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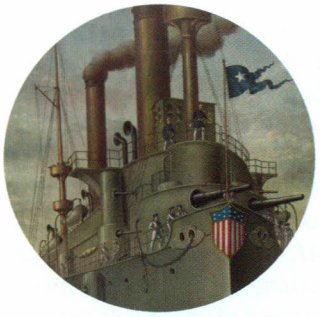


ASIA MINOR Uncertain Rosen 308
ASIA MINOR Uncertain Rosen 308
ASIA MINOR Sixth Century From Colophon
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UNCERTAIN N*
BYB ASIA MINOR Uncertain SNG(BYB) 1020
WEIDAUER
IONIA Uncertain cf. JHS 1951 pl. 38, 67.
ASIA MINOR Uncertain 650-625 Cf. Weidauer 171
IONIA N Uncertain Hess Sale Cat. 11/24/37, #42 (this coin)
ASIA MINOR K uncertain (Miletus 143 Hd)
ASIA MINOR K uncertain
UNCERTAIN N* Miletus ? Samos ?
UNCERTAIN N*
IONIA BYB SNG 1027
ASIA MINOR Uncertain Rosen 304
ASIA MINOR K uncertain
UNCERTAIN N* Var. B. 162
IONIA BYB SNG 1026
UNCERTAIN N*
Asia Minor Uncertain 1997.9.224
UNCERTAIN N*
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ASIA MINOR Uncertain
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IONIA BYB SNG 1024
ASIA MINOR Uncertain 1918 (plated)
AN* LESBOS ?
IONIAN REVOLT c. 500-494 B.C. (Cyme ?)
ASIA MINOR K uncertain 14.02 gm
ASIA MINOR K uncertain
IONIA N* (Vourla Hd.)

Facing page: A selection of early electrum coins in the ANS collection.

WHITE GOLD:
An Enigmatic Start to Greek Coinage

François de Callataÿ

On 26 June 2012, the Israel Museum opened a spectacular exhibit of early electrum coinage entitled "White Gold," and, in the days before, hosted an important academic conference reexamining the many economic, political and numismatic problems associated with these early coins. The papers of the academic conference are to be published this year under the auspices of Haim Gitler, Catherine Lorber, and Koray Konuk. What follows is the keynote address from the exhibit opening summarizing the results of the conference and where we now stand in our understanding of the earliest western coinages.

Some call it an *evolution* since ancient societies had been accustomed to settling transactions in precious metals for many centuries—even millennia—in some parts of Mesopotamia. But what happened in Asia Minor in the last third of the seventh century BC (the date is debated) is best called a *revolution*, one that shaped the world of money forever. It was indeed a revolution if the current view holds: an issuing authority was powerful enough to impose a forced currency of standardized stamped lumps of metal priced well above their intrinsic value. Compared with the ingots or nuggets that were traded before (fig. 1), the main difference is simple: money was no longer just weighed, anonymous lumps, but was now an object linked to a specific authority. This is, in fact, the very definition of what a coin is: a small blank of metal whose alloy and weight are guaranteed by the impression of an official stamp or seal. Implicit at the very heart of this revolution is the principle of fiduciary money, opposed to simple commodity money. People were convinced to accept a means of exchange whose intrinsic value was determined legally, not by the market, and archaic white gold coins are likely to have been priced considerably above their intrinsic value.

We know where it happened: ancient Asia Minor, now western Turkey (fig. 2). The distribution of recorded electrum coin finds, isolated or not, does not go beyond the territory controlled by the Mermnad rulers, that is the Lydian Empire, which came to an end with its last king Croesus. This mainly enveloped the areas of Lydia with its capital Sardis, and Ionia with the city of Ephesus; it also extended to some parts of Mysia to the north and Caria to the south. The distribution pattern of coins within the boundaries of the Lydian Empire strongly limits any explanation that ties these first coins to long-distance trading purposes.

