, and perhaps the one I would favor most at present, is that ship sizes were also growing throughout the first millennium BC and that, overall, this encouraged longer container shapes that maximized container-to-container contact during transport (thereby minimizing the risk of breakage), as well as ones that could be more easily trussed together or hoisted up from a deeper hold.

In any case, while subsequent trends in height to width over the next 1,000 years are less dramatic, they still mark out distinct container phases and wider geopolitical regimes. These include phase B (see fig. 9*B*), a transitional phase of further elongation but greater heterogeneity, during the large-

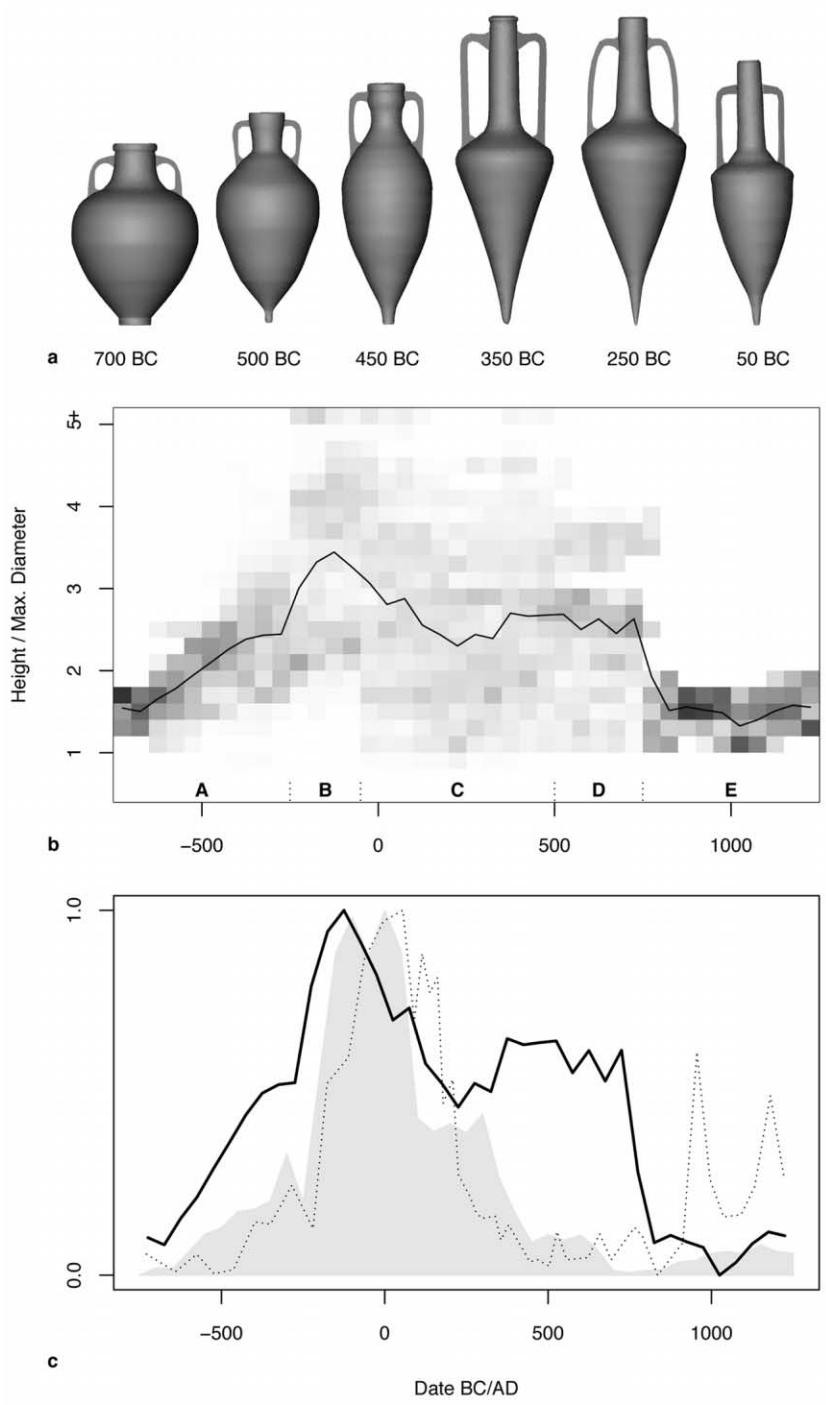

Figure 9. *A*, the changing shape of amphoras from the Greek island of Chios (after Grace 1979); *B*, a bivariate histogram of amphora height-width ratios from 750 BC to 1250 AD, with the weighted mean shown as a solid line (heights and widths taken mainly from Monakhov 2003; Ramon-Torres 1995; and from the University of Southampton's "Roman Amphorae: A Digital Resource," http://archaeologydataservice.ac.uk/archives/view/amphora_ahrb_2005/, with later additions); *C*, a normalized version of the same weighted mean (solid black line) compared to the levels of lead pollution from metallurgical industries as recorded in a northern Spanish peat deposit (dotted line; after Martínez Cortizas et al. 2002, fig. 4*A*) and the frequency of Mediterranean shipwrecks (solid gray line, after Wilson 2009, fig. 9.4; see also Morris 2010, figs. 6.2 and 6.6).

scale political confrontations of ca. 250–230 BC; phase C, yet greater diversity in the Roman imperial period, with its dedicated wine, oil, and fish sauce containers, parallel use of barrels, and combination of state-led and private enterprise; phase D, a further transitional phase associated with the more limited economies of the Byzantine and post-Roman period; and, eventually, phase E, the squat, multipurpose forms and far more restricted role for clay containers in the Medieval Mediterranean.

