Classical Greek Trade in Comparative Perspective: Literary and Archaeological Evidence

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Although some modern scholars still argue that the Classical Greek economy was rather heavily based on household production designed to meet domestic needs rather than commercial production for the market, this is certainly not the impression one gets from a careful reading of the ancient sources. As Eduard Meyer brilliantly observed, ancient Greek references to *autarkeia* are concerned with protecting city-states, not households, from undue dependence on imports,[1] a controversial and utopian project, and never a realistic prospect, even if it were desirable, for most Greek *poleis*, as we shall see. While Plato may have deplored the social, political, and military influence of the *agoraios ochlos*, the many small shopkeepers and craftsmen who dominated the economies of Athens, and many other Greek city-states,[2] he is equally explicit about their ubiquity, and of the commercialization not only of manufacturing, but of many different personal services, as well as entertainment and culture.[3]

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[1] Meyer 1924: 83 note 1: "Im übrigen stammt der Ausdruck Autarkie (RODBERTUS, Jahrb. für Nationalök. IV, 347) zunächst aus Aristoteles, und dieser schreibt bekanntlich nicht der οἰκία sondern der πόλις zu ... Von der "Autarkie des Oikos", die nach der modernen Konstruktion die Basis des griechischen Wirtschaftsleben sein soll, ist wie man sieht in den Quellen keine Rede.

[2] For the life of the Athenian agora, see AGORA TESTIMONIA

[3] See, for example, Plato, *Republic* 2.372b-373d: "It is not merely the origin of a city, it seems, that we are considering, but the origin of a luxurious city… houses and garments and shoes, will no longer be confined to necessities, but we must set painting to work and embroidery, and procure gold and ivory and similar adornments, must we not? … the entire class of huntsmen … poets and their assistants, rhapsodists, actors, chorus-dancers, contractors—and the manufacturers of all kinds of articles, especially those that have to do with women's adornment. … Don't you think that we shall need tutors, nurses wet and dry, beauty-shop ladies, barbers and yet again cooks and chefs? And we shall have need, further, of swineherds …and we shall also require other cattle in great numbers if they are to be eaten, shall we not?"

Professional services included such trades as washing clothes, cutting and styling hair, but also cooking for small family sacrifices, as in Menander's *Dyskolos*,[4] or for weddings or parties.[5] Some of the more ambitious or successful cooks published cook-books, since lost, advertising and publicizing their skill,[6] much as Polykleitus' Canon helped solidify his reputation as a leading sculptor.[7] Many even made a living as actors, playwrights, dancers, chorus trainers, and the like, while as crowds of up to two thousand supposedly took in the lectures of Theophrastus,[8] and tens of thousands attended the theatre, not just in a few large cities, but in hundreds of *poleis*, and even small rural demes like Thorikos, offering employment for local citizens and for the *technitai* of Dionysus in the region.

We will concentrate here, though, on foreign trade and consumer demand and their role in the development of a flourishing commercial economy and an industrious revolution, to use Jan de Vries' phrase,[9] of increased craft specialization, trade and manufacture. The greatest symbol of Greek commerce was the Piraeus, a sizeable city in its own right, covering 300 ha, an area comparable to Rhodes, and significantly more than the 211 ha of Athens herself.[10] It was the centre not only of its own *agoraios ochlos*, but also of the *nautikos ochlos*, which crewed merchant vessels and warships travelling throughout the Black sea, the Aegean, the Adriatic and beyond, shipping goods and protecting the sea lanes from privateers and pirates.[11] Blessed with what Xenophon

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[4] Menander, *Dyskolos* vv. CHECK

[5] As parodied in Diphilus' *The woman who left her husband* (Athen. 132D): "A. How many guests, sir, are invited to the wedding? Are they all Athenians, or are there also foreign merchants? - B. How does that concern you, you who are the cook? - A. That is the chief part of my art, sir, to know beforehand what mouths are going to eat. Suppose you have invited Rhodians: no sooner have they entered, than you must give them the largest sheat-fish or 'lebias' to enjoy, served piping hot. They will like that better than if you poured scented water over their hands."

[6] See Wilkins 2000.

[7] See Stewart 1978: 124-7; Pollitt 1995.

[8] Diogenes Laertius, *Theophrastus* 5.

[9] De Vries 2008.

[10] Hansen 2006: CHECK. For the extent of the harbour and its facilities, see Eickstedt 1991; Garland 2001.

[11] Scheidel 2011: 24-9 argues very plausibly that the suppression of piracy and reduction of multiple, and sometimes predatory, tolls played a critical role in increasing security and predictability for merchants and keeping down transport costs during the Roman

describes as “the finest and safest accommodation for shipping, since vessels can anchor here and ride safe at their moorings in spite of bad weather,”[12] and three secure deep water harbours, it would share with its Hellenistic rivals, Rhodes, Alexandria, and, in a brief anomaly,[13] Delos, the role as one of the principal ports of the Eastern Mediterranean.[14] Aelius Aristides’ flattery of Rome’s role as the great clearinghouse of the products of the world[15] is anticipated in the tributes of Isocrates, Xenophon, the Old Oligarch, and Thucydides on the role of the Piraeus as the principal axis of maritime trade, at least for the Eastern Mediterranean, in the Classical period.[16]

"From Cyrene, silphion and ox-hides; from the Hellespont, mackerel and all kinds of salt fish; from Sitalces, itching powder for the Lacedaemonians, and from Perdiccas, many shiploads of lies. Syracuse sends pork and cheese, and may Poseidon sink the curved ships of the Corcyreans since they collaborate with both sides. That is what comes from that direction. From Egypt, sails, rigging and papyrus; from Syria, incense. Crete the

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empire, but this phenomenon surely predates the Roman empire. For Athenian, and later Rhodian efforts to decrease the risk to shipping and to consolidate and control tolls and costs to merchants trading in the Black Sea, see Gabrielsen 2007. For the significant, and occasionally crippling, effect of piracy and warfare in the Eastern Mediterranean during the Venetian and Ottoman periods, see, in addition to Scheidel, Harlaftis 1996: 4-5.

[12] Xen., *Poroi* III, 1; V, 2-4.

[13] See Casson 1954; Reger 1994 for a healthy dose of caution about the importance of Delos as a rival of Rhodes in Hellenistic Mediterranean trade.

[14] For the major ports of the Classical and Hellenistic periods, see Blackmann 1982; 2008. While the Piraeus was an outstanding natural harbour, fully furnished, despite only limited need, with lighthouses, harbour moles, quays and jetties, Alexandria's site was significantly improved by the creation of the massive Heptastadion harbour mole and the world-famous Pharos lighthouse. See Goddio et al. 1998; Millet & Goiran 2007; Khalil 2008; Wilson 2011: 224-5. The harbour at Cnidos was especially noteworthy for the ambitious harbour moles and quays constructed. At Delos, 1700 m of quays were constructed along a shoreline of around a kilometer (Blackmann 1982: 202).

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[16] See Isocrates 4.42: “Again, since the different populations did not in any case possess a country that was self-sufficing, each lacking in some things and producing others in excess of their needs, and since they were greatly at a loss where they should dispose of their surplus and whence they should import what they lacked, in these difficulties also our city came to the rescue; for she established the Piraeus as a market in the center of Hellas--a market of such abundance that the articles which it is difficult to get, one here, one there, from the rest of the world, all these it is easy to procure from Athens.” See further Thuc. II, 38, 2; Ps.- Xenophon, *Ath. Pol.*. II, 7; Xen., *Poroi* III, 1; V, 2-4; M. H. Hansen, S. Isager 1975,19-34.

Beautiful delivers cypresswood to the gods; and Libya, ivory for sale; Rhodes, raisins and dried figs that bring pleasant dreams. From Euboea, pears and fat sheep; slaves from Phrygia and mercenary troops from Arcadia. Pagasae provides slaves and branded serfs; the Paphlagonians furnish Zeus' acorns and glistening almonds, the highpoint of the meal. Phoenicia, palm fruit and wheat flour of the finest sort; Carthage, carpets and decorated pillows."[17]

As this oft-cited fragment of the comic poet Hermippos, dated ca. 430, humourously reminds us, and as Erxleben has investigated in some depth,[18] the *deigma* in the Piraeus displayed products from the Egypt and the Near East, Ionia, Macedonia, North Africa, Carthage's colonies, and Magna Grecia. Recent archaeological studies, including the discovery of *bucchero* ware in Miletus and Ionia,[19] and strong Etruscan influences on Archaic and Classical Greek metalwork,[20] remind us that the Etruscans played a role in maritime trade comparable to that of the Phoenicians and Carthaginians,[21] not just in the Western Mediterranean, but also, perhaps in the Aegean as well.[22] Moreover, although direct evidence is scanty, we should be not neglect the likely importance of trade in a wide range of commodities, with the Thracians and the Scythians, through the Black Sea,[23] and, sometimes direct, and sometimes through Etruscan intermediaries, with Celtic Central and Western Europe.[24]

Although Meyer and Beloch insisted long ago on the comparability of Greek maritime trade to that of the late Medieval Italian, Dutch, and Hanseatic maritime

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[17] Hermippos fr. CHECK.
[18] Erxleben 1974.
[19] Fletcher 2007: 116-19; Naso & Trojsi 2009.
[20] Note the claim of Critias, fr. 2 West ll. 5-14, that "The Etruscans' beaten gold phiale is best, as is their bronze that decorates the house, whatever its use," cited by Greene, Lawall and Polzer 2008: 685. For further archaeological evidence, see below.
[21] For which, see Aubet 1987.
[22] Cristofani 1989; Camporeale 2001: 78-101.
[23] See Archibald 1998; 177-96; 213-81 for archaeological evidence of the luxury goods traded by the Greeks into Thrace, and Gabrielsen & Lund 2007, with references, for the Black Sea trade. *Pace* Braund 2007, but modern skepticism about the feasibility of large-scale Black sea grain exports are surely baseless. The Black Sea was the backbone of Greek trade in the 19th and early 20th centuries, with grain exports from England going from 2 million quarters in 1837 to more than 50 million quarters in 1906. See Harlaftis 1996: 14 and table 1.2.
[24] See, e.g., Cary 1924; Cunliffe 1988; Sherratt & Sherratt 1993.