What we don't know for sure is: 1) when the revolution first happened, 2) who the issuing powers were and, most, critically 3) for what purpose were these white-gold coins produced? But before we delve into these questions, let us remind ourselves of some basic facts. The common name for this type of coinage, "electrum", is derived from a word that, in ancient Greek, first designated "amber" and only later "white-gold coins", that is an alloy of gold and silver. "White gold" (Λευκός χρυσός) are the words of Herodotus (1.50.2), describing the electrum offerings of Croesus at Delphi. While some of these electrum coins were long ago recognized as having been produced with a man-made alloy, with low percentages of gold and a stable composition, it has long been thought that others—possibly the oldest ones—were issued using a natural alloy, with great variations from one specimen to another, as has been stressed for the electrum coinage attributed to Samos (cf. Konuk 2005). An ambitious French program of analyses confirms and amplifies the results already presented in a work on electrum finds from Sardis (Ramage & Craddock 2000). In these analyses,

Fig. 1: Silver hoard, Eshtamoa, Iron Age II, 9th–8th century BC. Silver and pottery. Weight: 1.090 kg, the equivalent of 500 shekels. Staff Archaeological Officer in the Civil Administration of Judea and Samaria. Accession number: K2754. Photo ©The Israel Museum, Jerusalem, by Neta Dror

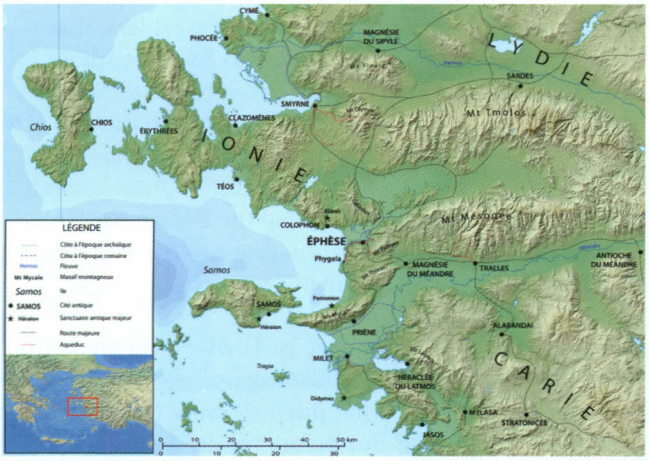

Fig. 2: Map of Ionia and the western portion of the Lydian Empire.

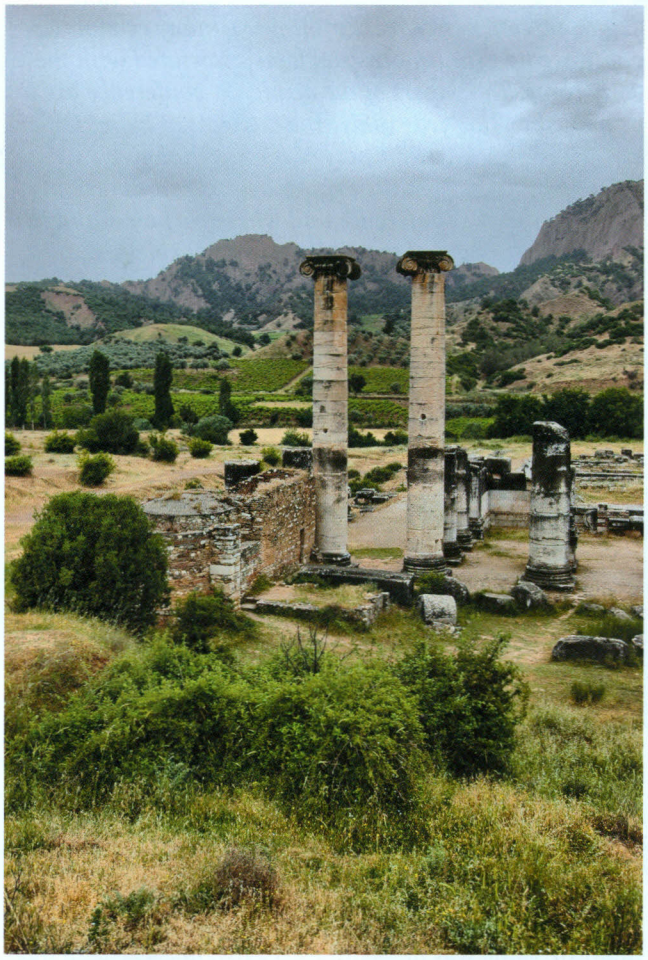

Fig. 3: Overview of Sardis. Photograph by Ahmet Tolga Tek.