There is certainly further insight to be drawn from more subtle quantification, as well as by distinguishing different regional tempos of change. Even so, these coarse Mediterranean-wide amphora patterns should lead us to anticipate similar large-scale trends in barrel design that, while far more difficult to unpick from archaeological finds alone, might still be explored in combination with documentary and representational sources. For example, many of the better-preserved Roman barrels have greater height-to-bilge diameter ratios (2–2.5, Marlière 2002) than later examples (where 1.5 is typical, see Barker 1994), and the best preserved Medieval barrel depictions suggest a combination of both unusually tall and squat shapes (fig. 6*C*, also Tucci 1967). Some of this variability may be driven by artistic license (where depictions are involved), reflect persistent regional preferences, be tailored to particular contents (fortified spirits, ordinary wine, beer, water, dry goods), be due to improvements in cooperage (better stave toasting, greater use of iron hoops, etc.) or indicate a preference for longer, more robust shapes in transport (rather than storage), but as yet we do not know. Equally, we should not be seduced by, on first glance, the apparent homogeneity of modern shipping containers into overlooking regional variations and historical dynamics in their different forms (20-foot, 40-foot, "high-cube," "pallet-wide," "side-loader," to name just some of the most recent options), as I would argue that these differences offer insights into changing economic priorities and political confrontations, even if they are as yet rarely quantified.

Conclusion

In summary, what should be striking about the Mediterranean container record discussed throughout this paper is not only its overall longevity, but also the early and enduring importance of liquid commodities, which often provided the impetus for specialized packages that thereafter see a wider set of uses. Indeed, if we seek a general explanation for the strengths, weaknesses, and unusual precociousness of Mediterranean economic life, then a good place to begin is with three persistent forms of Mediterranean "liquidity": the enabling medium provided by the Mediterranean Sea itself, the apical values ascribed to recyclable metals from a very early stage, and the central role played by highly processed, vertically differentiated, fluid commodities such as oils and wines. With respect to transport containers, there are clearly several possible ways to explore the long-term tradition of transport packaging further, and three opportunities stand out in my view. First, we should pay sharper attention to container size, shape, capacity, surface area, tare weight, center of gravity, stress-and-strain profile, and so on, across large samples of artifacts, with a view to how and why they change over time, both basin-wide and by subregion. Second, it would be rewarding to focus comparatively on the changing way the human body has interacted with containers when handling them during conveyance, and on a wider set of body-container relationships that have led to the reuse of amphoras as coffins, ox hides as execution chambers, barrels as chairs, baths or stunt vehicles, satchels or boxes as reliquaries, and shipping containers as houses and prisons. Third and finally, I would anticipate an important coevolutionary association between (*a*) patterns of spatial nucleation or dispersal in human settlement along the Mediterranean coastal margin (as well as raw population rise and fall), and (*b*) the mix of container sizes and types in different places, both of these being the kinds of data that archaeology, history and economic anthropology are well placed to recover. In any case, what these closing suggestions should reemphasize is that we gain much by ushering transport containers onto center stage of a long-term story about human interaction.

Acknowledgments

This paper was largely written during a period of research leave, kindly made possible by colleagues at the Institute of Archaeology and by University College London. It also benefited from a research visit to the Centre Camille Jullian (Maison Méditerranéenne des Sciences de l'Homme, Aix-en-Provence). Hannah Tillim helped with collecting the amphora height-to-width ratios, and I am also grateful to Richard Barker, Cyprian Broodbank, Diego Calaon, Brenna Hassett, Alan Johnston, Bernard Knapp, Andrew Merrills, Alessandro Quercia, Michael Rowlands, Demestica Stella, Tim Stevens, André Tchernia, Richard Unger, and David Wengrow for advice and comments on a draft. Further suggestions by anonymous reviewers were very helpful.

Comments

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Bevan's panoramic survey succeeds impressively in stringing together a striking variety of transport containers in a coherent narrative, while offering a template for further, more detailed accounts that view the container as an actor, or mediator, in a network (*sensu* Latour). This template, however, is not entirely self-explanatory: How and when does a vessel

become an agent of the institution: when it is made? filled? exchanged? Does it remain the same throughout its use life, or perhaps undergo transformations of its own? Bridging this gap between the vessels, as found, and the institutions behind them requires an approach both biographical—tracing the use history of the vessels actually considered (the considerable literature on the Uluburun wreck is a case in point, not to mention trading vessels found in land-bound contexts), and genealogical—tracing the history of their production. To illustrate, I will briefly consider the example with which I am most familiar—the third-millennium "combed metallic ware" containers associated with the "Byblos run" between Egypt and the Levant.

Combed metallic ware jars attributed to maritime trade are found principally in Egyptian Old Kingdom tombs and on Syro-Lebanese coastal sites. Little can be made of them, or of their institutional setting, without a broader technological-historical understanding of the ceramic industry that spawned them. As noted by Bevan, South Levantine late fourth- to early third-millennium BC containers were designed and used initially for land-based transport; they attained iconic status as such, at both ends of the connecting routes, whether in the form of laden-donkey figurines (Canaan) or in representations of Levantine trade in Egypt as well as local adoption of specific ceramic traits (Kantor 1992). Showing neither standardization nor any technological evolution, fourth-millennium containers belong to the prehistory of Mediterranean trade. In contrast, the containers eventually adopted by the Egypto-Levantine sea trade can be shown to be descendant from a land-based industry, South Levantine Metallic Ware. This industry was the first in the Levant to embrace the concept of commodity, that is, the fundamentally alienable, exchangeable material product, applying it to the container itself, no less than to the content (Greenberg 2011). This prioritization of the container—extending even to such actions as its branding at the point of production (the application of seals to the leather-hard ceramic)—was a predilection of south Levant potters in both the third millennium and in subsequent periods, contrasting with the more economically accountable practice of branding and sealing the perishable contents typical to the more developed bureaucratic economies of scale found to the northeast and southwest (Wengrow 2008).

Following Bevan's lead and distinguishing the interface of combed metallic ware with the sea trade, some salient points stand out: Where the land-based industry, probably located in the mountains bordering the upper Jordan Valley, diversified its products to include all manner of domestic ceramic utensils (including many that could contain nothing at all, such as the ubiquitous platter), a closely related industry, presumably located in proximity to the Lebanese coast, using the same techniques and virtually identical raw materials, homed in on the two forms best suited to sea trade—cross-burnished jugs and combed jars. Moreover, the design of the jars was tweaked to improve their durability by making them relatively taller and with streamlined handles (Thalmann 2010). These jars became the "iconic" vessels of the trade run between the Nile delta and the central Levantine coast (Thalmann and Sowada 2014). They completely displaced the more globular, land-based South Levantine Metallic Ware containers that, having lost their function in a severely diminished overland trade, quickly declined within the southern Levant itself. By the late third millennium, the production of combed metallic ware jars was a coastal affair, completely divorced from the defunct institutions that had brought it forth.