republics, this important source of comparative evidence has rarely been analyzed or exploited to investigate the scale of ancient trade. A few stray scraps of literary and epigraphical evidence show, however, that even at the nadir of Athens' fortunes, after the defeat in the Peloponnesian war, trade into the Piraeus was comparable in value (using wheat equivalents) to that of Venice, the wealthiest, and most enduring of the Renaissance mercantile, and naval, powers in the Eastern Mediterranean. We know from Andocides, that the *pentakoste* or 2% tax on trade into the Piraeus in 404/3 yielded 36 talents, implying imports and exports subject to taxation (since some favoured traders were granted *ateleia*) of 1800 talents or 10.8 million drachmae.[25] If we accept Hansen's estimate of the Athenian population, this represents just around 43.5 drachmae per capita.[26] In order to put this into context, as we must, the Venetian 6% tax on their own harbour produced 65,000 ducats in 1584 and 118,000 ducats in 1604,[27] implying trade of 3.35 and 6.08 million dr. respectively, or 27 dr. and 49 dr. per capita, if we convert Venetian ducats into drachmae using their purchasing power in wheat equivalents.[28]

More importantly, perhaps, this high level of trade activity was true not just of Athens itself, but also of most of the states in its maritime empire, which, even in the very difficult aftermath of the Sicilian defeat, and notwithstanding constant naval warfare in Ionia, Caria and the Hellespont, enjoyed an extremely vigorous trade. While a few states in the empire may not have been advanced commercial and trading economies, most seem to have been nearly as developed as Athens herself. We can estimate maritime trade among the members of the Delian league if we recall that the Athenians sought to raise their tribute to 1460-1500 talents in 425 B.C.,[29] and assume that they had a reasonable expectation that the 5% tax on the harbour trade of the members of the league, which

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[25] Andocides 1.133-4.
[26] Assuming Hansen 1988 is reasonably accurate with his estimate of 250,000 for the population of Attica in the 4th century.
[27] Lane 1966: 157 n. 11.
[28] Assuming a price of wheat at Athens of 5.5 dr., which is typical for the late 5th and early 4th century, and noting from Zanini 1999: 473-502 that in the late 1580s a *staro* or 35.2 litres of wheat sold for 7.4 lire, and remembering that one ducat is 6.2 lire, a ducat should have the purchasing power of 3.09 drachmae.
[29] IG I^3 71, l. 181.

replaced the tribute ca. 413,[30] would match, or perhaps exceed, this revenue target. This would imply a level of trade of 180 million *drachmae*, excluding Athens, or 65.6 *drachmae* per capita, assuming a population of the empire, essentially Ionia, the Cyclades, Thrace, the Hellespont, and Black Sea, of 2.743 million in the late 5th century, based on Hansen's recent estimates of the population of the principal Greek *poleis* in the 4th century.[31]

These figures for Athens are almost certainly unrepresentatively low, which is not surprising in a period of economic crisis,[32] but they are certainly realistic and credible, both in terms of Venetian trade, and that of the rest of the Delian league, as well as the following estimates. An inscription from Delos gives the revenue from the *pentakoste* as 14,200 dr. in 279 B.C. and 17,900 dr. in 280 B.C., corresponding to an overall trade of 895,000 dr. and 1,100,000 dr., respectively.[33] If we assume a population of around 25,000, we get trade per capita figures of 38.5 and 44 dr. per capita, reasonable for a small island in the Cyclades with an active port and sanctuary, but limited role in maritime commerce.

Polybius' data on the harbour dues collected by Rhodes, which fell from 1 million dr. to 150,000 dr. in the immediate aftermath of the Roman state's declaration that Delos would be a tax free port,[34] are also highly significant. These figures imply 50 million dr. of trade flowing through Rhodes, dropping to 7.5 million, which, if take Beloch's

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[30] See Thuc. 7.28.4; Blamire 2001: 114 n. 106.
[31] See Hansen 2006.
[32] Our population estimate, based largely on 4th century evidence, will be somewhat inflated for this immediate post-war period, since Athens had had little time to recover from the casualties of the Peloponnesian war, and, perhaps more importantly, a significant segment of the non-citizen population will presumably have fled, at least temporarily, from the effects of war and economic crisis, and the 30 tyrants' disastrous and brutal repression, much of it directed at metics.
[33] See IG XI(2) 161A, line 26, cited by Vélissaropoulos 1980: 208 and note 20.
[34] Polybius 30.31.12. For scholarly discussion, see Gabrielsen 1999: 202-9; Berthold 2009: 208 and note 35. Both Gabrielsen and Berthold are right to emphasize that the sudden drop in Rhodian commerce had less to do with the attractions of Delos' tax-free status as a (probably temporary) loss of confidence in Rhodes, related as much to fear of further Roman sanctions, and even the possibility of hostilities, given that the Romans were dragging their feet on making a treaty.

estimate of the Rhodian population of 100,000,[35] would imply trade of 500 dr. and 75 dr. respectively. We can see, therefore, comparable figures for trade per capita for Athens at its nadir, the Athenian empire, and from Rhodes and Delos when their ports were primarily serving their own domestic trade, giving us good reason for confidence in their accuracy, as well as suggesting similar levels of integration into broader markets. Our estimate for Rhodes just before the crisis of confidence caused by Rome's threatened reprisals (while based on very uncertain population figures) shows what a large amount of trade activity was constantly floating through the Eastern Mediterranean during the Classical and Hellenistic periods, ready to be attracted to an important trade hub.

Table 1. Trade Statistics for Great Britain (converted into dr. using wheat equivalents)[36]

Year	Imports (dr. per capita)	Exports (dr. per capita)	Total trade (dr. per capita)
1805	7.5	6.6	14.1
1815	8.3	11.6	19.9
1820	7.8	9.6	17.3
1825	12.8	11.6	24.3

Per capita trade in the early 19th century United Kingdom, if converted into drachmae according to wheat equivalents,[37] was significantly more limited than the Venetian Republic or most Classical or Hellenistic Greek *poleis*, at least those in Athens' sphere of influence, even as her colonial empire embraced India, China, the West Indies, North and South America.[38] Much of this British trade, often as much as 30-50% was immediately re-exported,[39] and these figures, while not adjusted for smuggling, may in

[35] Beloch 1886: 226-7.
[36] For imports and exports from Great Britain, see Mitchell 1962: 287-8 Overseas Trade 4; and Mitchell 1962: 295 Overseas Trade 5, respectively. The relevant population statistics are from Mitchell 1962: 9-14, and are all converted from pounds sterling to drachmae using wheat prices from Wordie 1982: 286 graph 4.
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[38] See Daunton 2007: 200-2, with further references.
[39] See Mitchell 1962: 450-1 External trade B. 1772-1804.

fact overstate Britain's trade activity compared to our Greek figures. As we will discuss further below, domestic demand in England likely remained much lower than in the more urbanized and egalitarian mercantile republics of Italy and Holland until at least the latter half of the 19th century, and England's trade dominance owed as much to the Royal Navy and her stranglehold on much international trade in Colonial commodities like sugar, rum, tea, coffee, and tobacco, which constituted 33- 58% of her imports, as well as Indian and American cotton, which represented a further 6-20%.[40]

One key commodity, which deserves to be highlighted, is grain.[41] Athenian wheat imports, estimated by Demosthenes at approximately 800,000 *medimnoi* or 42,105 metric tons in the mid-4th century,[42] or approximately 168 kg per person, were significantly greater on a per capita basis than the imports of 122 kg per person imported into the Netherlands in 1649,[43] at a peak of its Baltic grain imports - the figures for 1680, for example, were barely half those of 1649.[44] Athens imports of wheat dwarfed those of the United Kingdom, however, on a per capita basis, exceeding them by a figure of 7.5 in 1840, when imports were barely 22 kg per capita and by a staggering factor of 289 in 1835, for example, a year of minimal imports.[45] These massive imports of wheat permitted Athenian farmers to concentrate, like their Dutch counterparts in their golden age,[46] on intensive farming of cash crops for urban markets and for export. Archaeological evidence from field surveys and excavations of farmhouses corroborate Thucydides' insistence on Athens' densely settled landscape of small farms with tree crops, vines, and out-buildings for stabling sheep and cattle. Evidence from Herakleia in

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[40] See Mitchell 1962: 287-8 Overseas Trade 4.
[41] For a detailed recent survey of the ancient evidence and modern controversies, albeit one which is unduly skeptical of the likelihood of significant imports from the Black Sea in the 5th century BC, see Braund 2007.
[42] Dem. 20, 31-2. Some modern scholars have speculated that Athenian grain imports may have reached as much as 2.275 million *medimnoi*, but this ignores the domestic production of wheat and the role of wine, olive oil and other foodstuffs in the diet.
[43] De Vries 1974: 172 points out that in 1649 total Dutch grain imports were 112,901 lasts or approximately 225,802 tons. Grigg 1980: 149 table 21 yields a population of the Netherlands as a whole of 1.8 to 1.9 million in 1650.
[44] In 1680, Dutch grain imports were 64,535 lasts or 129,072 tons, or 67.9 kg per capita.
[45] For English wheat imports, see Mitchell 1962: 97 ff. table 10, and for the relevant population figures, see Mitchell 1962: 9-14.
[46] De Vries 1974; De Vries & van der Woude 1997: CHECK.

the Pontic Chersonese is extremely revealing,[47] as it shows that some small peasant plots had farm buildings comparable in size to many Roman *villa rusticae* of the Principate.