the percentage of gold is often well under the minimum of 65% found in native electrum, but copper is present nearly everywhere in too great a proportion not to have been intentionally added. Turning to trace elements, this statement is reinforced by high results obtained for lead (which comes with silver). There are two possibilities: either silver was added to natural electrum, or it was added to gold. Both Craddock, on the one side, and Maryse Blet-Lemarquand and Frédérique Duyrat, on the other, favor the second hypothesis. Therefore, it is likely that all electrum coins, whatever their gold percentages, were produced from non-natural alloys; we also are now certain that cementation was in fact known before 550 BC. If correct, these conclusions are seriously damaging to the idea constantly repeated over the last three decades that it was the variability of natural electrum ores which gave rise to coinage, with owners trying to overcome users' natural distrust in the metal by creating a forced currency. In response to the question—where does the metal come from?—the answer seems less and less reliant on the legendary Pactolus River flowing by Sardis (fig. 3), whose capacities were well below supporting this massive phenomenon. Thus we need to be looking elsewhere for gold sources, and the Troad seems the likeliest suspect.

Another aspect of prime importance not well taken into account in earlier literature was evoked by the conference. Before coinage, Asia Minor and more precisely the Lydian Empire had not transacted in electrum. Previous practice was to use gold and silver as the means of exchange and units of account. And it still remained the case after the birth of coinage, as proved by the lead accounting tablet discovered at Ephesus (IEph 1; fig. 4) dating to c. 550 BC, which was discussed by John Kroll (cf. Kroll 2008). But then, if issuing authorities were powerful enough to impose a forced currency, why not immediately issue it in gold and silver? Why push the limits of trust of those using the new coins even farther by making them in a new and adulterated alloy?

Because of their metal content, electrum coins were of high value whatever the denominations. Staters are thought to have been worth one month's salary while even the smallest denomination, a 1/96th stater (a coin of 1/192th has even been recorded; fig. 5), could possibly have fed a laborer for a week by contemporaneous Babylonian standards. As stated by François Velde in his paper: "the largest electrum coins could only be used in large commercial transactions but the smallest coins were not out of range of weekly or monthly purchases." In any case, even these miniscule 1/96th staters would have been reserved for comparatively large purchases and would not have been easily negotiable in smaller transactions, like for a loaf of bread.

Velde, an economist working for the US Federal Reserve Bank, who has recently and brilliantly ventured into ancient numismatics, has built a large database of electrum coins dated before 520 BC, amounting to nearly 3,000 examples (a high number in itself which to my mind likely accounts for around half of all the existing coins). The commonest fractions are the thirds (trites) and the sixths (hektes). Both fractions were worth several sheep, again indicating the comparatively high value of the transactions in which these coins were used. But the most surprising fact—again never highlighted before—concerns the large set of denominations for each individual obverse type. Many types are now known by five denominations, and some by seven; the range of denominations is a common proxy for the level of monetization. Significantly very few later Greek series reached this same level of denominational spread, and the same holds true for the Middle Ages and early modern Europe. To take these numbers at face value, it implies levels of monetization not reached until many centuries later. But a further question: do we have to take these numbers at face value?

Despite the pioneering work of Liselotte Weidauer (1975), we still lack a true die study for this large body of material. However, let us suppose that, out of the 3,000 coins recorded by Velde, we recognize 500 obverse dies (implying thus a high survival ratio of 6 coins per obverse) and that the median weight of these obverses equals 2.4 g, that is, the weight of a hekte. It is clear enough then that this would have been a massive striking, likely corresponding to a couple thousand silver Attic talents at the very least and possibly well above that conservative estimate. In other words, we can no longer hide behind our ignorance by assuming that electrum coins were the result of a discrete and restricted phenomenon about which it is futile to speculate.

While their metal content may have differed a great deal both between and within individual series, electrum coins were produced with an exceptionally high level of control. Their weights were adjusted with great precision: where we are able to judge, variations are only a couple of centigrams, a fact that is not observed with any recorded sample of Hacksilber. Moreover, as was nicely observed by Weidauer, great care was taken to hold reverse dies in the same orientation with every strike. This is all the more remarkable since these reverses are simple square or rectangular punches with no definite type and that, in order to obtain a good impression of the obverse type, it didn't matter how the

