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ASIA MINOR TO THE IONIAN REVOLT

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Coinage, as we know it, originated in western Asia Minor around the middle of the seventh century.[1] This was a significant step in a long development which started with barter and continued with the use of a wide range of commodities as money. In Anatolia and parts of the Near East, precious metals had long been in general use for commercial purposes before the advent of coinage and constituted the usual means of payment. Gold and especially silver were saved and transacted by weight in the form of cut and broken vessels and jewellery as well as whole and fragmentary ingots of various shapes and sizes (see previous chapter by Kroll). With coinage, an issuing authority, usually the state, weighed the pieces of precious metal to a recognised standard in a system of denominations and marked them with an official stamp to guarantee their value in the area of influence of that authority.

1. Coinage emerging from a fickle metal: electrum

The first coins were almost certainly minted in the Lydian capital Sardis in western Asia Minor. Coinage was quickly adopted and struck in neighbouring areas, chiefly Ionia, which came under the control or influence of the Lydians, who seem to have nurtured a particular disposition for commerce and, according to Herodotus, were the first people to engage in retail trade. Under the Mermnad kings, Lydia prospered and became the most powerful state in the region by seizing control of a number of Ionian cities. An important feature of these first coins is that they were all made of electrum, an alloy of gold and silver with small amounts of other elements (copper, traces of tin, lead and iron). Deposits of

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[1] All ancient dates are BC.

electrum occurred in the silts of rivers, such as the Hermus and the Pactolus, which flowed through the Lydian capital Sardis (Ramage and Craddock 2000: 14-26). The name of the alloy derives from the Greek *elektron*, which originally meant amber and was later applied to the alloy because of its pale yellow colour. Herodotus calls it ‘white gold’ in opposition to boiled (refined or pure) gold. Electrum was a commodity available locally and was largely controlled by the Lydian kings who turned some of it into coins by applying a design on lumps of electrum of consistent weights. With its naturally variable content of gold, electrum in its bullion form was a difficult metal to use in exchanges for every time it changed hands, its intrinsic value had to be ascertained using a 'Lydian stone' (touchstone; Craddock 2000: 247). The gold content of alluvial electrum varied greatly, from *c.* 65 to 85% (Meeks 2000: 145-148; Keyser and Clark 2001: 107). To counter this problem, Lydians turned bullion electrum into coins. Coinage was invented precisely because of the varying intrinsic value of electrum, which could not readily circulate without a guarantee (Wallace 1987; Kroll 2008: 18). Coinage was meant to solve a local difficulty in Lydia and its subject territories: that of using a metal of inconsistent value in transactions. By putting devices on carefully weighed lumps of electrum, the issuing authority would fix the face value of electrum at apparently the highest point of its intrinsic value (Price 1983: 5). A number of early electrum coins have been analysed to determine their exact alloy composition. A set of data involving 30 coins from two hoards from Samos shows a wide range of gold percentages, from 84 to 46% with a mean percentage at around 55-60% (Nicolet-Pierre and Barrandon 1998: 130; Konuk 2005: 49). This contrasts with their weights, which feature remarkable accuracy and consistency between various denominations. Just a few of these coins might have been struck with natural electrum (three or four of the coins with the highest content of gold), whereas all the remaining ones must have been minted with artificially made or altered electrum, containing less gold and more silver and copper (Keyser and Clark 2001: 106). The amount of copper

increases (up to 3.6%) as the gold proportion decreases; copper may have been added proportionally to standardize the appearance of coins of varying gold content (Konuk 2005: 51). A further set of coins to have been probed are the Lydian lion head issues which have a much more stable proportion of gold at around 54% with *c.* 2% copper (Cowell and Hyne 2000: 170-171; Keyser and Clark 2001: 114). Lydian coins were clearly struck with a manipulated alloy which contained a lower proportion of gold than is found in natural electrum (70-75% gold on average). The face or exchange value of these coins would have been superior to their intrinsic value, perhaps by as much as some 20% to coincide with a value close to that of natural electrum (Le Rider 2001: 94-5; see below for an anecdote in Herodotus involving a gift made by Croesus from which the value in question may perhaps be determined).