Far from producing for their own domestic consumption, Greek peasants relied on the strong urban demand for meat, wine, olive oil and vegetables from *poleis* throughout the Aegean to diversify and intensify production, introducing convertible husbandry and improved fodder crops, breeding larger, more fertile and finer-wooled domestic animals, and cultivating many fine fruits, nuts, vegetables, herbs.[48] This concentration on the export of cash crops rather than subsistence farming is clear not simply from the massive imports of grain, but also from the robust trade in wine and olive oil, which won markets not only throughout the Greek population of the Mediterranean, but also in Italy, Gaul, Thrace, Southern Russia, Egypt and the Near East.[49] The high reputation and heavy exports of Greek wine and olive oil in the ancient Mediterranean is a dramatic contrast with the marginal role of these same commodities in the trade of Greek merchants in the 19th century, when they played little more than a minor role in the exports of Patras and Smyrna.[50]

The evidence for the size of Greek merchant ships corroborates the evidence already presented that ancient maritime trade was as highly developed as in the great trading states of the Renaissance and 18th century,[51] for, although much of our iconographic, literary and especially our shipwreck evidence for the rise of massive merchant ships dates from the Roman era, there is good reason to believe that Wallinga and Casson are surely right to place the critical technological changes in the Classical and Hellenistic era.[52] Already in the 5th century, the harbour at Thasos would not even admit

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[47] See Saprykin 1995.
[48] See Kron 2002; Kron 2008a; and Kron forthcoming b for discussion and bibliography.
[49] Van der Mersch 1994; Brun 2004.
[50] See Harlaftis 1996: 11 Figure 1.3; 47 Table 2.5. For the even more restricted farming and trade regime in the Venetian and Ottoman periods, see Davis & Davies 2007.
[51] For the capacities of Greek and Roman merchant ships, see Wallinga 1964; Casson 1971: 186-200; Pomey & Tchernia 1978; Vélissaropoulos 1980: 61-5; Turfa & Steinmayer 1999; Tchernia 2008; Boetto 2008: 120-1; Wilson 2011: 213-17.
[52] Wallinga 1964: 28; Casson 1971: 173-4. The explosive period of innovation in warship technology in the Hellenistic period should provide ample confirmation. See, for example, Casson 1971: 97-135; 137-40.

ships of less than 78 or 130 tons cargo capacity respectively,[53] a regulation which Casson rightly takes to prove that this was the minimum size of a sea-going merchant ship,[54] and Vélissaropoulos has plausibly estimated that by the 4th or early 3rd c. BC, the average tonnage of Greek vessels had certainly exceeded 120 tons, with inscriptions alluding to ships of 165 or 320 tons as common.[55] A chance reference by Thucydides[56] to the construction of a well-armed version of a class of merchant ship called a *myriophoros,*[57] dated ca. 413 B.C., is convincingly interpreted by Wallinga as evidence that large grain carriers capable of carrying 10,000 transport amphorae, or *medimnoi* of grain, and therefore of over 400 tons burden, were already being built in significant numbers in the 5th century in order to ship Athens' massive imports of grain.[58]

Merchant ships in the Classical and Hellenistic period of 350-500 tons were therefore by no means uncommon,[59] but much larger ships are very well attested, particularly for the grain trade, such as the Roman era grain freighter Isis, a ship of at least 1,100 to 1,300 tons, and the ships used to transport obelisks to Rome by Augustus and Caligula.[60] One of the earliest and most celebrated, however, was Hieron II of Syracuse's *Syracusia*,[61] a massive ship capable of carrying 4,340 metric tons of cargo in

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[53] Vélissaropoulos 1980: 63 cites Launey 1933 = IG XII, 348 for the Thasos harbour regulation barring use of first harbour for ships of less than 3000 talents, or 78 tons, if we are correct to use the Euobean standard, and bars the use of the second for those of less than 5,000 talents or 130 tons. For the same observation see Casson 1971: 171 note 22. For an analysis of the archaeological remains of the harbour, see Empereur & Simonassi 1988-93.

[54] Casson 1971: 171 and note 22.

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[56] Thuc. 7.25.6.

[57] For the relatively common use of this term by other authors, see Casson 1971: 172 note 25.

[58] Wallinga 1964: 28.

[59] Casson 1971: 171-3. See also the evidence for substantial donations of grain by merchants at Athens, most likely representing all or part of the cargo of a single merchant ship, and generally representing from

[60] Casson 1971: 184-9; Boetto 2008: 120-1. Particularly notable is Papyrus Bingen 77, noting a grain ship returning from Ostia to Alexandria and loaded with between 525 and 700 tons of grain.

[61] See Athen. 5.206d-209b; Casson 1971: 191-99; Berlinghieri 1996; Meijer & Sleeswyk 1996; Turfa & Steinmayer 1999.

addition to its aquarium, mosaic floors, horse stables, and catapault towers,[62] with a hull plausibly estimated to displace more than 2,000 tons. Built sometime in the mid-3rd century, it was an especially lavish and extravagantly appointed version of the large freighters developed for the Athenians, Rhodian, and Syracusan grain trades,[63] and ought to convince us that Greek rather than Roman shipwrights were at the cutting edge of technological innovation. Ultimately, however, these technological achievements are less important in themselves, than as an index of the rapidly increasing levels of maritime trade, which made these innovations not only possible, but attractive.

Although our shipwreck evidence is heavily biased towards the Western Mediterranean, particularly Italy and France, and to coastal waters and presumably smaller craft,[64] there is ample confirmation that a significant percentage of ships were more than 100 tons, and that ships of 200 to 400 tons or more were relatively common, at least in the period from between 200 B.C. and 400 A.D. which has yielded the most shipwrecks, primarily in the Western Mediterranean.[65] Despite the very modest number of Archaic or Classical shipwrecks fully published to this point, we now have archaeological confirmation for the existence of the large merchant ships so well attested

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[62] Casson 1971: 186 argues, very implausibly, that the grain measures in Moschion's description are *modii* rather than *medimnoi,* thereby significantly underestimating the ship's cargo. For a convincing case against Casson's reading, see Duncan-Jones 1977; Turfa & Steinmayer 1999.

[63] See Turfa & Steinmayer 1999: 106 Table 1.

[64] For the biases in our record, note Parker 1992: 6-7, particularly his statement that of 1,000 wrecks recoreded by Greece's department of Underwater Antiquities, only 80 were known to him. One need only compare Parker 1992's maps 4, 5, 7, 8, 10 and 11 from the Western Mediterranean with the map 13, showing wrecks from the Aegean, overwhelmingly clustered around SW Turkey, an important trade hub to be sure, but also a popular hunting ground for the INA's busy marine archaeologists, to see how little we know of Classical Greek wrecks. See also the cautionary remarks of Parker 2008; Wilson 2009. We should also be aware of the serious problem of damage from trawling and the looting of wrecks, which progressively degrades the evidence. See Parker 1992: 354-5; 365-6; 395; 432; 438. Recent attempts to find methods of surveying deep-water wrecks have confirmed that Greco-Roman ships did not simply sail along coastal routes. See McCann & Oleson 2004; Sakellariou et al. 2007; Weitemeyer & Dohler 2009. Nevertheless, the shipwrecks most likely to be discovered are overwhelmingly found in shallow coastal waters and far more likely, therefore, to be small ships sailing (but not tramping - see Parker 1992: 21) along the coasts.

[65] See, for example, Casson 1971: 189-90 and Wilson 2011: 212-7.

by the literary and epigraphical evidence. A shipwreck dated between 420 and 400 B.C. was discovered off the modern island of Alonessos, ancient Ikos, with a large field, 25m by 10m in extent of Mendean and Peparethian wine amphoras.[66] More than a thousand amphorae are exposed on the sea bed and a preliminary excavation of two small trenches suggests that the ship's cargo included more than 4200 amphorae, weighing at least 126 tons.[67] Comparison with the fully excavated Albenga wreck of the 1st century AD suggests, however, that the Alonessos ship was probably a good deal larger than that. The Albenga ship was also marked by a field of amphoras just modestly smaller, 25m by 8-10m,[68] which has been calculated to have represented 10,000, or around 450 tons. The ship's actual length was revealed to be 40m rather than 25m, which is much more consistent with the dimensions of an actual merchant ship,[69] and yields an estimate of its total cargo capacity of 500-600 tons.[70]

The size of Greek merchant ships is all the more impressive, if one places it into the proper historical perspective. While 16th century Venetian merchant galleys could carry from 260 to 280 tons of cargo,[71] and ships of the Dutch Baltic fleet (which imported most of Holland's bulkiest cargoes of wheat) had increased in size to an average of over 260 tons by the 1630s, with Dutch East India merchant ships typically reaching as much as 900 tons,[72] British merchant shipping continued to rely on small ships of considerably less than 120 tons through much of the 18th and early 19th century.[73] It is not until the end of the 19th century that ships of 1,000 tons or more, often, but not exclusively, iron-hulled