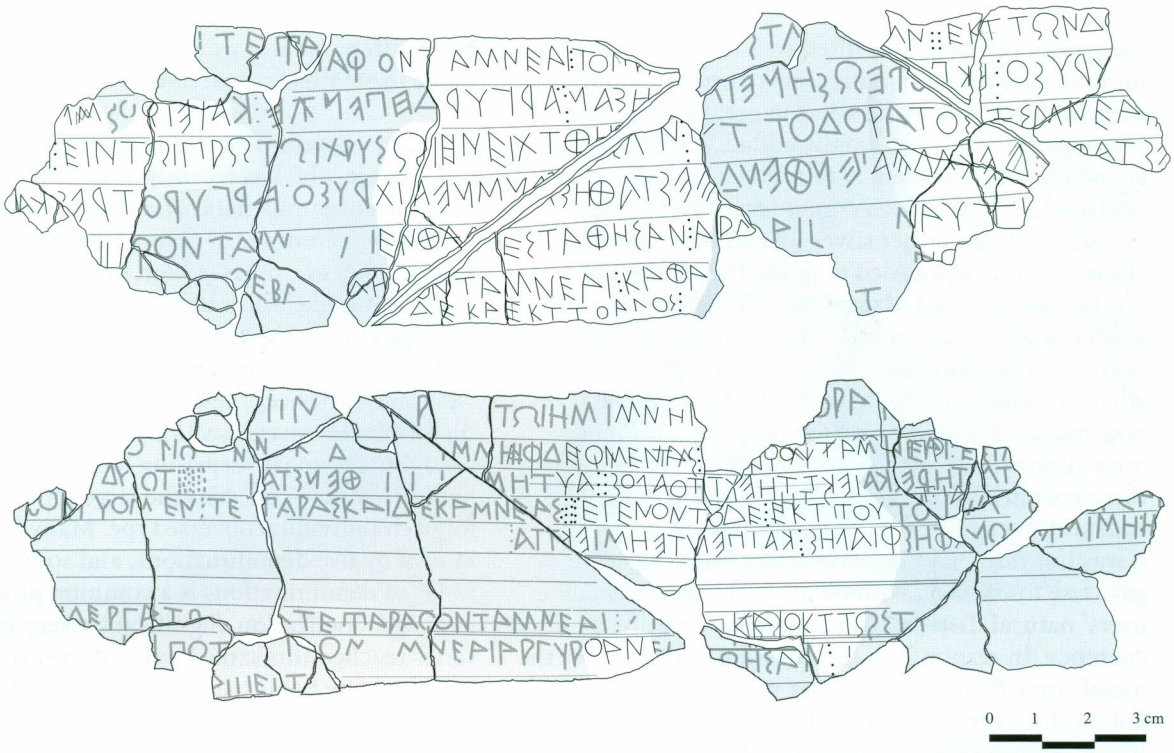

Fig. 4: Inscription (IEph. 1) written on a lead sheet found in excavations at the Temple of Artemis ("Artemision") at Ephesus dated c. 550 BC. The text lists various sources of income for the temple, including nearby salt pans, and the amounts paid in weights of gold and silver (bullion?), but significantly not in electrum. Drawing courtesy of John H. Kroll.

Fig. 5: Unknown Ionian or Lydian mint, c. 560 BC. Electrum 1/192 (?) stater (0.06 g). (ANS 1944.100.44630, E.T. Newell bequest) 3mm (images enlarged).

Fig. 6: Ionia, Miletus, c. 575 BC. Electrum stater (14.03 g) Weidauer 1975, no.126. (ANS 1957.138.1) 20.5mm.

Fig. 7: Ionia, unknown mint, c. 575 BC. Electrum stater (13.86 g) Weidauer 1975, no. 54. (ANS 1967.152.433, bequest of Adra Newell) 18mm.

Fig. 8: Ionia, Ephesus (?), c.560 BC. Electrum stater (14.02 g), with the inscription "I am the seal of Phanes" (British Museum, BNK,G.950). Image © Trustees of the British Museum (images enlarged).

punch was placed. This great care is best understood as an attempt to deceive forgers, giving credit *à rebours* to the idea of a substantial price difference between legal and intrinsic value.

In terms of the weights, we should note that nearly all fit within a couple of weight standards, among which the so-called Milesian weight-standard is largely predominant, encompassing approximately 70% of all known coins. This unified metrological landscape again points to a superior level of supervising power.