This brief attempt to focus on one small corner of the broad canvas presented by Bevan illustrates the value of his container-based approach, while highlighting the need to enhance it by including a consideration of technology and the industry implicated in container manufacture. Clearly, there is an interface between local technological and design traditions and maritime needs. But once an industry producing the containers is put into place, it may well take on a life of its own, occupying a mediating position between its land-based institutional origins and the arenas of consumption and repeated use. In addition, the afterlife of the distributed container is something to be considered: A wooden barrel in a Medieval Levantine context surely conjures up a host of connotations. And what are we to make of the ubiquity of metal storage containers in the contemporary landscape, where their installation—completely divorced from their role in global trade and oblivious of the logos imprinted on their sides—has become virtually emblematic of the initiation of construction projects, road building, and, best of all, archaeological salvage excavations?

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With this remarkable contribution, Andrew Bevan weaves together the variegated spaces of the Mediterranean with a deep history of containers. While his approach is synthetic and wide-ranging, his firmly empirical focus on container materialities allows the ingenious use of "liquidity" as a uniting theme. What I suggest here is that another kind of liquidity is at work—one that concerns the "fluid technology" of some containers—and that this helps explain their incredible longevity.

The double liquidity Bevan describes creates particular technological requirements. In theory, the transport medium itself could be the container, though liquids do not ever seem to have been poured directly into the hull of a ship. So the transport technology is the container for other containers, and these were variably made of ceramic, wood, cloth, glass, or steel. This range suggests that container requirements are not all that constraining, and given the striking variation over time and space in the contexts of container use—with very

different scales of supply and demand in the Middle Bronze Age as compared to the Roman period, for example—we might expect widely divergent responses. We should surely anticipate all kinds of changes in how, where, and why liquids circulated. Indeed, this is part of Bevan's argument that "container strategies have changed in episodic bursts" and that the complex coevolutionary feedback between different elements means "we should anticipate boom-and-bust trajectories as much as or more than we should unidirectional change."

While I largely agree, what really strikes me is how extraordinarily resilient the first transport amphoras are to change and radical innovation. Perhaps the amphora changes shape from one phase to another, and this may indeed go hand in hand with evolving nautical technologies. But these adaptations aside, the clay amphora just will not go away. Even when it seems that the barrel has it beat, it makes a comeback. The amphora really doesn't change, and it is resilient to all those forces swirling around it, from changing consumption habits to fluctuating product output. This requires some explaining, and though I agree with Bevan that the picture is hardly one of unidirectional change, neither does "boom-and-bust" quite capture it either.

So what can explain this dynamic stability? Although mundane, perhaps it is a special kind of artifact owing to the "network" location it occupies between many different kinds of pressures being exerted on it. Here one might note that Bevan talks about how "packaged goods have navigated the seams between different kinds of institution." Perhaps mundane artifacts act like this more than we realize. If we turn briefly to sociology, we find that the network qualities of everyday artifacts are given special treatment in Actor-Network Theory (ANT). To quote from one source, ANT maintains that "objects are an effect of stable arrays or networks of relations" (Law 2002, 91). One example Law provides is the Portuguese ship in the sixteenth century, which is enabled to travel across geographical space because of the strong relational forces holding it together functionally. Latour has dubbed such objects "immutable mobiles" (1990, 21). This artifact, however, has an entire imperial system invested in keeping the entity functionally stable. Perhaps more relevant here is another example discussed by Law (2002), that of the Zimbabwe bush pump (see de Laet and Mol 2000). This is a technology so flexible as to be difficult to define and so distributed as to fall beyond the purview of centralized state power. Moreover, its creator refuses to take credit for its invention and "insists that it was invented and adapted in all sorts of distributed locations" (Law 2002, 100). This sounds a lot more like the Mediterranean ceramic amphora. And appropriately enough, given Bevan's theme of liquidity, the bush pump is what de Laet and Mol refer to as a "fluid" technology.

So what then holds a fluid technology or thing together? With the bush pump, the technological design itself incorporates a simplicity and durability that serves effectively to scaffold a variety of actions. For the ceramic amphora too we can look to the affordances of the materials themselves. Bevan highlights the ubiquity of clay in the Mediterranean, the durability of ceramic amphoras, and their portability (loading and offloading is an important cost). So the container form itself scaffolds action and can do so resiliently over time because its technology has this fluidity to it.

This diversion through ANT is a means to think about containers alongside other technologies. It highlights our relatively poor understanding of the relative contributions of material affordances and network effects on trajectories of innovation in materiality. An object like a container, being caught up in diverse relations, could quite conceivably be vulnerable to changes around it and thus be continually changing. And yet some things or technologies have their own material structures that seem to render them resistant to such wider forces. Clearly, more comparative studies are sorely needed, though it will be difficult to match the rigor and range of Bevan's inspiring contribution.

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5 III 14

Bevan sets for himself the monumental task of surveying "a 5,000-year container tradition" with the goal of understanding the Mediterranean as the prime example of a trading zone dominated by the "container." In this comment, I focus on the period most familiar to me: 1000 BC to 200 BC.

Bevan's coverage of the Archaic through Hellenistic periods begins with the comment that "some of the most interesting developments in liquid container shapes are found in the eastern and northern Greek islands." One imagines he is referring to Thasos, Chios, Samos, Rhodes, and Kos. For the period of the sixth through the fourth centuries BC, equally significant developments occur at mainland centers. Miletos, along with a wide range of neighbors, produced one of the most widely distributed Archaic amphora types (Dupont 1998:170–177). Mende, again alongside near and far neighbors, defined and refined a regional style of which Thasos was but one of many participants (Lawall 1997; Papadopoulos and Paspalas 1999). Corinth anchored the easternmost end of an exceptionally wide regional style (Corinthian Type B) that spread across to southern Italy and up into the Adriatic and for produced some of the earliest purpose-built transport containers (Corinthian Type A; Koehler 1978; Pfaff 1988; Sourisseau 2006, 2011). Had islands led the evolution of containers, then perhaps something special about them catalyzed the long-term success of amphoras as containers. Since the same case can be made for nonislands, the factor of "islandness" at least in this regard disappears.