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[66] Hadjidaki 1996; Turfa & Steinmayer 1999: 105.
[67] Hadjidaki 1996: 558.
[68] As noted by Casson 1971: 172 note 23.
[69] Casson 1971: 189 notes ratio of length to beam of most modern, and ancient, merchant ships normally ranges from 3: 1 to 4:1.
[70] Boetto 2008: 121 citing Pomey & Tchernia 1978.
[71] De Vries and Van der Woude 1997: 404. Smaller coastal ships would typically range from 40 to 80 tons, and likely represented the vast majority.
[72] Lane 1964: 231. Such ships represented a minority of the Venetian fleet, particularly in the 15th and 16th centuries. As Scheidel 2011: 34 notes, citing Lane 1934: 102, in 1423, 3,000 of the 3,300 ships in a Venetian census of shipping were of less than 100 tons, and only around 1% above 240 tons.
[73] In 1787, the 1,427 ships built in the British Empire averaged only 82.7 tons burden (97 tons for the 940 ships built in England). By 1818, these figures had risen modestly to 97.5 and 120 tons, respectively. See Mitchell 1962: 220 Transport 2 A.

steamships, begin to be built in quantity by British shipwrights,[74] but Casson is mistaken to claim that this was the result of any technical limitation on the size of wooden hulls,[75] as Chinese ships of over 4,000 tons can be documented.[76] Even the economic significance of the transition from sail to steam can be exaggerated,[77] for, although steel hulls with effective anti-fouling paint and steam would eventually cut the length of trans-Atlantic sea voyages from 5-6 weeks to 2,[78] which was critical for the passenger trade, wooden sailing ships remained competitive for the transport of bulk cargoes into the 20th century,[79] with clipper ships only being supplanted in the China tea trade with the re-opening of the Suez canal.[80]

What explains this gap between the relatively modest impact of shipping and trade on the English population, despite her command of the seas and international colonial empire, and the heavy participation of the ancient Greeks, or the Renaissance Venetians or Dutch, for example? Although English urbanization exploded in the mid-19th century,[81] she had lagged well behind Italy and the Low countries until that time. Moreover, agrarian capitalism and the proletarianization of the rural labour force meant

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[74] Mitchell 1962: 221.

[75] Casson 1971: 185 and note 8. We should also note that Casson fails to distinguish between the displacement tonnage and cargo capacity of the *Syracusia* when claiming that a wooden vessel of such a size is unattested. For example, the Liberty Ship, the standard World War II freighter, with a displacement tonnage of 3,600 tons, could carry 10,500 tons of cargo. See Lane 1964: 217.

[76] Turfa & Steinmayer 1999: 108-9, citing Levanthes 1994: 7; 80, notes massive ships of the Chinese treasure fleet (1405-1433 AD) measuring 408 feet long with a 166 foot beam, likely displacing 5000 tons or more. A tradition of building massive wooden sailing ships continued in the United States through the 1880s, even as iron hull technology advanced, with the construction of the Wyoming, a ship of 3,781 tons, and the "big wooden four", built by Arthur Sewall & Co. of Bath, Maine, including the Rappahannock of 3,185 tons, a three-masted ship like the *Syracusia*, and the Roanoke, of 3,539 tons. See Jobé 1967: 226.

[77] See, for example, Scheidel 2011: 32.

[78] Cohn 2005: 469.

[79] For the competitiveness and strong performance of wooden sailing ships, until at least the 1880s, see Graham 1956. Until the development of anti-fouling paint, wooden sailing ships were often faster and more effective for hauling cargo, especially over long distances (Graham 1956: 76-7).

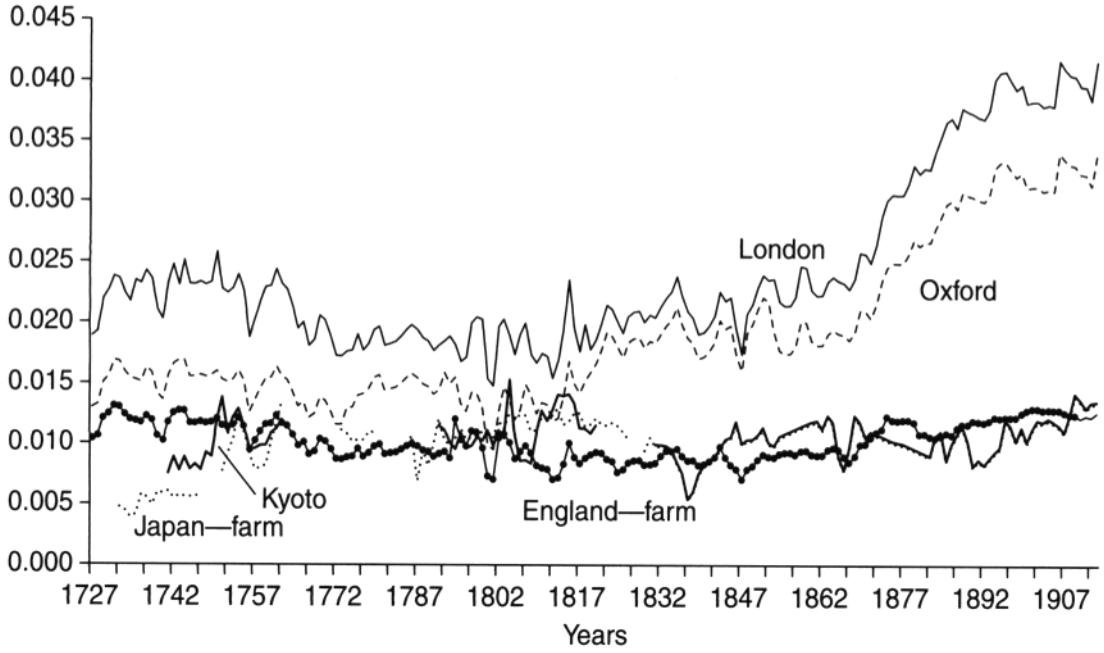
[80] For the size, speed and economic competitiveness of the clipper ships of the late 19th century, see Evans 1964.

[81] See Carter & Lewis 1990: 32-7.

that most consumer demand was restricted to the gentry, landowners and small urban middling classes. Even for Northern Italy and Holland, however, urbanization rates seem to have been significantly lower than those suggested for Greece by the survey work of John Bintliff and Mogens Hansen's *Shotgun method*.[82] Very few cities of significant size could be found in England before the 19th century, and a massive gap remained between London and the rest, typically ports or important market or university towns.[83] London's merchants and craftsmen, as Defoe describes in depth,[84] served the carriage trade, the rural gentry and aristocracy, who flocked into London for the social season, engaging in a flurry of conspicuous consumption,[85] powered by the rents extracted from the landless labourers and tenant farmers, who populated England's villages and produced her wheat and wool, but were too poor themselves to contribute much in the way of demand to London's burgeoning commerce,[86] as is apparent from their low and stagnant real wages, illustrated in fig. 1, below.

Fig. 1. Real wages in London, Oxford and the English rural population.[87]

[82] See de Vries 1984: 39 table 3.7; Bintliff & Snodgrass 1985; Hansen 2006; Bintliff, Howard & Snodgrass 2007; de Callataÿ forthcoming.
[83] See Patterson 1978 for the development of English towns.
[84] See Defoe 1726.
[85] See McKendrick, Brewster and Plumb 1982, exaggerating, however, the breadth of consumer demand; Weatherill 1988; Berg 2005; De Vries 2008.
[86] For the low standard of living of the English rural labourer, see Hasbach 1908.
[87] Source: Allen, Bengtsson & Dribe 2005.



A true urban middle class culture of the sort, which developed in many Greek *poleis*, Renaissance Italy, or the Netherlands could exist, outside of London at least, only in small pockets.[88] There was therefore little domestic demand outside of the rural gentry and aristocracy and London's bankers, merchants and middle classes until the 1860s or 1870s. Village England offered very little scope for imports, although tea, coffee, and sugar became critical sources of quick energy to under-fed labourers, despite the complaints of polite society that such extravagance was ill-suited to their station in life.

I will discuss the distribution of wealth and income at Athens, and in Greco-Roman society generally, in greater depth elsewhere, so I will forgo a detailed account here,[89] but the foundation of the robust trade of the Greek poleis was their high level of urbanization and the existence of a sizeable and prosperous middle class. As Walter Scheidel and Ian Morris have recently pointed out, and as was first demonstrated by Gustave Glotz in the 1920s, Classical Athenian wages, even for unskilled labourers and slaves, were several times subsistence, and could afford a decent standard of living. Of

[88] See ADD Berg 2005 for the fairly limited social classes wealthy enough to participate fully in the growth of English craft manufacture and early industrial growth. For the dependence of most English manufacturers on European and particularly colonial North American markets to compensate for their weak domestic markets, see ADD

[89] For what follows, see Kron 2005; Kron forthcoming a; forthcoming b; forthcoming c. See also Mayer forthcoming and de Callataÿ forthcoming.

course, many Athenians had some land and capital, running small businesses or farms rather than working for a wage, and skilled workers could earn much higher returns.

However, it is tolerably clear from the evidence for the distribution of wealth at Athens, and from a comparison of Greco-Roman housing and nutrition with that of the working classes of the *ancien régime*, that Greek society was dramatically different and significantly more egalitarian than the profoundly unequal society of 19th century England. Instead, we see a level of housing, and of wealth and income distribution comparable to 20th century representative democracies, or societies like Renaissance Florence, a broad-based oligarchical republic, which flirted with a short-lived democratic regime following the Ciompi revolution of 1378.[90] Greek houses were remarkably large and modern in appearance, with a median ground area of significantly more than 200 m^2, dramatically larger than the typical cottages or tenements of the working classes of 19th century England, with a median size of 21.8 m^2, and slightly larger than the median of single detached houses from the US housing survey of 1997. Some Greeks did not rent or own entire houses, of course, but lived in apartment buildings or *synoikiai*. Even these, however, as the few excavated examples show, typically provided apartments with more than 60 m^2 of living space.