Among all of the early electrum coinages known, scholars have observed at least 100 different obverses types, but, as first established by Weidauer, some of these must have originated from the same workshop since they are linked together by ornate reverse dies (figs. 6–7). It is often assumed that the number of issuing authorities is roughly equal to the number of obverse types, and, impressed by the variety of the types, some have argued that this number exceeds the number of city-states in Asia Minor that could have produced the coins. Thus springs the notion that electrum coins were issued by private individuals. This argument, however, lacks strength. The types, mostly animals, have been interpreted in a rather mechanical way with later monetary developments in mind. Stags were thus given to Ephesus, seals to Phokaia, tunny-fish to Cyzicus, and the lion, the king of animals, to Sardis. None of these attributions can be taken absolutely guaranteed, however.

Some rare issues have an inscription, which have elicited much discussion. The most spectacular example is in Greek and says: "I am the seal of Phanes" (fig. 8). This Phanes is unrecorded by any other historical sources, and thus some scholars have thought he was not a ruler, but rather a merchant. Regardless, most commentators have struggled to explain the beautiful grazing stag that appears on the coins, which seems to refer to the city of Ephesus, and how it was that a private individual usurped the badge of the city. Either Phanes and the stag on the coins had nothing to do with Ephesus or an unknown ruler had temporarily taken control of the city.

Two other inscriptions are in Lydian and engraved on lion-head types: one is read "Walwet[as]" which is taken for the name of the king Alyattes, Croesus' father (fig. 9). The other refers to a certain Kukas (Kukalim) (fig. 10), identified more hesitatingly with Gyges, the founder of the Mermnad dynasty (cf. Wallace 2006), who reigned until 644 BC at the latest, an identification which presents chronological problems with the archaeological record.

Also, some 80 coins described as royal Lydian have been repeatedly punched (fig. 11). These marks have been interpreted to date as the work of bankers or money-changers. Their purpose remains obscure, however. To see them as test marks, meaning a control over the quality of the alloy, is hardly reconcilable with the number of these marks, up to twenty on a single coin. Whatever their purpose they do certainly attest to real circulation for the coins.

With these facts in mind, we may now turn to the three basic questions I asked earlier: 1) when did the revolution first happen, 2) who were issuing powers, and 3) for what purpose were these coins produced? The answers to them are interconnected and—as is hardly surprising—partly determined by modern cultural preconceptions. More sensitive to mainstream economics, for example, our American colleagues have favored explanations giving a leading role to private individuals in the production of the earliest coins. The role of the State, even if never precisely defined, has found greater empathy with our continental European colleagues. So who then were the true heroes? Those who invented coinage, were they entities, whether private or public, trying to maximize their profits, as argued by Sture Bolin (1958), or was it the State trying to gain benefits in order to promote democracy, a notion developed by Georges Le Rider (2001)?

Let's first consider the question of when. The accepted truth has changed twice during the last few decades. When I discovered Greek numismatics as a student of Tony Hackens at the very beginning of the 1980s, the big name was Lygdamis (Dugdamme), the Cimmerian ruler who devastated Lydia and the city of Ephesus (Strabo 1.3.21). Electrum coins found in the temple of Artemis (the "Artemision"; figs. 12–14) at Ephesus were supposed to have been recovered in a layer of destruction, giving us a *terminus ante quem* of 630 BC for the birth of coinage. Subsequent excavations made by Anton Bammer (1988) altered this vision, lowering the same *terminus* down to as far as 560 BC. In the nineties, some numismatists went on to date the first Greek coins to around 585 BC while others remained attached to a high date in the seventh century. Reexamining the Artemision context, Michael Kerschner has more recently defended a high chronology, going against Bammer's conclusions for two reasons: first, he identifies several grouping of coins as foundation deposits (i.e., the coins existed already by 630–620 BC, when the new temple was built), and second he dates associated material to the second half of the seventh century BC. This looks to be strong evidence indeed, especially since 17 electrum coins were found in a jug beneath the ground

Fig. 9: Lydia, Sardis (?), c. 570 BC. Electrum, 1/6 stater (with inscription "Walwet[as]"). (private collection) 9mm (images enlarged).

Fig. 10: Lydia, Sardis (?), c. 570 BC. Electrum, 1/3 stater (with inscription "Kukalim"). (private collection) 12mm (images enlarged).

Fig. 11: Lydia, Sardis (?), c. 560 BC. Electrum, 1/3 stater (punch marked). (ANS 1955.147.4) 12mm (images enlarged).