With the exception of some electrum issues with a plain surface (fig. 1) or simple striations on their main side (called the obverse), the earliest coinage is characterised by a large diversity of designs which are called 'types' (coins with plain and/or striated surfaces and coins carrying types circulated together and are therefore contemporary as hoard evidence shows; a punch-sharing has also been noted between a typeless coin and a lion type coin: Karwiese 1991: 9-10). Wild and domestic animals are most frequently represented, often just foreparts, heads or body parts (lion paws); lions (fig. 2, 8, 12, 13 and 15) were especially popular in the electrum bestiary which included rams, goats (fig. 3), stags (fig. 11), boars, bulls (fig. 15), horses (fig. 4), hares, foxes, dogs, tortoises, various birds, fish, seals, octopus (fig. 9), crabs, dolphins, insects such as bees (fig. 7) and beetles. Fantastic animals (winged horses, griffins, the Chimaera), monsters (gorgons, sirens, winged men), objects (fibulae, thunderbolts, shields), human depictions (fig. 5), geometric patterns and irregular markings (fig. 6) also adorn the obverse of these coins (Spier 1990: 111). Close to a hundred different devices have been identified and new ones continue to surface. The type was engraved on a

die upon which was placed a pre-weighed piece of electrum that was then struck with a punch (a simple rod) and a hammer. As a result, the main side received the type in positive, the other side was left with one or several punch marks (called an incuse) which exposed the interior of the coin. Each issuing authority used a principal identifying type on its coinage, but some mints used several types (Weidauer 1975). At Sardis it was the lion, the royal animal *par excellence* and closely associated with the Lydian dynasty, most commonly the lion's head (fig. 12 and 13) but also its forepart or just its paw. A rare Lydian issue with a head of a boar, sometimes inscribed, should also be placed at Sardis (Spier 1998: 331). In Ionia the earliest identifiable mints adopted the following types: Ephesus - a stag or a bee (fig. 2); Phocaea - a seal (fig. 9); Miletus - a recumbent lion (fig. 8) or just its head; the island of Samos - a lion's head facing, irregular markings, a reclining lamb or a bird, the island of Chios - a seated Sphinx, Cyzicus - a tuna fish, or its head in a composition (fig. 10). In the case of Phocaea, the seal, *phoke* in Greek, is a pun on the city's name (fig. 6). There were clearly a number of other mints in Ionia which cannot be identified as yet, but the number of mints was smaller than the multiplicity of types would suggest, different types being often linked by the same punches. Just a handful of inscriptions on very early coins are extant, mostly in Lydian but the longest inscription is in Greek and reads "I am the badge (or seal) of Phanes"; it is placed above a grazing stag depicted on the a series of staters of which four specimens are know today (fig. 11); the third one to appear has just '*phaneos emi*'. These staters were issued by a mint, usually identified as Ephesus, which produced a whole range of smaller denominations (down to 1/96^{ths}), the thirds have simply '*phaneos*', 'of Phanes', depicting the stag as a forepart or just its head on smaller fractions (punch-sharing has been noted between stater and sixth). Who this Phanes was remains a matter of conjecture, but the fact that a fraction was discovered in a hoard from Ephesus (Spier 1998: 330) and that the '*phaneos emi*' stater reportedly came to light near the modern town of Torbalı (not far from Ephesus), strengthens

an attribution to Ephesus where the stag associated with Artemis was a longstanding civic coin type. The Phanes inscription derives from an earlier tradition of seal inscriptions (Seaford 2004: 115-124) and it has been pointed out (Spier 1990: 117) that the word *sema* does not refer to the device of the stag alone, but rather to both the device and the inscription taken together as a means of identifying the issuer of the coin (perhaps an official of Ephesus responsible for the issue). Rather than badge or emblem, *sema* would be better translated as 'seal' or 'signature'.

The most prolific mint for early electrum coins was Sardis which produced large quantities of the lion head thirds, sixths and twelfths along with lion paw fractions. Some of the lion head coins are inscribed in Lydian with *walwet* or *kukalim* (presumably meaning 'I am of Kukaś' or 'I belong to Kukaś', which reminds one of the signet seal tradition; the legend placed between opposing lion's heads (Wallace 2006; fig. 12). There is also a variant which reads -*late*- between two opposing boar's heads (Karwiese 2008: 147: found in 1986 in the Artemisium foundations). On both series, one of the two heads is usually off-flan, for the dies seem to have been made for staters which are not extant. These coins are punch-linked and they seem to form a fairly compact series. *Walwet* has been usually identified as the Lydian name of king Alyattes (*c.* 610-560) and the other two names may also be connected to the royal household. One difficulty with attributing the series to the time of Alyattes is the discovery in 1994 of a *kukalim* third (ART 94 K277) in the eastern *sekos* of the temple of Croesus in a context which is dated to *c.* 630/20 BC (Kerschner 1997: 100; Karwiese 2008: 146). Four *walwet* coins (third, sixth and two twelfths) were also among the 93 Artemisium deposit coins (see below; Robinson 1951: 166-7). Lion head coins show a stylistic evolution and a classification has been proposed by Weidauer. A hoard from Gordion in Phrygia of the later lion head coins (fig. 13), which were issued in large quantities, produced 45 specimens in all three denominations (Bellinger 1968). A few of these carry tiny

punch marks (called countermarks). Other examples have one, two and very often three, usually on both sides and sometimes on their edges. Some lion coins are completely covered by countermarks, in some cases more than ten. These marks were probably applied by moneychangers and bankers to coins that they considered of correct weight and alloy (counterfeits were not uncommon). If these coins came into their hands again, they would recognise their marks and have no need to test the coins again. This practice became commonplace under the Persians on their sigloi.