Although it is often claimed that the 18th century saw an English consumer revolution,[91] this was largely restricted to the aristocracy, the great rural landowners, and a few wealthy merchants. Very few gentry or middle class households in England owned china or pictures, for example, as late as 1725,[92] and inventories of English tenant farmers and minor gentry in Essex, dating from 1633 to 1749, showed that only 13%

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[90] Whereas the richest 1% of the English population in 1911 held 67% of the total wealth of the society, the poorer 80% held less than 3 or 4% of the total wealth of the society and virtually 60% of the population had no wealth whatsoever, at Athens, the richest 1% possessed 30% of the wealth of the society, comparable to many contemporary societies. At the beginning of the fourth century barely 14% of the Athenian people did not own some land, and, when Antipater imposed an oligarchical constitution in 322, almost 30% owned the substantial sum of 2,000 drachmae, equivalent in purchasing power to £300, the extremely high wealth qualification demanded for members of Parliament, and 30 times the probate wealth threshold of £10 held by a mere 17% of the English population in the early 20th century.

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[92] See Berg 2005: 219-27; especially Berg 2005: 220 Table 6.1.

owned silver and only 2% owned books, pictures, maps, whereas, by early 1700, most Dutch rural households also had consumer goods, e.g. in one region 55% owned books; 70.5% owned clocks, 94% owned mirrors, and 63% owned silver.[93] Moreover, as Goldthwaite points out: "In a letter to Benedetto Varchi, Vasari observed that there was not a house in Florence without a Flemish painting. In Venice, the number of households with 10 pictures increased four times in the second half of the 16th century, [and] 1,000 households sampled in seventeenth-century Bologna had 10 or more pictures."[94]

While 18th and even 19th century England offers a very poor model (except by way of contrast) for Classical Greek economy and society, 17th century Holland and Renaissance Venice or Florence,[95] despite being decidedly less democratic, do suggest a model for the robust demand for consumer goods, which Athens' large and prosperous middle class generated. The spaciousness and luxury of Greek housing opened up a very large demand for home decoration, furnishings, furniture and house wares. Although best preserved in Pompeii and Herculaneum, and late antique contexts in North Africa and the Near East, Walter-Karyadi and Graham have argued that wall-painting and fine pebble and glass mosaics began to decorate private houses already in late 5th century Athens,[96] gradually became more and more common in ordinary Greek and eventually Roman households, a development which will have generated considerable income and employment for plasterers, painters and mosaicists.

Greek middle class demand, and ready maritime markets among non-Greek but rapidly Hellenizing peoples throughout the Mediterranean encouraged intense competition and innovation among workshops throughout the Greek world. Modern stylistic analysis has corroborated and supplemented our literary evidence for important regional schools, much as one would expect from the evidence we have already noted of strong trade throughout the Athenian empire. While Athens arguably enjoyed the greatest and most persistent influence, many other states, most notably Argos, Laconia, Corinth, Arcadia, Aegina, Sicyon, Egypt, Rhodes, Pergamum, Syracuse, Tarentum, and

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[93] See de Vries 1974, 214-23.
[94] Goldthwaite 2010: 279.
[95] See, for example, de Vries 1974; Goldthwaite 1993; De Vries & van der Woude 1997; De Vries 2008; Goldthwaite 2009; Spear and Sohm 2010.
[96] Graham 1974; Walter-Karyadi 1998.

Macedonia were able to build up a pan-Hellenic reputation and win important markets beyond their own region, at some point.[97] Nor should we neglect the importance and stylistic influence of imports of non-Greek manufactured goods, particularly Phoenician and Punic imports in the Orientalizing period, and Etruscan metalwork and *bucchero* through the Archaic and Classical period, but also Achaemenid luxury goods, particularly silverware and textiles.[98]

The wealth, which successful artists and craftsmen could achieve, is well attested by Andrew Stewart's studies of the social status of Classical and Hellenistic sculptors, such as Praxiteles and his son Kephisodotus, trierarchs several times over, and, like quite a few other sculptors, members of Athens liturgical class.[99] But humbler arts could also be nearly as lucrative, as Aristotle suggests,[100] and as the success of several potters shows, such as Andocides and Euphronios, who set up expensive dedications on the acropolis,[101] or Bacchius, honoured by Ephesus with citizenship and an honorary decree.[102]

A recent study of the economic lives of painters in the Italian Renaissance, as well as the Florentine *catasto* tax records, and documents from artisans' guilds, amply demonstrate how much money skilled craftsmen stood to make from the robust demand for art generated by a prosperous society, with a tolerably broad middle class. Naturally Michelangelo, who left fl. 22,000, Raphael, Bernini, and Ghiberti made large fortunes,[103] like those generated by Pheidias[104] or Lysippus, but humbler craftsmen like the

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[97] For metalwork and bronze sculpture, see Treister 1996: 197-213; 298-324. For the art of sculpture in marble, see Stewart 1990.
[98] For the influence and penetration of Persian art, see in particular Miller 1997; Archibald 1998: 179-84; Paspalas 2000; Zournatzi 2000; Treister 2010.
[99] See Stewart 1979: 101-14.
[100] Aristotle, *Politics* 1278a: "In oligarchies on the other hand, though it is impossible for a hired laborer to be a citizen … it is possible for an artisan; *for even the general mass of the craftsmen are rich*."
[101] *Pace* Vickers & Gill 1994: 93-7.
[102] Cook 1997: 260.
[103] See Goldthwaite 2009: 405-6 for the huge fortune built up by Michelangelo, who left an estate worth fl. 22,000, having earned perhaps as much as fl. 50,000 over lifetime.
[104] Plato, *Meno* 91d.

enterprising stonemason Piero d'Andrea could also get rich.[105] A number of artists chose to diversify into retailing the work of others as well, and some, like the Venetian Marco Boschini, a minor talent himself, set himself up as a connoisseur, wrote a book extolling Venetian art, took prospective buyers on gondola tours of the city's great artistic landmarks, and boasted of the money to be made in art by those able to buy well, claiming that Tintorettos commissioned for 50 ducats now selling for 50,000.[106]

The best-documented, but hardly the most important, Greek craft export is one of the cheapest and most fragile - fine pottery. It offers important proxy evidence for the geographical reach of many much more expensive manufactured goods produced by Greek craftsmen.[107] Expanding the markets once captured by Corinthian fine pottery, Attic black-figure and red-figure ware, like Etruscan *bucchero*,[108] was relatively inexpensive yet attractive pottery, ideally crafted for a broad and expanding market of prosperous peasant farmers and middle class urban craftsmen and shopkeepers.

The Attic stelai and commercial graffiti clearly prove, as Vickers and Gill have argued in depth, that fine attic pottery, remained very inexpensive and was well within the means of virtually all Greek households and many Italic, Etruscan, and Near Eastern ones.[109] Although Beazley's superb art-historical scholarship may seem disproportionate to the value of the pottery analyzed, it is helpful in establishing individual workshops and tracing their diffusion, as in the case of the Niobid painter, for example, whose work has been found at Spina,[110] Bologna,[111] Altamura,[112] Capua,[113] Vulci,[114] Tarquinia,[115] S.

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[105] Piero d'Andrea and his son Giovanni had a net worth before deductions of 1,000 florins, renting a shop in the Via Tornaquinci for 10.5 florins, and owning land worth 709 florins scattered at Settignano, where Piero lived, at Porta a Faenza outside the walls, and at Signa outside the city. See Goldthwaite 1980: 234-5.
[106] See Sohm 2010: 210-2.
[107] Osborne 2007.
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[109] For the limited monetary value and non-luxury status of even fine and decorated pottery, see, Amyx 1958: 174-217; Johnston 1979; 1991; Pritchett Isager and Hansen 1975: 41; Vickers 1985; Vickers and Gill 1994.
[110] Museo Nazionale di Spina, 2652; T936; T313.
[111] Museo Civico Archeologico 269; 18108.
[112]
[113] Museo Campano 204; Basel, Antikenmuseum und Sammlung Ludwig, BS1906.296.
[114] British Museum, E257; Munich, Antikensammlungen, J326.

Russia,[116] Nola,[117] Camiros,[118] Kimissala,[119] Athens, Vari,[120] Camarina,[121] and Monte Sannace.[122] While the economic impact of the industry should not be over-estimated, it was likely to have been far from negligible, for Athens at least. The Staffordshire potteries ranked fifth in their share of English manufactured exports to North America in the late 18th and 19th centuries,[123] behind textiles, hardware, cutlery, and iron and steel, since, as Josiah Wedgewood said "our home consumption is very trifling in comparison to what is sent abroad."[124]

We can get some impression of the reach of Athenian products from the list of findspots of Attic black and red figure pottery compiled in the appendix to this paper, based upon the Beazley archive website, with additional material from Beazley's own work. It is, of course, extremely selective, based almost entirely upon complete pots of museum quality, and excluding many fragmentary and poorly executed works. Its scope would increase exponentially were one to attempt to survey even the excavated and published archaeological material, to say nothing of the millions of sherds, which were presumably spread with manure and compost all over the Greek and Italian countryside. Nevertheless, it is clear that Attic imports were ubiquitous in most Greek settlements, in Ionia, naturally,[125] but even in states at war with Athens, like Corinth.[126] They penetrated far beyond the Greek world, however, as deep as Babylon and Susa,[127] and were especially massive in the Levant.[128] As an excellent 2005 survey by Andrew Stewart,

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[115] Museo Nazionale Tarquiniese, RC2240.
[116] St. Petersburg, State Hermitage Museum, 2227.
[117] Oxford, Ashmolean Museum, 280.
[118] Rhodes, Archaeological Museum, 13205.
[119] London, British Museum, 1885.12-13.18.
[120] University of Mississippi, University Museums, 1977.3.88.
[121] Christie's, XXXX214837.
[122] Gioia, Museo Archeologico di Gioia, MG398.
[123] Thistlethwaite 1958: 265 note 1.
[124] Thistlethwaite 1958: 266.
[125] Tuna-Nörling 2002.
[126] Herbert 1977.
[127] See, for example, De Vries 1977.
[128] For Beirut, see Hitzl & Hitzl 2006.

and Rebecca Martin shows, "by the Achaemenid period, virtually all finewares were Attic imports" throughout Syria, Phoenicia, and eventually Judaea.[129]

Perhaps one of the largest, and certainly the most comprehensively studied foreign market for Greek, Carthaginian, and Phoenician manufactures was Italy, recently analyzed in depth by Fletcher.[130] The Etruscans, Messapians, Peucetians, Apulians, and Campanians were all prodigious consumers of Attic fine pottery, so much so that a number of workshops seem to have catered to Etruscan consumers.[131] Egypt and North Africa were important markets, not just Greek settlements at Naucratis or in Cyrene, but among the Carthaginians, and in Egyptian centres such as Memphis, Luxor, Saqqarah, Elephantine and Meroe.[132] The Greek colony of Ampurias, not surprisingly, has 175 complete pots by known masters studied by Beazley, 145 from nearby Ullastret, but Attic pottery has also been found in many sites in Baetica and along the Southern coast of Spain and Portugal. Even across the Alps, along the Rhone trade routes, but also in Central Europe, red-figure pots can be found, clear evidence that they were appreciated by the Celts and Germans. Finds are especially dense in Celtic sites in Provence and Languedoc, with 303 pots from Enserune, for example, many times more than at Marseilles, and more even than at Ampurias.