Fig. 12: Overview of the remains of the Temple of Artemis ("Artemision") at Ephesus. Photograph by Ahmet Tolga Tek.

in the southwest corner of Temple B (fig. 15). Unfortunately, the Ephesus context continues to be the only one that truly nurtures the chronological debate, despite interesting new discoveries such as the ones reported at the conference for Miletus by Bernhard Weisser and for Sardis by Nicholas Cahill.

Even if some doubts can be cast about the evidence from the Artemision, the more recent trend has been a return to a high chronology, with the start of coinage sometime before 630 BC. In a way, this is corroborated by another important archaeological context. The American team excavating at Sardis has found two fractions of Croesus in a layer dated to the destruction of the city by the Persians (ca. 547 BC). Therefore we have also a high chronology for the so-called "croeseids," which started to be struck under Croesus' reign, and not later under Persian rule as some have recently suggested (figs. 16–17). François Velde too has implicitly argued for a high chronology. Studying weights and wear, he writes: "The tentative conclusion is that lower mean weights for smaller denominations are typical of circulating coinage, and can be accounted for by annual weight loss due to increased circulation for smaller denominations." Possibly, but it could also be argued that it was common practice with ancient coinages, as with more modern ones, that the smaller the denomination, the greater is the deviation from the theoretical weight. This is not due to wear but to the combination of two basics facts: first, whatever their size, coins were calibrated with the same degree of precision in absolute terms (typically one or two grains above or below theoretical weight), and secondly, astute mintmasters have always looked to "chatouiller le remède," that is to work as much as possible towards the lower limits of allowance. This said, we cannot deny that some electrum coins seem to show considerable traces of circulation.

As for the questions who and why, the two current main reconstructions agree on profit as a major impetus. The main problem lies in the variety of the gold content of natural electrum, a matter of natural distrust for the users, as noted above. The owners of electrum, so the argument goes, would have cornered the market, imposing a standardized monetary form (i.e., coinage), with each coin valued at a fixed and advantageous (for them) price set at a level above the market price of the gold contained within the coin. This hypothesis has then been linked to the presumption that the cementation process, which allowed the separation of gold from silver, was invented only ca. 550 BC, that is at the time when the first coins of pure gold or silver, the so-called "croeseids', were struck. This hypothesis is seductive but has its difficulties. The general tone is rather modernist, particularly the focus on profit and rationality, seemingly derived from neo-classical economics, an approach that has its detractors among ancient historians who seek more distance between modern and ancient practices. This is not a counter-proof in and of itself, but an additional viewpoint that ought to be fairly recognized. Beyond this, the expected benefit is also questionable. As argued by Paul Craddock (2000) and others, ancient Greeks were separating gold from silver well before the mid-sixth century BC, effectively negating the role that natural alloys may have played in the origins of coinage. But even if we admit, for the sake of argument, that the very first electrum coins were all produced from natural alloys of variable contents, why then did the great owners (kings or merchants) take pains shortly thereafter to produce coins with an artificial and controlled content? And—what is not made explicit—by what mechanisms do we imagine that these electrum coins of great value were put into circulation, if not by state payments? What kind of transactions were these whose average value (a *trite*) corresponded to ten days salary or several sheep? Another difficulty with the private merchants hypothesis is to explain why they were in such a dominant position at the beginning of the process, but soon thereafter disappeared and are not heard from again for centuries.

The arguments developed by Georges Le Rider (2001) are rather different. He starts with the fact that the Greek city-states were poor compared to palatial economies. They were constantly short of funds, unable to cope with any unexpected event, and were characterized by a comparatively low rate of taxation on overall economic activity (likely to be below 20% compared with the c. 50% in Mesopotamia, Persia, or Egypt). Necessity, aided by two favorable circumstances—the ores of electrum and the commercial reputation of the Lydians—prompted this innovation that shaped the world.

Neither of these scenarios, however, is totally satisfying. It is better to recognize that the general pattern of electrum coins defies what are supposed to be sound economics, otherwise how do we explain that the weights were carefully adjusted while the alloys were not? To pretend that users may have been abused by the last and not by the first looks hopelessly indefensible. As we have seen, the very idea of profit is at odds with the possibility that electrum coins were all and from the very beginning produced from an artificial alloy.