Bevan situates the beginning of amphora stamping in the late fifth century as follows: "The stamps often carried a recognizable symbol or an explicit statement of provenance, as

well as further information about the date of production and the manufacturer . . . and they seem to have guaranteed a certain capacity, albeit following multiple local standards that varied over time." Stamping on jars (not necessarily amphoras in every case) is attested already from the late eighth century BC (Papadopoulos 1994) and is not difficult to find in the late Archaic period (Garlan 1999:54–58, 59–60; Johnston 1990:51). No less important is the common appearance of both prefiring and postfiring dipinti and graffiti on Archaic and later amphoras (Besios, Tzifopoulos, and Kotsonas 2012; Johnston 2004; Lawall 1995, 2000). Only the most widely published and discussed early stamps, the coin types of Chios (hardly a "regular" practice, as these stamps are quite rare) and Mende, are neatly informative as to the jar's point of origin. Far more often a single letter or generic image is all that appears on the stamp. Date of manufacture only begins to be indicated with the names of annual magistrates found on fourth-century Thasian amphoras (Garlan 1999). The closest one gets to the name of a manufacturer on Greek stamps is the name conventionally referred to as the fabricant (only seen from the fourth century and later, not earlier), but the identity of this person is very much debated (Debidour 1998; García Sanchez 2008; Garlan 1998). Finally, stamps as having "guaranteed a certain capacity" is but one side of a very complex debate, which had barely begun with Grace (1949; see Finkielsztejn 2006, 2012; cf. Garlan 2000:169–171). Most importantly, only one group of stamps—those of Akanthos—indicates the capacity module of the stamped amphora (Garlan 2006). It should be clear simply from these points of correction that the purposes served by amphora stamps varied from place to place, period to period; it is difficult to see here a "coevolution" between "transport containers . . . [and] an information technology of marking practices, ensuring date, quality, origin, and so on, and invoking institutional authority of one kind or another." Instead, it is precisely the varied and changing needs for "information" from the container itself that are fundamental to the understanding of how containers were used in Mediterranean commerce.

Finally, Bevan observes that Aegean amphoras "by and large . . . took forms that linked them to the commercial identities of particular city-states." While it is true that ancient textual sources used terms like "Knidian" and "Thasian" to refer to the jars (though usage of such terms is not straightforward, Kruit and Worp 2000; Mayerson 2000; Papadopoulos and Paspalas 1999), it is not the case that city-specific shapes were the norm. Bevan does note that "less place-specific jar styles and acts of imitation were also common" (with reference to Lawall 2011). I go much further than that: regional styles were the norm; city-specific forms are the distinct exception. The consistent link Bevan postulates between container and sociopolitical institution (in this case the "tiny Greek city-states") is itself a dynamic variable.

Hence, where Bevan sees long-term consistency in basic needs for standardization and institutional support surrounding container use, I see inconsistency. In this regard, a close study of transport amphoras of the Archaic through Hellenistic periods neatly complements Johnstone 2011, cited only once here, arguing that Classical Greek expectations and needs concerning containers often contradict modern expectations of precision and accuracy.

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I am not often asked to comment on archaeology papers, but I was glad to be invited in this instance, for, as with Bevan's previous work (2010), I find fruitful commonalities with my own work (Meneley 2007, 2008*b*) on the contemporary global circulation of olive oil. Bevan's article indicates the importance of considering the ethnographic present as part of a much longer history of containers and shipping. While recent moves in cultural anthropology (see Keane 2003) encourage anthropologists to pay attention to the materiality of the object itself (cf. Manning and Meneley 2008), Bevan shifts our attention away from the object itself, toward the material qualities of the containers themselves that are used to ship the object in question. Containers also provide a ready source of (potentially misleading) metaphors for the relation of meaning (content) to materiality (container), but there has been little exploration, it seems, of the literal material semiotic potentials or affordances of containers in themselves. Nineteenth-century philosopher (and amateur ethnographer) Robertson-Smith discusses how meaning and value must be cloaked in a "husk of material reality" (1972 [1889]:437). Bevan is literally talking about the husk itself, the container that encases the commodity to protect its value over long shipping voyages.

Bevan discusses how the means of shipping (e.g., the size of the boat, how the containers are taken from the boat to the consumer) is related to the shape and attributes of the containers (e.g., do they have handles or pointed or flat bases). As Simmel (1959) notes, handles on vases (or in this case amphoras) are both practical and aesthetic. Bevan points out the shifting tension between the bulk and the beautiful, noting that rebottling in smaller containers can add value and impart charisma through the repetitive imagery of seals, again both aesthetic and imparting a guarantee of provenance. But this guarantee of provenance embedded in the container can also lead to adulteration or downright falsification. Falsification is "semiotically parasitic" on authentication. As Manning (2012: 107–109) argues in his discussion of authenticity and falsification of Georgian mineral waters, bottles can serve two very different semiotic functions. Because they are durable, bottles, like amphoras, can be a part of a semiotic chain of authentication, indexing a source or producer. Yet precisely because they are durable and can outlive this original function, they can serve other masters, moving from relaying a chain of authentication to becoming the means of falsification.

Manning quotes one informant as saying "falsification is a second hand bottle" (108).

The knowledge of how the materiality of the containers affects the quality of the product they contain has a long history. When amphoras gave way to wooden barrels as shipping containers in Medieval Europe, they were found to be inferior for olive oil transportation, as a quality of olive oil is that it expands as it heats up and may "ooze out between the staves." Indeed, preserving the quality of the oil has been central to the recent production of extra-virgin olive oil, and the preservation of that olive oil is linked quite crucially to containers. Contemporary elite olive oil producers in Tuscany display the picturesque antique amphoras in their museums in what used to be created from the olive mills on their estates. The history of the techne, the ancient craft of producing olive oil, is omnipresent in their marketing, yet the technoscientific practices that ensure the highest-quality extra-virgin olive oil are also highlighted in the stainless steel containers used to house the olive oil before it is decanted for shipping into dark green bottles (cf. Heath and Meneley 2007, Meneley 2007). The "charisma" and aesthetic appeal of the techne are embedded on labels often adorned with vistas of reusable landscape capital, which is how Bevan describes the terraced landscapes, although the producers certainly do not.