We do not know whether there was a state monopoly of issuing coinage or whether some wealthy private individuals such as bankers or merchants were also allowed to strike coins of their own (Price 1983). Although irregular in size and shape, these early electrum coins were minted according to a strict weight-standard. The denominations ranged from the unit called stater (14.15g in the Lydo-Milesian weight system) down through half-staters, thirds, sixths, twelfths, 1/24^{ths}, 1/48^{ths}, 1/96^{ths} to 1/192^{nds} of a stater (about 0.08g, fig. 11; this denomination has been recently identified: Stingl 2001: 42; Konuk 2003: 33). The rich iconography of the obverse of the early electrum coins contrasts with the dull appearance of their reverse which usually carries only punch marks. The shape and number of these punches varied according to their denomination and weight-standard. Although there are some exceptions, the following system was in place: in the Lydo-Milesian standard, by far the most widely used, staters (14.15g) carried an oblong punch mark between two square ones (fig. 2, 4 and 8), half-staters had two oblong punch marks, third and sixth two square punch marks (fig. 7), smaller fractions had only a square one. In the Samian (Euboeic) weight system, the stater (17.4g) had two oblong punch marks, the half-stater, a rectangular and a square (sometimes triangular) punch marks (fig. 12), smaller denominations only a square one. In the Phocaic weight system, the stater (16.8g) had two square punch mark, one bigger than the other (fig. 4 and 5), although there are a few examples with only one punch mark which was the rule for

smaller Phocaic fractions.

2. The date of the early electrum coinage

Excavations carried out by the British Museum at the temple of Artemis at Ephesus in 1904-5 yielded 93 coins among the foundation deposits of the archaic temple (Robinson 1954). These finds are critical for our understanding of how and when the earliest coins appeared. Among these deposits was the earliest known pot-hoard: a group of 19 electrum coins sealed and buried together in an olpe. The majority of the Artemisium coins are Lydian issues of the lion head type and lion-paw fractions. The interpretation of the Artemisium coins and their dating in particular, have been the subject of an intense debate among scholars, some advocating a high dating (first quarter of the seventh century: Weidauer 1974; Furtwängler 1986), others a low dating for their introduction (first quarter of the sixth century: Price 1983: 4, who later suggested a date shortly before 600: Carradice and Price: 20), while a majority of numismatists opting for a middle chronology of *c.* 630 (Robinson 1954; Kraay 1976: 21-2; Wallace 1987: 385). Recently, an architectural re-assessment of the excavations made in the 'central basis' of the Artemisium dated the earliest context for the foundation deposit coins to *c.* 560 (Bammer 1990; 1991: 83). However, this interpretation has been vehemently opposed (Weissl 2002: 315-321; 2005: 365) and, in any event, *c.* 560 was only a *terminus ante quem* and how much earlier the first coins were to be placed remained uncertain. Latest evidence from the Artemisium in the form of stratigraphical data of some recently found electrum coins suggest that electrum coinage was already in place in *c.* 625 (Kerschner 1997). During the excavations of 1993/94 in the Eastern *sekos* of the *dipteros* of Croesus, a few coins were found in pre-Croesus levels. The most important context was a

stratified deposit of sacrificial residues dating to the last third of the seventh century. The sacrificial deposits were covered by river sand after the area had been inundated. A third-stater, which belongs to the Lydian lion head group inscribed *kukalim* (inv. ART 94 K 277), was found in the earliest layers "Opferschicht G or F" which can be dated to *c.* 630/20 (Kerschner 1997: 100; 226). Five more coins have been found in a layer of debris on the north side of the Archaic *dipteros* of Croesus. The pottery finds of these context, however, have not yet been studied. These new stratigraphical data provided by the Austrian excavators is consistent with a dating that had been proposed for the olpe of the pot-hoard (Williams 1991-3). The vessel was reckoned to have been buried between 650 and 625 and the beginning of electrum coinage was therefore placed *c.* 650. It appears that in the light of the latest stratigraphical evidence from the Artemisium, the middle dating should gain further support, with probably an adjustment on the upside of a decade or two.

3. Croesus and the advent of bimetallism

For 80 years or so, electrum remained the sole metal used for coinage. Its varying intrinsic value and the rarity of its natural occurrence outside Lydia discouraged the spread of electrum coinage to other parts of the ancient world. Electrum coinage remained in effect a local phenomenon limited to Lydia and its subjected territories. But towards the middle of the sixth century, Croesus (561-546), the last and the wealthiest king of Lydia, was responsible for a remarkable monetary innovation, one that was to have a profound impact on the diffusion of coinage throughout the ancient world. Herodotus (1.94) reported this event in these words: “So far as we have any knowledge, they (the Lydians) were the first people to introduce the use of gold and silver coins, and the first who sold goods by retail”.