Attic pottery exports are well known only because ceramics are preserved archaeologically. Greece's most skilled craftsmen surely worked not in ceramic, but in textiles, marble, wood, bronze, iron, ivory, bone and precious metals, and wherever cheap

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[129] Stewart and Martin 2005. For the evidence of strong Greek trade ties with Cyprus see Demesticha 2011: 48-9 with up to date bibliography.

[130] Fletcher 2007.

[131] For the Etruscan market for Athenian decorated pottery, see, for example, Webster 1972: 291-3; Spivey 1991; Kracht 1991: CHECK; Barker and Rasmussen 1998: 203-5; 214; Giudice 1999; Osborne 2001; Lewis 2003; Fletcher 2007: 100 figs. 169-71; 121-4; Ambrosini 2009; Baldoni 2009. For the great appetite for Attic fineware imports in South Italy and Sicily, see, for example, Carpenter 2003; Giudice 2006. Large-scale local workshops were eventually created in multiple sites in Magna Grecia, and not simply among the Greek colonial population. For the production of South Italian painted pottery, see, for example, Trendall 1967; 1989. Recent studies have even revealed evidence for Attic pottery geared to the Thracian market (Oakley 2009).

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and fragile pottery reached, other, more valuable products were surely traded.[133] Of course, shipments of raw and processed agricultural products, raw materials and commodities, like metals, timber, and stone will often represent a disproportionately large share of the tonnage transported by traders, ancient or modern, and this was clearly true throughout Greco-Roman antiquity.[134] Accounts of cargoes imported into Achaemenid Egypt by Greek merchants featured wine and wool, but also iron, bronze, clay, tin, and timber, especially cedar.[135] With their massive production of merchant vessels and warships, Greek states had to import a great deal of timber. Athens relied heavily upon Macedonia, as is well known,[136] but recent analyses of wood preserved in Pompeii and Herculaneum show that a good deal was imported along the Adige and Po rivers from the Austrian Alps,[137] and we should probably imagine a vigorous trade throughout the Mediterranean in common as well as rare timber, like cedar, ebony, and citrus wood, much of it in the hands of Greek merchants. While cargoes of wood are hardly likely to be preserved, shipwrecks can document the trade in raw glass,[138] ingots of refined or of scrap metal,[139] as well as stone, particularly the fine Parian, Pentelic, Hymettian and Proconsesian marbles, which represented one of Greece's most remarkable natural resources.[140] At its peak under the control of the Roman emperors, the ancient marble trade was so vigorous that it would choke off the maritime trade for centuries to come, as

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[133] For the limited monetary value and non-luxury status of even fine and decorated pottery, see, Isager and Hansen 1975: 41; Vickers 1985; Vickers and Gill 1994. For a discussion of the use of pottery as a proxy for other archaeologically invisible exports, see Osborne 2007.

[134] For a rare synthesis regarding the trade in stone, tile, metals and timber at Athens, see Thompson 1980. In 17th century Holland, as in 19th century England, timber was one of the largest imports, in terms of value, but especially in terms of bulk. See De Vries & Van der Woude 1997: 423-9. In the 1640s, a Dutch fleet of 387 ships travelled to Norway several times a year, and over a period of 8 months in 1652, during the war with England, 1,000 ships set out, with a capacity to import up to 375,000 m^3 of wood. See De Vries & Van der Woude 1997: 423.

[135] Porten & Yardeni 1986: 3: 82-193.

[136] For the ancient timber trade, see Meiggs 1998.

[137] Kuniholm 2002.

[138] Fontaine & Foy 2007.

[139] Treister 1996: 347-61.

[140] See McCann & Oleson 2004: 92 and n. 6; 99 and n. 15 for a list of ancient shipwrecks with cargoes of stone; and McCann & Oleson 2004: 91-117 for a ship with a cargo of 8 tons of granite. See also, inter alia, Carlson & Aylward 2010.

Renaissance and 19th century masons could rely upon spolia from the ancient monuments for most of their supplies of exotic stone, but modern scientific methods of studying marble provenance[141] are increasingly demonstrating the importance of the trade from Classical period through the Roman Republic.[142]

We will concentrate primarily here upon the trade in manufactured items, however. The workmanship and versatility of Greek craftsmen would be more evident had we a larger sample of their marble and bronze statuary, jewelry, and silverware. Greek silver and gold plate, described in great detail in the procession of Ptolemy Philadelphus[143] or in the treasury accounts of many temples,[144] almost never survives, and then, almost exclusively in barbarian graves, or the occasional fortuitous hordes, such as the Rogozen treasure from Thrace.[145] Some idea of the importance of raw, coined, and worked silver for Greek trade,[146] and the amount of plate in circulation in the Classical and Hellenistic world,[147] now almost entirely lost to us, can be gathered when one recalls that Alexander the Great captured as much as 2200 metric tons of precious metals from the Persian monarch, and the Romans looted 550 tons of silver from their campaigns against the Macedonians and Aetolians, including innumerable gold and silver vessels, despite leaving many of the major sanctuaries largely intact.[148] When contemplating just how much plate has been melted down over the centuries, it is worth reflecting that the 108 silver and silver-gilt *phialai* uncovered in a single hoard from a modern garden in Rogozen was more than twice the total number of such vessels preserved in the world's

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[141] See Herz & Waelkens 1988; Herz 2006 for an overview of the state of the discipline.
[142] See Gabellone, Giannotta & Alessio 2009; Calia, Giannotta, Lazzarini et al. 2009; Fischer 2009; Bernard 2010; and Aurigny 2010 for some intriguing recent contributions.
[143] Athen. *Deipn.* 5.197A-202B; see also Fraser 1972: 136-7. As Rostovzeff 1941: 1411 note 175 points out, the weight of all the gold and silver plate was 10,000 talents, and silver plate is very frequently mentioned in the correspondence of Zeno.
[144] See Vickers 1990.
[145] See Fol, Nikolov, and Hoddinot 1986; Cook 1989. For other Classical treasures, note also the Tarentine silver horde discovered in 1886 described in Weuilleumier 1930.
[146] Panagopoulou 2007.
[147] Brought out very effectively from this and other literary sources by Vickers 1985; Vickers 1990; Vickers and Gill 1994: 55-76. For a recent survey of plate from Macedonia, see Zimi 2011.
[148] See Treister 1996: 381-3 and note in particular the inventory of treasures displayed in M. Aemilius' triumph, quoted from Diod. Sic. 31.8.9-13. Note also the large amounts of coined silver and plate held or donated by the Hellenistic monarchs.

museums at the time.[149] Excavations in Thrace, the North Pontic region, Macedonia, and among the Italic populations of Magna Grecia, provide us with a disproportionate amount of evidence for Greek production of art objects in precious metals.[150]

In addition to furniture, vessels, tools, statuary and the like we must also factor in fine jewelry, rarely buried in Greek graves, but much more common among Hellenized Southern Italians, in Thrace and the Black sea region, Cyprus, Egypt, the Levant, and increasingly uncovered in recent excavations and northern Greece and Macedonia.[151] One of the most remarkable testaments to the workmanship of Greek jewellers is the exquisite gold pectoral, normally dated sometime between 400 and 350 BC, from the Tolstaja Mogila Kurgan in the Ukraine,[152] but hundreds of more modest items have been excavated,[153] many showing how closely attuned Greek craftsmen had become to producing artworks for barbarian clients, even reflecting their lifestyles, myths, and adapting traditional subject matter in the finest Greek style.[154]

The existence of an organized trade in silverware can be documented by a few fortuitous finds of commercial graffiti on silver or other vessels, as on an inscribed cup from Dalboki in Thrace, now in the Ashmolean Museum.[155] Moreover, a large horde of 5th and 4th century bronze ware from a river shipwreck near Peschanoe in Dnieper Basin,