Bevan traces the movements of containers and the objects they encase over millennia, arguing that "maritime-led, containerized exchange in classic regional products such as wine and olive oil becomes Mediterranean-wide, distinguishing the whole area from often less integrated economies beyond." He also notes the potential political implications of access (or lack thereof) to ports and containers. Bevan's use of "Israel-Palestine," should properly read "what is now Israel-Palestine" to index the recent establishment of the state of Israel in 1948. A sign of another Israeli dispossession not only of Palestinian land but also their history is that Palestinians are now excluded from the Mediterranean. Palestinian olive oil marketing notes their ancient connection to the Mediterranean, but the only contemporary evocations of the Mediterranean itself have been reduced to statements that note how on clear days, one can see the Mediterranean Sea from Palestinian mountain terraces and, if one is lucky, catch a whiff of its beautiful sea air. Their actual connection to the inclusive potential of the Mediterranean shipping trade has been squelched by Israel, which allows no unmediated Palestinian access to their former vibrant ports in Haifa and Jaffa, with their remaining port at Gaza restricted from sending or receiving shipments.

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Bevan makes plausible claims about the importance of this neglected subject. The Mediterranean is prominent in the archaeology of bulk transportation and the history of standardized packaging, and both themes thoroughly deserve scholarly attention from his chosen angles of inquiry.

One issue worries me, though: Do the moments in the record of Mediterranean container behavior all belong in the same explanatory narrative or "salient tradition," and does this record really exhibit the evolutionary character that Bevan gives it? Can we justify a more than contingent juxtaposition of many different container histories? Are ox hide ingots of lead in the Tyrrhenian Sea in 600 BC, Byzantine wine amphoras from the north shore of the Sea of Marmara, and the steel containers of the great port of Algeciras today really so closely related? The "Mediterranean container record" is arguably only as long as the narrator chooses to make it. Either it has no intrinsic characteristics that might endow it with "longevity," or they are not investigated or presented here. These are fascinating questions, then, context by context, but in making them join up in this way, Bevan may not be squeezing the maximum return out of them. A comparative, rather than a teleological, approach might be preferable, even if we had to jettison the seductive figure 8 with its curious but unexplained rhythms of mutation.

Being content with comparison would let us off a couple of hooks. The first hook is the task of identifying essentially Mediterranean behavior. While there are some reasons for thinking that the large-scale use of ceramic containers for transportation took on a distinctive, significant, and very long-lasting form in Mediterranean contexts, barrel history, as Bevan knows, is probably mainly a north European behavior extended to the Mediterranean basin. The "industrialization of packaging," likewise, can hardly be described as a Mediterranean transformation, and containerization, again, in its modern sense (standardized steel transport containers), is a feature of intercontinental, oceanic trade. On a related point, amphoras may be very Mediterranean, but how vital to the Mediterranean as a whole were amphoras? There is a danger that the high survival rate of clay jars has skewed the evidence. Bevan is absolutely right to foreground intermedium flexibility: the amphora and the sack are easily transhipped to pack animals, while the barrel needs a wagon—and a road. But in both cases we are reminded that "the Mediterranean" is much more than just a sea.

The second hook is the need to make the story one about commercial exchange. Bevan too readily labels the products that were the subject of the transportation systems under discussion commodities in the full sense (at "one end of a spectrum of fungibility and alienability"). His definition of commodity more helpfully includes both the bureaucratic taxonomies of controlled exaction and the more familiar commercial ones. Tax and trade as motors of production and distribution may be essentially similar, and both may generate packaging and branding. But it would be good to explore that richer comparison, between some behaviors that might be fitted in to a progressivist account of how we got where we

are economically and ones (such as the state-supply systems of Mycenaean palaces or the Roman army) that really cannot.

Similarly, Bevan lists briskly a number of really important and interesting (if rather varied) themes for the inquiry: "metrical convergence, product labeling, subpackaging, small-scale repackaging, and bulk cereals." He makes them sound intrinsic to a single pattern of behaviors, when they long remained much less aggregated, serving multiple different local and periodic functions. Here I missed a distinction that is axiomatic in the containerization world, between bulk cargo (such as staple foodstuffs) and the kinds of more diverse and occasional cargo that lend themselves to containerization. Indeed we might do more to separate packaging, with all its complex political, cultural, religious, ideological semiotics (including all the various registers of branding), and containerization proper. The ancient counterpart to the latter might not be the amphora, but the trading ship, a precociously intermodal, multifunctional transport unit.

Which is the direction of causality? Did demand produce more efficient, and readily standardized, containers, or did easy, cheap distribution generate demand—and the production to meet it? Did the fact of shipping with amphoras make possible—and call into being—the huge distribution systems of wine and olive oil of Mediterranean history? The crucial take-off moment that he attributes to the eighth century BC might be seen not as a response to an independent history of "classic regional products" but as a maritime revolution that turned scattered local productions into the building blocks of Mediterranean economic history. Finally, Bevan is right to insist that containers and packaging were a language in which social consensus and differentiation, trust, rivalry, interdependence, prosperity, and tradition have all regularly been expressed and that these semantics offer rich territories for the historian and archaeologist to explore.

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It is heartwarming to see this tracing of the *longue durée* history of Mediterranean trade containers published in the pages of *Current Anthropology*. It complements recent work by Bevan and others on commodity branding in Old World prehistory and early history (see, e.g., Bevan 2010; Wengrow 2008), reminding us that the past was not entirely such a foreign country as we sometimes like to believe and that sophisticated design and technology were applied to the logistical challenges of shipping or otherwise transporting bulk commodities with as much inventiveness almost 5,000 years ago in the East Mediterranean and Near East as they have been ever since. What Bevan brings out particularly nicely is the direct line of descent between the all-purpose *pithos* (large, Ali Baba–sized ceramic jar)—as found, for instance, filled with a variety of commodities on the Uluburun wreck of the fourteenth century BC, excavated off the coast of southern Turkey—and the all-purpose metal shipping container of today; or between the ceramic "Canaanite jar" of the early second millennium BC and the modern metal "oil" drum, which, like its ceramic Greco-Roman, Medieval, and even twentieth-century predecessors in the form of transport amphoras (see, e.g., Mallowan 1939), can also be used for shipping a wide variety of sometimes unexpected commodities.