Croesus replaced the electrum coinage by a currency system of pure gold and pure silver coins, struck at Sardis. The multiplicity of types on electrum coins was replaced by a single coin type used both on gold and silver issues and for all denominations, namely the confronted foreparts of lion and bull stamped on the obverse (fig. 16). A rare issue of staters in electrum (fig. 15) depicting the same foreparts but back to back, has been alleged to represent the last electrum coinage of Croesus, the animals attached by their backs symbolizing gold (lion) and silver (bull) still mixed in one metal: electrum (Robinson 1958: 585). The confronted lion-bull coinage was later struck by the Persians after the conquest of Sardis (see below), but lifetime issues of Croesus show a more naturalistic rendering of the two animals (Naster 1965: 30; Nimchuk 2000). The reverse was struck with two incuse squares, one a little bigger than the other, the bigger always positioned underneath the lion. Smaller fractions have just one incuse square; in recent years a great many of these have surfaced, in both metals, attesting that it was not a coinage issued for making large payments only (Walburg 1991: 15-8). We are now confident that the lion-bull coinage belongs indeed to Croesus, at least in its initial phase, thanks to three lion-bull fractions (one gold 12^{th} and two silver: 12^{th} and 24^{th}) unearthed recently during excavations at Sardis in pre-540s levels (Cahill and Kroll 2005). Furthermore, the discovery at Sardis of a large workshop for refining electrum into ingots of pure gold and pure silver, dated independently by the diggers to *c.* 560-550, helps us to understand how the precious metal for coinage was obtained (Ramage and Craddock 2000: 81-96). Analyses of the gold fragments found in this workshop and those of the gold used for coins attributed to Croesus produced similar results (Cowell and Hyne 2000). No doubt part of the gold and silver purified in that workshop was used under Croesus to strike coins.

Croesus thus established the first known example of bimetallism, commonly defined as a monetary system in which the state fixes the exchange rate between gold and silver. The

gold staters were reduced from 14.15g of electrum to 10.8g of gold, coins referred to in ancient sources as *kroiseioi stateres* (Le Rider 2001: 102), and today as Croeseids (fig. 16). Not long after their introduction, gold Croeseids and their fractions came to be struck on a lighter standard of 8.1g, some specimens being struck with dies and punches used for the production of heavy staters which have survived in fewer examples than those on the light standard. Staters in pure silver of 10.8g were also issued together with a wide range of smaller denominations (third, sixth, twelfth, 24th). The weights of the new coins are believed to have been designed to facilitate the exchange of old electrum coins for new gold ones. By the ratio between gold and silver prevailing in that period (1:13.3), a stater of 14.15g of electrum would have been equivalent to a stater of 10.8g of gold. Kroll has suggested that the Lydian state first used this heavy standard to recall old electrum coins at a 1:1 bullion ratio between pure gold and electrum at its natural intrinsic value (70 to 80% gold which was probably the face value of electrum coins; Cahill and Kroll 2005). Later, when enough electrum was redeemed from private ownership, the Lydian treasury issued the light gold stater at 8.1g, a weight which corresponded to the gold content of Lydian electrum coins which typically contained *c.* 54% gold and *c.* 44% silver. Accordingly a 14.15g electrum stater contained *c.* 7.6g of gold and *c.* 6.2g of silver, the latter being equivalent to 0.46g of gold, which would amount to the total intrinsic value of a light gold Croeseid.

Croesus was particularly munificent towards sanctuaries and sent generous offerings to the oracles of Apollo at Miletus and Delphi in Greece. Among the lavish gifts reported in Herodotus (1.50) one, made to the oracle at Delphi, attests that the use of electrum as bullion had not been completely abandoned. It was a prodigious amount as Croesus presented a total of 177 brick-shaped ingots of equal size (presumably all cast in the same mould), four of them of 'refined' (pure) gold each weighing two and a half talents and the rest of white gold (electrum) each weighing two talents. From that information we can calculate that these white

gold ingots consisted of about 72% gold, a proportion corresponding to that found in alluvial (natural) electrum. One can only be amazed by Croesus' largesse towards Delphi for what he sent weighed about six and a half tons of pure gold. In the same vain, Herodotus (1.94) reported that, pleased by an auspicious oracle, Croesus presented each citizen of Delphi with two gold staters.