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[149] Fol, Nikolov and Hoddinott 1986: 16.
[150] See, for example, Gorbunova 1971; Metropolitan Museum of Art 1975; Archibald 1998: 177-84; Modrvinceva & Treister 2007: 5-84; 154 Karte 1; Teleaga 2008.
[151] See Pfrommer 1990 for the most complete synthesis, in particular Pfrommer 1990: 148 Abb. 23; 155 Abb. 26; 158 Abb. 27; 173 Abb. 32; 178 Abb. 35; 179 Abb. 34; 182 Abb. 35; 186 Abb. 36, conveniently collected together as Treister 1996: figs. 42.1-2; 43.1-2; 45.1-2; 46.1-2. See also Archibald 1998: 190-3 for the analysis of Thracian jewelry, a good deal, but by no means all, imported Greek or Macedonian work, found in several rich burials near Duvanli, in particular three rich female burials yielding 1265.35 gm, 436.35 gm and 158.5 gm of gold respectively. More recently, see Pfrommer 2001; Treister 2005; Jackson 2006; Treister & Mordvintseva 2007.
[152] For images, see Metropolitan Museum of Art 1975: No. 171 pl. 31-3; Galanina & Grach 1986: 95-8 fig. 118-21. For further discussion, see Stähler 1997: 117-96.
[153] See Pfrommer 1990: *passim*; Treister 1996: *passim*; Treister 2001: *passim*; Treister & Mordvintseva 2007.
[154] Moreno 2007: 74. For art works designed to appeal to the Thracians, see Oakley 2009. For the difficulty of distinguishing Greek and Thracian work, for example, and the vitality of non-Greek metalworking under the stimulus of Greek craftsmen and trade, see Szymanska 1984; Fol, Nikolov & Hoddinott 1986; Archibald 1998: 178-9; 181.
[155] See Johnston 1978: 79-80; Gill 1987: 51 and note 12-3.

gives a rare glimpse into how Greek metalware was traded into the interior of the Northern Pontic area, with further finds as far as the Tauric sanctuary in the Caucasus mountains.[156]

At an intermediate level of cost, between precious metals and simple bronze, one has Corinthian bronze, identified by Paul Craddock as the ancient counterpart to Japanese Shakudo,[157] an alloy of bronze and silver or gold, which can be treated to create a glossy black patina which complements gold and silver inlay, as well as superb pieces like the Derveni Krater, from a 4th century Macedonian grave, but likely manufactured in Athens, a masterpiece of toreutic art, in lustrous high-tin bronze convincingly imitating a gold or gilt vessel.[158] Moreover, we should not neglect bronze plated with gold or silver. Analyses of counterfeited Roman coins provide important proof that the ancients had mastered a wide range of techniques for the plating of base metals with silver.[159]

Precious metals and their imitations, although widely traded, were arguably far less important than bronze and iron work. Bronze tableware of a wide range of designs, including mugs, bowls, hydriae, and situlae, many, although by no means all, of Greek manufacture, have been identified throughout the Thracian kingdoms of the Odrysians, as documented in detail by Archibald.[160] An exemplary recent study of Greek imports in barbarian graves excavated along the lower Danube and Dniester clearly documents a no less remarkable interpenetration of Greek commodities and craft products,[161] not only transport amphoras from Lesbos, Chios, Mende, Peparethos, Thasos, Herakleia Pontica,

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[156] See Treister 1996: 362.
[157] See Craddock and Giumla-Mair 1993; Wallace-Hadrill 2008: 373-5. For the analysis showing a similar technique in the celebrated Mycenaean daggers, see Demakopoulou 1995.
[158] See Rolley 1986: 178-84 and Barr-Sharrar 2008, a recent monograph with full references.
[159] See La Niece 1993.
[160] Archibald 1998: 184-90.
[161] Teleaga 2008: 5-54 for a catalogue of sites. In many regions, as many as 10-20% of all graves contain some Greek imports, particularly along the Dniester. See Teleaga 2008: 1, Abb. 1. Although a few exceptional artworks may have been diplomatic gifts to rulers or influential chieftains, as Archibald 1998: 193-4 suggests, it seems clear from the wide range of material in the Danubian graves, and the remarkably broad social cross-section involved, that trade on a significant scale, and not just gift exchange, is operative in the ancient Black Sea, as in the 19th century.

Chersonesos, Sinope, Rhodes, and Kos,[162] but a great deal of ceramics, including Corinthian[163] painted pottery, and Attic black and red figure finewares,[164] black glazed pottery,[165] terracotta lamps, and coarse wares,[166] but also armour and helmets,[167] weapons,[168] and innumerable bronze vessels, lamps, and mirrors.[169] Although less striking, perhaps, than the deep contacts with the Thracians and Scythians, Greek exports to the Celts should not be neglected. The massive bronze krater, weighing more than 208 kg., found in the burial of the wealthy Celtic chieftain at Vix, with Greek wine amphoras and Attic black figure pottery, gives us a striking impression of the remarkable logistical feats performed to export the products Greek workshops to distant markets.[170] Moreover, as Rolley aptly points out,[171] Greek bronze work can be found well beyond the natural Rhône corridor, in Germany, and even as far as the Carpathians.

With the increasing use of bronze vessels by ever more prosperous middle class Greeks, the market for fine painted pottery seems to have declined, at least outside of Lucania and Apulia, with potters turning instead to imitations of metalwork for those households still unable to afford the real thing.[172] Black gloss ware was available to imitate a wide range of metalware, with some of the finer examples painted to resemble Corinthian bronze with gold and/or silver inlay,[173] and quickly became as widely

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[162] Teleaga 2008: 55-118. For an analysis and synthesis of the distribution of the amphoras, see Teleaga 2008: 296-305.
[163] Teleaga 2008: 119-25.
[164] Teleaga 2008: 126-56. The distribution of red figure kraters is very striking evidence of the vitality of Greek trade links deep into the Ukraine. See Teleaga 2008: 138 karte 19.
[165] Teleaga 2008: 156-200.
[166] Teleaga 2008: 200-32.
[167] Teleaga 2008: 232-51.
[168] Teleaga 2008: 289-95.
[169] Teleaga 2008: 258-82.
[170] For the assemblage in the princely burial at Vix, including a large number of Attic red-figure vases, see Rolley et al. 2003 and Petit et al. 2003. For the range of Greek imports in Gaul, see Rolley 1995. For the controversy on the logistics of its export, see Cook 1979; Wells 1980, 53-5; Treister 1996: 84-5.
[171] Rolley 1986: 140-50.
[172] As notice, for example, by Rolley 1986: 192-3.
[173] See Zimmermann-Ekseify 1998.

distributed as Attic red figure ware,[174] paving the way for the Roman *terra sigillata* industry.

The furniture manufacturing business of Demosthenes' father, using imported ivory and wood, was large enough to employ 20 slave craftsmen,[175] and will hardly have been unique. Unlike 18th century or Victorian England, the Greek design aesthetic was simple, elegant, and appropriate for a broad market. The most expensive furniture was decorated with ivory, silver or Corinthian bronze accents,[176] or created from prized imported woods, but otherwise did not differ dramatically in design from the furniture of the middle classes.[177] Although businesses like Demosthenes' will have found ready markets for their products outside of Athens from the many merchants thronging the Piraeus, other centres are highlighted by our sources. Aegina became famous for a special alloy of bronze, used not only in sculpture, but to manufacture the upper parts of bronze candelabra.[178] Delos is described by Pliny[179] as an important centre for the manufacture of couches, as can now be confirmed by excavations on the island, which have revealed moulds for casting bronze couch fittings of Faust I and II types, found so far in SW Asia minor, Greece, the Kuban basin, and Italy.[180] The maritime trade in furniture is documented not only by stylistic means, but can be demonstrated from shipwreck evidence. Found off the coast of Carthage and tentatively dated to the 2nd or 1st century BC, the Mahdia wreck is one of the most spectacular and best studied of Greco-Roman shipwrecks carrying furniture, as well as fine art objects and luxurious

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[174] Note the frequency of large consignments of black gloss ware on ancient shipwrecks. See, for example, Parker 1992: 80-1 No. 124; 118-9 No. 236; Parker 1992: 160 No. 355; 191 No. 448; 197-8 No. 468; 200-1 No. 472; 241 No. 593; 281-2 No. 715; 313-4 No. 820; 367-9 No. 986; 384 No. 1032; 392-4 No. 1058; 392-4 No. 1065; 451 No. 1230; Hadjidaki 1996.
[175] Dem. 27.9-11.
[176] See Wallace-Hadrill 2008: 422-35. The Amiternum couch in the Capitoline Museum is one of the most luxurious and best preserved late Hellenistic examples. See Wallace-Hadrill 2008: 424-5 and figs. 8.42-4.
[177] On Greek furniture, see Richter 1966; Faust 1989; Adrianou 2006.
[178] See Treister 1996: 203.
[179] See Pliny, *NH* 33.144; 34.9.
[180] See Treister 1999: 361-4 with Faust 1989: Karte 1-2.

home furnishings,[181] but quite a few such ships have now been excavated.[182] In addition to the cargo of couches already noted, a wide range of products were being carried on the Mahdia ship: ingots of raw metal from the Iberian mines,[183] 67 unfluted marble columns and numerous capitals, representing approximately 230 tons alone, elaborate carved marble kraters and candelabra, a wheeled bronze brazier, fine bronze lamps, and a large cast bronze herm, nearly identical to another from the Getty, and small grotesque statuettes which reveal clever techniques for producing large numbers of nearly identical but unique sculptures by re-fashioning the wax models.[184]

Such shipwrecks provide important evidence for the extent of the trade in furnishings, housewares and metal goods,[185] but only hint at the full extent of the potential demand. For this one needs to look at the unique situation of Pompeii and Herculaneum, communities abandoned with many of their possessions intact and then buried.[186] In addition to untold thousands of metal vessels and tools of bronze and iron,[187] there are innumerable small and even life-size statues of bronze and marble, many products of Greek, particularly Athenian,[188] workshops, some of excellent workmanship, a few of questionable taste, and a few masterpieces.[189] This industry of producing small decorative statuettes in bronze, marble, or terracotta seems to have really