There is no doubt about the ubiquity (and consequently sheer quantity) of ceramic transport amphoras that traversed the Mediterranean from well before Classical Greek times onward. The pile of broken and discarded amphora fragments that make up the eponymously named Monte Testaccio at the Roman port of Ostia and the wealth of indestructible "toe" fragments found at almost every Roman or late antique site around the Mediterranean bear witness to this, as do the many bars or restaurants on the Mediterranean coast of Turkey and other countries fringing the Mediterranean that display barnacle-encrusted ancient amphoras dredged up from the sea by their patrons' fishermen friends and relations. Moreover, as Bevan indicates, it is indeed Phoenician transport amphoras that have allowed archaeologists to identify Phoenician maritime traders at Huelva in southwest Spain as early as 900 BC and to trace part of their route to the far west by means of identical, contemporary amphora fragments at the port of Kommos on southern Crete.

Ceramic containers remain indissoluble and often very visible in the archaeological record, and generations of archaeologists have spent their lives classifying and provenancing particularly Roman amphoras, but what Bevan also reminds us is that there is an equally long heritage of transport containers that do not survive and whose existence can only be surmised in the absence of textual or iconographic information, which, for one reason or another, is not at all evenly distributed over the millennia and regions covered by his paper. The question of wooden barrels always seems to me something of a puzzle. Since their construction techniques are really not all that different from some of those needed for certain types of boats or, indeed, for the felloes and rims of wheels, it would perhaps be surprising if some of the more heavily wooded regions of the Mediterranean and surrounding areas (e.g., parts of the Pontic coasts) had not made use of them considerably earlier than the first century BC, when Strabo (5.1.12) described the wooden wine casks larger than houses produced in the Po Valley. The word Strabo uses is *pithos*, and since, even as early as Herodotus in the fifth century BC, the need seems occasionally to have arisen to qualify particular *pithoi* as specifically of earthenware or even metal, one wonders if this generic Greek word might not also, at least in certain regions (as Bevan obliquely hints), subsume regular wooden examples. Diogenes the Cynic, a fourth-century BC philosopher, may not have lived in a wooden barrel in Athens—a myth probably started by nineteenth-century

translations of *pithos* as barrel—but perhaps the statue of him and his large wooden barrel erected by the modern citizens of his birthplace, ancient Sinope, is not quite as anachronistic as it seems, had he continued to live and work where he was born. The southern Black Sea coast would be (as doubtless its modern inhabitants recognize) just the sort of place one might expect wooden transport containers to have had a particularly long history.

After decades in which historians and archaeologists have been confined within narrow chronological or geographical limits or constrained by abstract anthropological theories, it is liberating to read a joined-up narrative of the long history of Mediterranean transport containers and the steady growth in scale and scope of Mediterranean (and wider) commodity trade to which they testify. It draws a seamless link between the world of up to five millennia ago and the "globalized" world of today, via Fernand Braudel and Immanuel Wallerstein.

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The container, as Andrew Bevan points out in this valuable survey, is an object in search of its own history. We do not lack for archaeological studies of containers or their sherds. It is less common, however, to find the container treated as a defining cultural motif or an aesthetic object (though see Saito 2007), a thing in its own right. There is something quite compelling, therefore, about his proposal to craft a genealogy of the Mediterranean container.

The trick to any phylogenetic approach to inanimate replicating matter lies in the need to identify a unit of transmission (see Shennan 2002). In the case of containers, the usual strategy would be to locate the unit of transmission in the knowledge sets that are passed from one potter or cooper to the next. But this might be overly literal, and it is certainly not Bevan's approach. Andrew Shryock and I (Smail and Shryock 2013) have wrestled with this question while contemplating Upper Paleolithic shell beads and their descendant forms, ranging from pearl necklaces to coins. It is possible to imagine a transmission of bead-making skills remaining unbroken for 42,000 years and ending with Kula valuables and plastic shirt buttons, but it may be more parsimonious to use a pattern such as convergent evolution to explain the similarities we find among small, hard things with holes in them. If so, the history actually describes a phylogeny of habitat, a cultural niche that continuously generates new organisms—beads or barrels, depending on the habitat—which in turn vary across the ages as a function of changes in the niche.

The niche that interests Bevan is a Mediterranean niche defined by the bulk transport of liquid commodities. But as he subtly indicates, there is more to it than that. Clive Gamble (2007) has observed that the container is deeply entangled in the human past, both as object and as metaphor. From Gamble's perspective, pots and baskets are containers, but so are Paleolithic campsites and Neolithic houses, not to mention symbols and words. Containers, in short, contain many things, including other containers. At each level of the container hierarchy, in this nesting series of Russian dolls, the form of the container follows a pattern that is culturally distinctive.

One of the many things that makes containers special is their capacity to enable time travel. Some kinds of containers, including the transport containers featured here, remove foodstuffs from the ordinary cycles of decay and rebirth. When foods are sealed up and stored in this way, they can be made to travel across time and space, allowing people to manage risk and uncertainty. Documents and the archives, libraries, or genizahs in which they are stored are containers for ideas or information that can travel the ages; this lies at the heart of the historian's craft. Containers for devotional exercises, ranging from architectural spaces to icons, grant their users instant access to times past.

As it happens, devotional containers, in the form of sanctuaries, baptisteries, reliquaries, pyxes, and monstrances, are a distinctive feature of the world that Bevan explores, at least on the Christian side of the Mediterranean (Bynum 2011). Some of these containers, notably the chasses-reliquaires, are similar in form to the chests, bins, and caissons that are ubiquitous dry storage devices in the Medieval European household. In a similar manner, the shape of the amphora is partly echoed in the loop-handled ampullae or flasks, bearing stamps of provenance, that pilgrims purchased so as to carry holy water or oil away from a shrine. The container mentality finds many echoes across this world, suggesting that Christianity borrowed some of its distinctive qualities as a container religion from the transport systems that defined the Mediterranean world. Containers make for good economic history, as Bevan shows, but their cultural meanings may be fractal and fungible.