4. The Great King's 'archers'

After the demise of the kingdom of Lydia in 546, the coinage of the Persian kings became one of the most important currencies of western Asia Minor. However the death of Croesus did not mean the end of Lydian coinage. Indeed, Cyrus adopted for his purposes the bimetallic system introduced by Croesus and continued at Sardis to strike gold and silver issues on the Croeseid model. Coin hoards indicate clearly that the issues of Lydian type continued until *c.* 520 (Carradice 1989; Robinson 1960). Persians authorities continued to strike gold staters on the light standard of 8.1g, and silver units weighed half of their former weight at 5.4g. The Persian issues are characterized by a more dynamic style with a vivid sense of movement that can sometimes result in a relatively schematic rendering of the two animals. As we have seen, on earlier (Lydian) issues, the confronted lion and the bull foreparts were depicted in a more naturalistic and neat manner. Coin hoards show that the issues attributed to Croesus did not circulate with those struck by the Persians. The foundation deposit boxes of the apadana at Persepolis included eight light gold Croeseids together with silver coins of Aegina, Abdera and Cyprus (Meadows 2003). Dating the construction of the apadana has proved more problematic that had been assumed and it would be wiser, until more conclusive evidence is found, not to use the foundation deposit coins for dating the end

of the Croeseid issues (and the introduction of the Persian-type coinage by Darius).

Darius I (521-486) reformed the Lydian system adopted by his predecessors by introducing new Persian types and weights, while maintaining bimetallism. The name of the pure gold coin called by Greek authors the daric, or more usually 'daric stater', no doubt derives from the name of Darius who is also known to have reformed the tribute system of the Empire. The weight of the daric at *c.* 8.4g was slightly higher than the standard used previously (8.1g) and was thus brought into relation with the old Mesopotamian shekel measure (1 mina: *c.* 504g, 1/60 mina: 8.4g). On the other hand the weight of the unit of silver, known as a siglos or siklos in Greek, after the Semitic unit of weight, the sheqel, remained at 5.4g. The types however changed, the obverse depicting the figure of the Royal Hero, a conventional representation of the king as an archer wearing crown, and the reverse an oblong punch mark. Under Darius the ratio of value between gold and silver in the new Achaemenid imperial system was 1:13 and the official exchange rate between the daric and the siglos set at 1:20.

The oldest type (Type 1, fig. 18) is known so far in sigloi only and started around 520. The Persian hero-king is depicted from the waist upward; he holds a bow in the left hand and two or three arrows in the other. The depiction of only the upper part of the figure recalls the foreparts of animals used on previous issues, but this design may have rather reflected the king in state procession or ceremonial in his chariot (Root 1989: 47). There are no known examples of fractions of the siglos for this first type which is the rarest of all Persian silver issues. So far as we can ascertain, one or two decades after the introduction of these sigloi – around 510-505 – the royal figure began to be depicted with his right knee on the ground and drawing an arrow (fig. 19). This new depiction has been labelled Type II. The majority of recorded specimens are sigloi and their fractions, but there are also some rare darics, the first Persian-type gold coins, and fractions of the daric. Until recently, silver fractions of Type II

were rare, but many have surfaced over the past few years. A precious *terminus ante quem* is thankfully provided by a clay tablet discovered in Persepolis, which is precisely dated to 500 (the twenty-second year of reign of Darius) and was stamped with a Type II coin used as a seal (Root 1988). A short while later, around 490-480, perhaps on the accession of Xerxes (485-460), the royal figure was given, in addition to his bow, a long spear which he held obliquely in his right hand – this is know as Type III. One can distinguish two sub-groups: the first and earliest is characterised by two small pellets behind the beard of the figure (fig. 20). The following sub-group (IIIb) omits the pellets, and has its weight increased from 5.4g to 5.55g. The change probably took place after the second Persian wars, towards 475 or a little later.

When studying the coinage of the Persian kings, it is important not to simply regard it as the currency of their whole Empire. In fact, coin finds clearly show that sigloi mainly circulated in a very small part of the Empire: western Asia Minor. It was a regional coinage, struck at Sardis but perhaps also, later on, at other administrative centres like Dascylium and was only intended for the coastal provinces of Asia Minor. The circulation pattern of darics, however, was wider and hoards have been found not only in western Asia Minor but also in Greece, Macedonia and Italy. There is little doubt that most of the available silver, and to a lesser extent the gold which circulated in the Empire, was not minted. The few metal analyses of Persian coins that are available to us do not allow any detailed conclusions to be drawn. The following observations are however worth making. Darics were struck in extremely pure gold, the recorded percentages falling only very rarely below 98%, with the majority of the specimens analysed reaching 99%; Herodotus (4.166) mentions the exceptional purity of Darius' gold coins. This level of purity is not however achieved in the silver sigloi, whose metal is normally around 97-98% pure silver, with some specimens going as low as 94-95%.

Toxotai (archers), as the Greeks called them, were thus employed primarily in

transactions between Persian authorities and the western populations which had long been familiar with coinage. Their fundamental purpose may have been to pay for mercenary soldiers. Darics were also a very effective instrument of foreign policy, buying support for Persian interests among key politicians on the Greek mainland. Since the striking of small silver coins in the coastal cities of Asia Minor developed during this period of Persian rule, it would seem that the Persians left the production of the small change to vassal Greek cities, which were allowed to use their own civic types on their coinage.