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[181] For the Mahdia wreck, see Parker 1992: 252-3 no. 621 (dates 110-90 BC); Hellenkemper Salies et al. 1994; Wallace-Hadrill 2008: 366-71.
[182] See Bol 1972; Rolley 1986: 193-4; Arribas *et al*. 1987; Parker 1992: 40 No. 1; 88 No. 147; 176 No. 396; 259-60 No. 650; 332-4 No. 879; 367 No. 985; 369-70 No. 993; 392-4 No. 1058; 412 No. 1113; Gelsdorff 1994; Baudoin, Liou, & Long 1994: 31-60; Mattusch 1996: 87-94.
[183] Treister 1996: 354 citing the judgement of Domergue.
[184] See Mattusch 1994; 1995.
[185] See further Treister 1996: 361-3.
[186] For a catalogue and analysis of the impressive range of sculpture and reliefs found in a sample of five far from palatial Pompeian houses, see Dwyer 1982.
[187] See Wallace-Hadrill 2008: 391-2, who notes that Tassinari catalogued 1,678 bronze vessels found in situ in Pompeii, and estimates that there are more than 4,000 uncatalogued bronze and iron vessels from Pompeii and Herculaneum in the storerooms of the Naples Museum.
[188] For the continued productivity and appeal of Athenian sculptors through the Hellenistic and Roman period, Stewart 1979 remains a classic.
[189]

begun to take off in the Hellenistic, rather than the Roman, era[190] although literally thousands of small votive statuettes dating as far back as the Geometric period have survived from ancient sanctuaries.[191] The massive production of life-size marble and bronze statuary[192] is suggested by the more than 1,000 Greek sculptors whose names are preserved in the literary record or on statue bases or inscriptions,[193] and from Pliny's despair at classifying it all: "Bronze statuary has flourished infinitely, and would fill a work of many volumes if one wanted to pursue much of it; as for all of it, who could do it? When Marcus Scaurus was magistrate, there were 3,000 statues on the stage of a temporary theatre. ... And it is said by Mucianus ... that there are still 3,000 statues on Rhodes, and no fewer are believed to exist at Athens, Olympia, and Delphi,"[194] and he goes on to claim that Lysippos was said to have produced more than 1,500 statues in his own workshops.[195] Although many life-size statues or statue groups were likely cast or carved by sculptors who travelled to complete the commission, and skilled craftsmen are often an itinerant sort, in the ancient world as in the Renaissance,[196] a trade of services, then, rather than of goods, a surprisingly large number of bronze or marble statues have been recovered from shipwrecks,[197] and, despite the temptation to attribute them to *spolia* from the sack of Athens or the Macedonian wars, it seems clear that we are in fact dealing with an established trade.[198]

In addition to the eruption of Vesuvius, we can thank the raids of the Alamanni for a glimpse of the vast production of metal vessels and tools available to loot from

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[190] Rolley 1986: *passim*; Treister 1996: 327-8.
[191] Mattusch 1996: 1 citing Zimmerman 1989 for the preservation of 1700 horse figurines from 70 different sites.
[192] See Treister 1996: 241-3 for an excellent survey of some of the evidence.
[193] Stewart 1990: 1: 237.
[194] Pliny, *N.H*. 34.36-7 (Translation excerpted from Mattusch 1996: 33-4). Note, however, that the manuscript reading mentions 70,000 statues on Rhodes, and this reading, exaggerated or not, makes rather more sense of Pliny's text, since 3,000 statues could be collected for a single display in Rome. At least some of the dedications to the gods displayed on the Acropolis at Athens were inventoried in inscriptions. See Harris 1992.
[195] Pliny, *N.H*. 34.37. As Treister 1996: 242 points out, our fragmentary literary
[196] See Treister 1996: 237-44;
[197] See Gelsdorff 1994 for a recent synthesis.
[198] See Wallace-Hadrill 2008: 365-6 for an excellent statement of the case, and recall Stewart 1979 for the important trade of Athenian workshops exporting to Rome.

Gallo-Roman farms and villas of the 3rd century AD.[199] Unlike the Hildesheim horde, for example, the farms looted were stocked with utilitarian bronze vessels, and a few pieces of simple silverware, of relatively low silver content, some deliberately cut up for division among the looters, unconcerned about its value. Most of the victims were likely small or medium-scale owner-occupiers rather than owners of palatial villas. Significantly, but not surprisingly, the German raiders did not even bother to steal any of the *terra sigillata*, or even glassware, if any, just as we find a great deal of Attic red figure pottery unlooted at Olynthus.

Perhaps the most striking feature of the loot is the wealth of iron tools. Such tools are rarely alluded to by our sources, but they certainly will have represented a lucrative craft industry and an important contributor to agricultural productivity.[200] Ironworkers will have also made considerable profits from arms manufacture, another important feature of the metal trade, which is often overlooked,[201] and can be documented, to note just one striking example, by finds or representations of Hellenistic Boeotian helmets from Italy, Greece, Ionia, Lycia, the Levant, Egypt, Mesopotamia and Bactria.[202]

In closing, I would like to add a few more observations on the question of self-sufficiency. Classicists still give undue credence to claims about the poor integration with the market or low productivity of peasant farming or craft production in small, often domestic, workshops. I have already written elsewhere about peasant farmers,[203] so I will concentrate on crafts here. A great deal, often the majority, of production for the market has always taken place in homes, as studies of the early Modern putting-out system, and of 19th and early 20th century sweating system of textile production in London and many other English cities, makes entirely clear.[204] But Booth's 1890s survey of London labour shows that textiles were only one of many crafts manufactured in private homes.[205] So,

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[199] See the detailed publication of Künzl 1993. The plunder included dozens of metal vessels, adding up to a total of 219.5 kg iron; 197.3 kg copper; 10.03 kg silver; 1.54 kg tin.

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[201] But see Treister 1996: 218-29; Teleaga 2008: 289-95.

[202] See Treister 1996: fig. 40.

[203] Kron 2008.

[204] See Schmiechen 1984: 50-79.

[205] Booth 1902-3: *passim*.

just as Renaissance Florence's many stone-cutters worked out of studios in their homes,[206] so we find workshops in several Olynthian houses. The stone-mason in one house (A5) made stelai, altars, and louteria, of the sort often found in ancient shipwrecks,[207] the owner of A 10 carved architectural elements.[208]

Studies of rural cloth production in 19th century Eastern Canada show that those rural housewives who did fashion their own clothes, would normally carry out only one or two stages in the production process, typically sold some of their production on the market, and relied heavily on purchased materials already processed in other homes or in textile factories.[209] Moreover, in the early Modern putting-out system, most textile and craft production was entrusted to the cheap, largely female, labour of under-employed rural labourers or peasants, but Erdkamp's claim that the same was true in Greco-Roman antiquity,[210] while certainly possible, need not represent the dominant method of textile production. In Renaissance Florence, for example, wool and silk production remained urban crafts, in part because the intensive cultivation of the Florentine *contado* minimized rural under-employment.[211] The actual firms remained small,[212] however, with most of their capital tied up in raw materials,[213] and, aside from a few fulling mills,[214] little investment in fixed plant or equipment,[215] and relatively little vertical

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[206] Goldthwaite 1980: 233-4,
[207] See, for example, Parker 1992: 111-2 No. 450; 261-2 No. 658.
[208] Cahill 2002: 252.
[209] See Craig, Rygiel & Turcotte 2002.
[210] Erdkamp 1999.
[211] Goldthwaite 2009: 282: "Because of the integration of the urban and rural economies, labor was not much cheaper in the countryside around Florence limited the availability of wage labour even on a seasonable basis. Given the mix of cropping that characterized Tuscan agriculture, sharecroppers were busy working their land throughout the year, and there was not a landless class of day laborers of any size available for employment."
[212]
[213] Goldthwaite 2009: 337 notes that 40% of the cost of wool cloth and 65-70% of silk cloth comes from raw materials.
[214] See Goldthwaite 2009: 301-2 for the water-powered fulling mills located all along Arno outside of city.
[215] Goldthwaite 2009: 300 points out that most of the equipment and tools required for textile production were owned by the workers themselves, working in rented premises. Dyer's equipment was worth only fl. 50, a silk throwing machine fl. 25, even the most expensive looms for silk brocades fl. 25-35, and wool-working looms only fl. 5, all well within the means of skilled artisans with wages of fl. 35 - 70.

integration of the different crafts, which made up the industry, in the hands of a few wealthy merchant capitalists.[216]

In such a situation, archaeological evidence for ancient textile production will necessarily be tenuous, but 247 loomweights, sufficient for 6-12 looms, were found in one room of House A viii 7 in Olynthus, along with 50 elsewhere, while the communicating house A viii 9 has 133 loom weights, enough for at least 3 more looms.[217] This business would be comparable to one of the largest Florentine silk weaving shops, and larger than almost all wool weaving establishments.[218]

Much as we might marvel at the technological sophistication of industrial cloth production, factories were never strictly necessary to adequately clothe England's population, nor did they succeed in doing so. The Jenny or mule could be operated by hand in a private household, and even Arkwright's much larger machine, deliberately designed solely for use in factories, was often powered by water mills or horse power. The great attraction of factory production, as Octave Mirabeau pointed out and Marx noted, was not to increase productivity, but to engross the profits from workers at every stage of production into the hands of the factory owner. England's cotton mills produced more cloth than they could sell in the markets of India, China, Europe, Australasia, North and South America. Nevertheless, working class households had very little disposable income to lavish on clothing through most of the 18th and 19th century, and many could afford little more than a "complication of dirty rags." The ancient Greeks managed to feed, clothe, and house their population to a much higher standard, and exported their products throughout the Mediterranean and beyond, using skilled craft production in small independent urban workshops.

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[216] Goldthwaite 2009: 304-6.

[217] Cahill 2002: 250-2.

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