A burgeoning literature in anthropology, archaeology, and history makes much of the thing. But if anything defines our distinctive patterns of consumption in the present day, surely it is the lengths to which retailers will go to package the things they sell. It is packaging that we most commonly consume, in the sense of "discard." In light of Bevan's study, what is noteworthy about the robust anthropology of things is how it is not balanced by an equally robust anthropology of containers, let alone an anthropology of trash. This survey provides an essential starting point for rectifying this imbalance.

Reply

Many thanks to all of the respondents for their encouraging and insightful commentaries. It was daunting to wrap up my

thoughts on this large topic, load them into a standard-length article, and ship them forth. Reassuringly, most have arrived safely and to positive response, while only a few have suffered in transit or might have been better packaged. Below, I will try to do a little further justice to some of the analytical challenges and opportunities that the above comments have raised.

Tempos of Change

Any ultra-long-term perspective on material culture inevitably throws up problems about how best to describe consistency and change over time, as well as how to unpick cause and effect. Carl Knappett rightly cautions against overemphasizing long-term "boom-and-bust" in transport container strategies, especially given the undeniable resilience of solutions such as the amphora. I agree entirely: there is nothing particularly roller-coaster about much of the history of Mediterranean containers and it is thus important not to lose sight of their remarkable continuities. However, neither are such objects wholly "timeless," and modest but observable episodes of greater flux or greater stability in container design have much to say about broader historical questions, as I will try to restate with respect to settlement patterns and trade routes below. Mark Lawall also offers an important steer, to the effect that "regionalism" in amphora styles, production rationales, and distribution mechanisms is a Mediterranean norm. Different parts of the basin repeatedly develop their own slightly differing local approaches. Nevertheless, there clearly is something basin-wide to be said, both about the globally unusual intensity of Mediterranean container traditions through time and about certain kinds of long-term stylistic change (e.g., the elongation trends for amphoras shown in fig. 9*B*: A–B). Moreover, not all forms of regionalism are of a piece: for example, style zones visibly vary through time, in geographical size and shape, as well as in institutional underpinning. So again we cannot just mention a long-term propensity for regionalism but should also look out for outlier periods that, comparatively speaking, exhibit more or less homogeneity than we might otherwise expect. One episode that springs to mind (following Arthur 2007:174–175) is the late seventh to eighth centuries AD, when small, globular amphoras of similar general form and approximate capacity were unusually widespread across much of the basin. Given our predisposition to think about this period as one of regional rupture, this consistency is at first counterintuitive and certainly worthy of further attention.

More generally, of course, there is always an interpretative tension between identifying general trends versus particular details. Most academic discussions (and disciplines) swing backward and forward in their prioritization of one or the other. To some extent, Raphael Greenberg is addressing a similar "wood for the trees" tension in his call for us to combine detailed container use histories (which will vary in interesting ways by type, region, and period), with container genealogies (which offer tree-like summaries of more complicated transmission histories) and with attention to much wider contexts of technological transfer (e.g., among all Early Bronze Age Levantine ceramics). He also brings out another salient issue: that the afterlives of traded commodities and their specialized packaging (where they go and how they are redeployed after any primary use) are not epiphenomena but are fundamental to the way such material culture has circulated (also Bevan 2010:41). For example, since the Bronze Age, royally branded goods (e.g., wine or oil from royal estates) have routinely "leaked" out of the superficially narrow Mediterranean courtly circuits in which they were supposed to circulate. Likewise, military merchandise has often found its way into hinterlands well beyond or behind perceived state frontiers and formally militarized places (both container and contents, but especially the former). Finally, containers have always been routinely recycled in village economies, via further refilling and restoppering as transport vessels but also via a host of other onward uses (e.g., as water carriers, as alternatives to dedicated agricultural storage bins/jars, as road and roof makeup). In a sense, the discard of millions of oil amphoras that built Monte Testaccio is an exception, driven by a particular governmental provisioning strategy for the Roman capital. Normally, it has been routine contextual leakage and everyday, widely expected recirculation (rather than one-off, throwaway use) that have been structurally important features—and arguably the way that containers have often pushed their way into the wider social consciousness. A typical modern shipping container might spend a decade being stacked, unstacked, and shipped alongside thousands of others on huge boats. Images of this kind have long been used as easy shorthand for globalization, but these boxes' subsequent, often eccentric, repurposing creates a mosaic view of local reinterpretation and opportunism that is now almost as popular an image.

In the main text, I occasionally mentioned "evolution" and most commentators seemed very much at ease with this usage. In fact, my primary goal was not to provide a rigorous evolutionary archaeology (thankfully, there are now lots of good examples: see Shennan 2011) but merely to advocate stronger comparison and contrast within long-lived material culture traditions (e.g., amphoras) or between distinct but historically entwined functional solutions (e.g., amphoras and barrels). Even so, Nicholas Purcell and Mark Lawall both express concern about the perceived coherence of this subject matter, the assumed consistency of intraregional patterning, and the risks of ignoring cause and effect. I agree with much of what they say, having argued strongly in the main text that, despite undeniably transformative changes in recent times, there is no longer-term, unilinear, onward-and-upward process of container development, nor any monolithic, panregional coherence to this tradition. Even so, I worry that a misleading evolutionary stereotype lurks beneath the surface of their remarks, especially with regard to the supposed specter of "modern expectations," "teleological" approaches, and "pro-

gressivist" thinking that they invoke. Concerns like this continue to arise whenever someone mentions culture and evolution in the same breath, but it is high time we scotched the notion that evolutionary archaeology, history, or anthropology necessarily involves these assumptions.

Put simply, Mediterranean transport containers are precocious (i.e., worldwide, they appear comparatively early as specialized forms), have some unusually enduring features (especially amphoras, but also barrels), form intriguing constellations with other objects or cultural practices (that are more comprehensible if not treated in isolation), and have been recorded to an unusual level of detail (that makes them conducive to analysis). Beyond these basic statements, I do see further exciting opportunities for formal evolutionary modeling, even if my paper above did not set itself that task. For example, some amphora shapes are clearly borrowed by one regional center of production from another in relatively discrete horizontal episodes of technical exchange or indirect copying. But for both barrels and amphoras, there are strong suspicions of evolutionary pressures working over longer time periods too (e.g., as boat shapes or port infrastructure changes). The amphora record in particular would provide an ideal setting to address such issues, if we were to lay better groundwork for making large-sample morphometric comparisons. The purpose of such comparison would not simply be to refine our current typologies but to distinguish branching versus blending patterns of regional development, based on whether these shape sets exhibit better fits as evolutionary phylogenies or as networks (e.g., following the methodological distinctions and statistical apparatus suggested by Huson and Bryant 2006).