5. The spread of silver coinage

In the years following the Persian conquest, many of the major city-states of western Asia Minor started to produce their own civic silver coinage. Most had already taken part in the first wave of electrum minting and the passage to silver was only a natural development which quickly spread to other non-electrum-minting cities. Owing to its lower value and wider acceptance, silver made way for coins to be ever more commonly used in a wide range of transactions. Hoard evidence suggests that unminted silver continued to be exchanged in areas which produced coinage. Gold was not struck and the daric remained the only gold currency until the second half of the fifth century. Besides Greek, inscriptions in Carian and Lycian began to appear on coins and the habit of indicating ethnics slowly spread, but did not become a common practice until the first half of the fifth century. Among the earliest mints to issue silver were first and foremost the Ionian cities of Ephesus (Karwiese 1995), Clazomenae (Dengate 1967), Erythrae (Işık 2003), Teos (Balcer 1968; Matzke 2002), Phocaea (Cahn 1998), Miletus (Pfeiler 1966; Becker 1988), Colophon (Kim and Kroll 2008), Chios (Hardwick 1991) and Samos (Barron 1966), although we lack secure chronological pegs in most cases for dating precisely the beginning and sequence of these coinages. The Lydo-Milesian, Phocaic and Samian weight standards continued to be used for silver, in addition to

which the Aeginetan standard (*c.* 12.4g) was sometimes adopted by mints of Ionia and Caria. Some mints struck units (staters) or large denominations together with fractions, whereas others like Miletus or Colophon confined themselves to small denominations. A hoard of Colophonian fractions (12^{ths} and 24^{ths}) and unminted silver testifies to the considerable quantities that could be minted, albeit of minute size. A staggering total of 393 obverse and 413 reverse dies have been identified for the 903 fractions of the hoard (Kim and Kroll 2008: 54). A single hoard can radically change our understanding of a mint, but moreover, it can help us to reassess the role of small change in late archaic communities (Kim 2002). A far greater amount of fractional coinage was issued than previously thought, and one should be in no doubt that a moneyed economy was being established as early as the late sixth century. Numerous finds of small denominations of Teos that have appeared over the past decade or two illustrate that Colophon was not an isolated case in the massive production of small change. Besides silver, however, three mints continued to issue a regular electrum coinage: Phocaea, Mytilene and Cyzicus. All three struck on the Phocaic standard: all minted sixths in quantity, but Cyzicus minted also staters. This was to be a longstanding tradition which would only cease with the arrival of Alexander the Great. Another noteworthy feature of the coinage of Lesbos, probably minted at Mytilene, was a production of base silver staters and fractions, whereas contemporary coins of Asia Minor were invariably made of silver of the highest purity. However, from the island of Samos is a group of lead pieces whose reverses with two parallel rectangular incuse remind one of the electrum staters struck earlier on the island, but their types do not find any parallel on its the regular coinage (Robinson; 591-2; Kraay 1976: 29-30). The elaborate designs suggest that these should be dated somewhat later that the first phase of the city's electrum coinage. Five types were known until the recent discovery of a hoard from the Mycale region which has revealed a number of new types (Chimaera, silen head, dog, lotus flowers) along with lead pieces bearing the emblem of Miletus (reclining lion

with head reverted). The lead pieces of Samos have been brought into connection with an anecdote incredulously retailed by Herodotus (III.56.2), that Polycrates, the tyrant of Samos, persuaded the Spartans to lift their siege of the island in 525/524 by bribing them with a payment of staters in gilded lead. No trace of gilding can be detected on any of the extant specimens and Herodotus' story, whose veracity he doubted himself, might derive from an earlier occasion involving the production of a lead token coinage.

Further south, in Caria, mention should be made of a hoard which was reportedly found south of Iasos in the mid 1980s. It included over 600 fragments of jewellery and other scrap silver together with nearly 280 silver Croeseids and over a hundred silver issues from Caria of the lion forepart type from staters down to 48^{ths} (*CH* 8, 9-10; Kroll 2008: 24; Carradice and Price 1988: 31; Price 1989: 10). This find shows that Caria started to mint silver at an early period, *c.* 540-520; the Carian issues probably belong to Mylasa (Konuk 2000: 172; 2007: 472-3) which appears to have also minted a small series of late electrum coins which could be placed in the context of the Ionian Revolt (Konuk 2003: 89). A further lion forepart type series on the Aeginetan standard was struck in Caria in *c.* 500 and bears what is possibly the earliest Carian legend on a coin: *oul* (Konuk 2007: 489). Not far from Mylasa, Kindya has been identified as the mint of a prolific series of silver coins weighing *c.* 2.2g with a head of a *ketos* (sea monster) on the obverse and an incuse geometric pattern on the reverse (Kagan and Kritt 1995), but an alternative attribution can be made to the Carian Telmessus (fig. 21; *SNG Kayhan*, 810). Cnidus (Cahn 1970) initiated its coinage in the last quarter of the sixth century along with their neighbours from the Loryma peninsula, the Chersonesians, though their coinage might be of a slightly later date. The Island of Rhodes with Camirus and Lindus (Cahn 1957) issued early silver coins and some electrum coins that are probably contemporary (fig. 21). In Lycia, large amounts of silver coins were issued and their obverse usually depicted a wild boar, sometimes winged, and various incuse shapes on their reverse

(fig. 22; Vismara 1989). The Rhodian colony of Phaselis was among the first to issue a coinage in Lycia, and with its strong maritime tradition, it chose the prow of a warship on the obverse of its coinage, but as a Lycian city it made it resemble the forepart of a boar (Heipp-Tamer 1993). There is also an early series of Aeginetan-weight staters with various obverse types (dolphins, crab, sphinx and a female head) which has been tentatively attributed to Lycia (Sheedy 1998).

Within a few years of the fall of Sardis, the whole of Ionia was incorporated in the Persian Empire. As was the case under the Lydians, Ionians had to pay an annual tribute to the Great King but the cities were left to manage their own affairs, and most of them were ruled by Greek tyrants approved and supported by the Persians. However, in 499 the Ionian cities revolted against their Persian overlords, expelled their pro-Persian tyrants and managed in some cases to establish democracies; this is known as the Ionian revolt. Aristagoras, the tyrant of Miletus, resigned from his own position and led a coalition against Artaphernes, the Persian governor of Sardis. The coalition marched on, captured, and burnt Sardis in 498, but it was defeated at the battle of Ephesus. In 494, the Persians finally managed to capture and destroy Miletus and reduced the cities along the west coast that still held out against them. A series of rare electrum coins, showing a variety of obverse types but with a uniform fabric and square incuse in the reverse, has been associated with the Revolt, though decisive proof of the connection is still lacking (Kraay 1976: 30; Carradice and Price 1988: 33). These coins are staters and fractions on the old Milesian standard used for the earlier electrum coinage. Some of the obverse types have been attributed to specific mints such as Lampsacus (winged horse), Abydus? (cock), Cyme? (horse, fig. 24), Clazomenae (winged boar), Samos (bull forepart), Priene? (Athena head). It is rather puzzling that no type can be attributed to Ephesus, or Miletus, the leading city of the revolt which has been proposed as possible mint for the entire series. Clazomenae has also been suggested as central mint on account of punch sharing

between winged boar staters and regular silver issues of the city. In addition most of the types were represented in a hoard found in Vourla (Urla, *IGCH* 1194), the site of Clazomenae. The common features of this coinage, however, may not be sufficient in themselves to warrant a centralized mint and there are later examples of alliance coinages struck by individual mints. In any case, the absence of punch-sharing between staters of different types would support coordinated but separate minting. A further noteworthy civic coinage in that context is that of Miletus whose extensive silver issues are the most important of archaic Asia Minor (Pfeiler 1966; Becker 1988). These were 12^{ths} staters (obols, 1.2g) on the Milesian standard which are today extant in thousands of specimens (fig. 25); a few in electrum are also known (*SNG Kayhan*, 482). They were minted for a decade or two before the destruction of Miletus in 494 and it is possible that the bulk of this coinage was produced during the troubled period of the Ionian Revolt. Hoard evidence suggests that a smaller production resumed sometime after the destruction of the city.