Institutions and Networks

How does transport packaging become associated with particular productive strategies or institutions? This is Greenberg's query, and he nicely describes the complex road taken by Early Bronze Age combed metallic ware jars: starting as part of a wider inland pottery repertoire and eventually becoming specialized coastal containers for seaborne trade. Arguably barrels may have taken a similar route, as Sue Sherratt hints, starting as part of a wider repertoire of woodworked objects for storage (e.g., of beer) and handling (e.g., paniers, buckets), but with technical links to boat building and wheel making that probably encouraged their increasing specialization for transport. To take a further example, the Medieval Cretan wine barrel exhibits a striking set of institutional links with the commercial and accounting practices of the Venetian Republic that also connect (*a*) lumber extraction from the wooded uplands of the Alps and northern Balkans, (*b*) the piracy-busting, highly bundled routing of Venetian ships on their way to the Levant, (*c*) the historically contingent opportunities for landscape capital intensification in a period of comparative peace on Crete, (*d*) the desire to conjure up a suitably attractive cargo in Venetian ship holds on westbound return journeys, and (*e*) the barrel-borne logics being given ever greater priority by linkages between northern Italian centers and the economies of northern Europe. Knappett and Greenberg are right that there is common ground between such observations and Actor-Network Theory, and, akin to Latour's "immutable mobiles" (1990), containers have had unusual societal impacts in part because they are a kind of technology that can be moved around large geographic spaces easily, encourages abstract thinking (e.g., can be meaningfully counted up), partially suspends change (e.g., by conserving the contents), enables unusual and socially agonistic accumulations (of commodities drawn from far off, not just produced locally), and is easily reproducible (i.e., to a standardized shape and manufacturing recipe).

Despite my enthusiasm for exploring the relationship between containers and different kinds of institution, this linkage deserves to be treated cautiously, and Mark Lawall sounds useful notes in this regard for the Classical-Hellenistic period. For example, he questions my suggestion that "some of the most interesting developments" in containers from this period are associated with island city-states, and his comments are thereby largely in step with wider disciplinary dissatisfaction about the traditional dominance of polis-centered narratives (e.g., Constantakopoulou 2012). Certainly the situation is not simple, and my original phrasings were deliberately circumspect, but viewed from a broader perspective (e.g., across over three millennia of Aegean transport jar production or across several thousand kilometers of Mediterranean basin), it remains hard not to remark upon the links between new amphora shapes, a constellations of marking and standardizing practices on coins, bricks, and tiles (albeit with variability in what these marks say or show), and the emergence of Classical-Hellenistic civic institutions. Likewise, while islands may not be the whole story, they are nonetheless far more prominent as distinctive amphora producers in this period than they are in earlier or later ones, and the isthmian and peninsular sites Lawall adds to the list (e.g., Miletos, Mende, Corinth) merely reinforce a point about how network-driven this phenomenon is likely to have been.

The main article also proposed that military and religious institutions sometimes foster particular container networks. Daniel Lord Smail goes further in making the case for religious associations by noting how Mediterranean transport containers have repeatedly provided a ready conceptual metaphor for the devout. Closed containers keep their contents pure and make them longer-lasting: "[they] remove foodstuffs from the ordinary cycles of decay and rebirth." Sealed and standardized transport containers then offer additional guarantees, about lack of tampering and reliability of product for people involved in awkward, attenuated kinds of longer-distance interaction. The resulting metaphorical possibilities with respect to purity, longevity, inviolateness, and interpersonal trust do indeed make containers useful religious and political props, and certain Mediterranean attitudes clearly point in this direction, as Smail indicates. However, Jean-Pierre Warnier

(2007) has also written at length about the container-based ideologies of West African kings, so further work is needed to explore what, if anything, is particularly Mediterranean about these attitudes.

Hierarchies of Packages, People, and Paths

Knappett, Purcell, and Smail all agree on the existence of a nested hierarchy of transport containers, from small decorated bottles to larger plainer packages, and even to ships as containers themselves. Anne Meneley further brings this out with respect to the very strong to and fro between high-tech and high-trad(ition) in the branding of Mediterranean commodities such as olive oil and wine. The perceived pros and cons of oil cans versus bottles, of cork wine stoppers versus artificial alternatives, or wine bottles versus flexi-bag containers evokes this tension but also involves questions of commodity scale and supply chains involving break-bulk repackaging. Value inequalities are thus built upon these size hierarchies, and vice versa. However, again, we should do more than just note the existence of these inequalities and instead should anticipate that they will vary regionally and chronologically in interesting ways. For example, there remain many opportunities to compare transport container assemblages and changing regional settlement patterns over multiple chronological periods (right up until the present). There are some clear and persistent features of Mediterranean settlement that we should not ignore, with bigger towns typically located in the middle of bigger agricultural zones or at good harbors. However, through time, there are also clear ups and downs in aggregate human population, episodes of coastal retreat or advance (e.g., in response to piratical threats), switches from more nucleated to more dispersed settlement configurations, as well as functional diversification or consolidation at individual centers (for a small island view, see, e.g., Bevan and Conolly 2013). These patterns are also intimately linked with the bundling and unbundling of trade routes (e.g., Bevan and Wilson 2013; Taaffe, Morrill, and Gould 1963), as well as with whether beaches and small ports play a major role or are excluded from most interaction because harbor sites are the dominant conduits (which relates also to institutional interventions on customs duties, protection from piracy, and the spread of disease; Arnaud 2011).

Comparing settlement and route hierarchies with those exhibited by container sizes and shapes will require us to collect artifact data in ways we have rarely done so far (but see Reynolds 2008 for a good way forward), as well as to better exploit our unusually detailed site survey and census evidence. Regardless, it should be clear from these remarks that while containers do benefit from being given center stage, they will still always speak to a range of other actors.

—Andrew Bevan

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