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TABLE OF ILLUSTRATIONS

1. Uncertain mint of Ionia or Lydia, *c.* 650-600, EL Lydo-Milesian stater (14.32g). Obv. Striated surface. Rev. Oblong incuse between two roughly square incuses. Triton IX (2006), 938.
2. Uncertain mint of Ionia or Lydia, *c.* 650-600, EL Lydo-Milesian third-stater (4.79g). Obv. Forepart of a lion right in linear style. Rev. Two square incuses. Muharrem Kayhan coll., MK1380.
3. Uncertain mint of Ionia, *c.* 650-600, EL Lydo-Milesian third-stater (4.72g). Obv. Confronted foreparts of two goats. Rev. Two square incuses. Muharrem Kayhan coll., MK1615.
4. Uncertain mint of Ionia, *c.* 650-600, EL Lydo-Milesian stater (14.31g). Obv. Forepart of bridled horse right. Rev. Rectangular incuse between two square incuses. *SNG Kayhan*, 714; Konuk 2003: 36.
5. Uncertain mint of Ionia, *c.* 650-600, EL Lydo-Milesian half-stater (7.19g). Obv. Striated surface upon which are the confronted heads of lion and man. Rev. Oblong incuse between two square incuses. Triton VIII (2005), 444.
6. Samos, *c.* 600-550, EL Samian half-stater (8.64g). Obv. Typeless rough surface with irregular markings. Rev. Square and rectangular incuses. *SNG Kayhan*, 628.
7. Ephesus, *c.* 600-550, EL Lydo-Milesian third-stater (4.48g). Obv. Bee within rectangular frame. Rev Two square incuses. *SNG Kayhan*, 112; Konuk 2003: 26.
8. Miletus, *c.* 600-550, EL Lydo-Milesian stater (14.05g). Obv Lion reclining left; its head turned back; all within rectangular frame divided into smaller rectangular and square compartments. Rev. Central oblong incuse containing a running fox, two dividing lines and two pellets; square incuse to right containing five pellets connected by lines; square incuse to left containing a stag's head. CNG Triton VIII (2005), 419.
9. Phocaea, *c.* 600-550, EL Phocaic standard stater (16.39g). Obv. Seal swimming left, an octopus clamped in its mouth; around, three incuse squares in positive. Rev. Two square incuses, the right one smaller. Seen in trade.
10. Cyzicus, *c.* 600-550, EL Phocaic standard stater (16.22g). Obv. Gamecock standing right, holding a tuna fish head in its beak. Obv. Two square incuses, the right one smaller. Berlin Münzkabinett (Löbbecke coll.).
11. Ephesus?, *c.* 600, EL Lydo-Milesian stater (14.14g). Obv. Stag grazing right; on its back, *phaẹnos emi sema* . Rev. Rectangular incuse between two square incuses, all striated. Seen in trade in Munich.
12. Sardis, *c.* 650-600, EL Lydo-Milesian third-stater (2.36g). Obv. Confronted heads of two roaring lions, between them, *walwel*. Rev. Two square incuses. *SNG Kayhan*, 1012; Konuk 2003: 33.
13. Sardis, *c.* 600-560, EL Lydo-Milesian sixth-stater (4.74g). Obv. Head of roaring lion left, sun with multiple rays on forehead. Rev. Two square incuses. CNG.
14. Uncertain mint of Ionia, *c.* 650-600, EL Lydo-Milesian 192nd stater (0.08g). Obv. Globule (eye?). Rev. Rough incuse. *SNG Kayhan*, 691; Konuk 2003: 33.
15. Sardis? Croesus? *c.* 560, EL Lydo-Milesian stater (13.93g). Obv. Joined foreparts of lion and bull. Rev. Rectangular incuse between two square incuses. Oxford, Ashmolean Museum (Loan coll.).
16. Sardis, Croesus (561-546), AV heavy Croeseid (10.77g). Obv. Confronted foreparts of lion and bull. Rev. Two square incuses. CNG.
17. Sardis, Achaemenid period, *c.* 530 BC AV light stater (8.09g). Obv. Confronted foreparts of lion and bull. Rev. Two square incuses. CNG Triton XII (2009), 320.

18. Sardis, Darius I (521-486), *c.* 520-510, AR siglos (5.18g). Obv. Upper part of Persian hero-king right holding a bow in his left hand and arrows in the other. Rev. Square incuse. Muharrem Kayhan coll., MK1374; Konuk 2003: 54.
19. Sardis, Darius I (521-486), *c.* 500, AV daric (8.36g). Obv. Persian hero-king right, in kneeling-running position, drawing bow. Rev. Square incuse. Seen in trade.
20. Sardis, Xerxes I (485-465), AR siglos (5.28g). Obv. Persian hero-king right. Rev. Square incuse. Muharrem Kayhan coll., MK1376; Konuk 2003: 55.
21. Kindya or Telmessus in Caria, *c.* 510, AR (2.22g). Obv. Head of *ketos* (sea-monster) right, with gaping mouth. Rev. Incuse geometric pattern. *SNG Kayhan*, 814.
22. Camirus, *c.* 500, EL Lydo-Milesian 24th (0.48g). Obv. Head of griffin right. Rev. Two rectangular incuses with the letters KA. Muharrem Kayhan Coll., MK1562.
23. Uncertain mint of Lycia, *c.* 510 BC, AR Lycian stater (9.16g). Obv. Forepart of boar left. Rev. Rectangular incuse. *SNG Kayhan*, 1044.
24. Kyme?, *c.* 500 BC, EL Lydo-Milesian stater (14.06g). Obv. Prancing horse left; pellet above and floral motif below; all within linear circle. Rev. Quadripartite square incuse. *SNG Kayhan*, 735; Konuk 2003: 45.
25. Miletus, *c.* 520-490, AR Lydo-Milesian twelfth-stater (obol, 1.13g). Obv. Forepart of lion left with its head turned back. Rev. Starlike floral design in square incuse; one side of the incuse in the shape of the letter M. *SNG Kayhan*, 468. Konuk 2003: 69.

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