Moreover, a problem only recently tackled by John Kroll is to explain how one passed from a supposedly highly profitable system with significantly overvalued electrum coins, during the first half of the sixth century, to a far less advantageous system with the "croeseids" and their higher intrinsic value. How can

Early structures within the sekos of the dipteral marble temple of Artemis: temples and contemporaneous altars and bases (second quarter 7th century BCE until second quarter of the 6th century BCE)

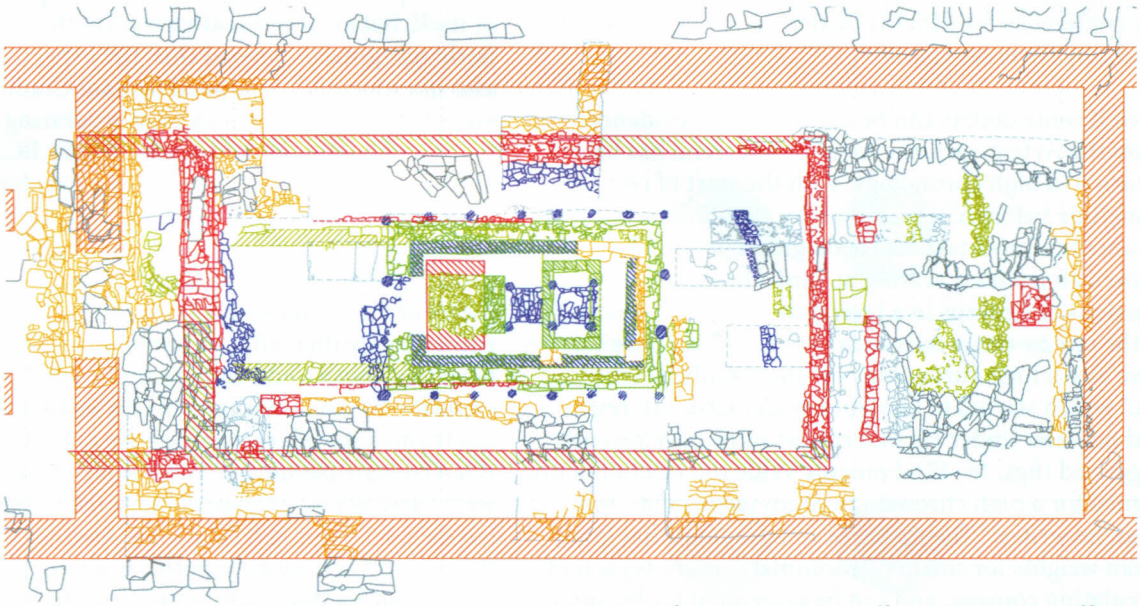

Fig. 14: Excavation of the Central Basis, Temple B (Naos 2). Image courtesy of the Austrian Archaeological Institute.

we sustain that profit was the motor of invention with electrum coinage and that the Lydian kings, now at the summit of their power, decided to renounce these benefits, while, as convincingly argued by Ute Wartenberg Kagan, the Greek cities continued to strike electrum coins after the Lydians ceased to do so? In his elegant paper, Peter van Alfen attempted to tackle these problems, starting by denouncing the ideal type of the State. Indeed, the Lydian reality of state-ness may have been something different, a competing society where elites were likely to have negotiated with emerging rulers. Referring to the works of political scientist Margaret Levi (1988), he hypothesizes that "if electrum coinage had been used to generate revenue through overevaluation, the long-term effects of this tax may eventually have been politically detrimental. Increased political stability would, in Levi's model, see a correlating lowering of discount rates, and a subsequent change in internal taxation policies". In this model, possibly a bit too irenic, rulers would have no choice, first to be rapacious to establish their powers, then later to offer concessions to keep it. Whatever the reality may have been, this progressive model, with its emphasis on political constraints and the necessity of negotiation between the rulers and the ruled, is well in step with current and dominant NIE (new institutional economics) perspectives.

Another fresh look at the problem, also borrowing hugely from neo-institutional economics and its focus on transaction costs, was put forward by Alain Bresson who tried to answer the question: why did coinage appear in Asia Minor around 600 BC, and not elsewhere, and why electrum? He also plays down the role attributed to the supposed favorable circumstance of disposing of natural electrum. What really made a difference was the emergence of markets for the first time (cf. Hdt. 1.94.1, 1.153.1), a place to negotiate over commodities. This created, Bresson suggests, a favorable environment for making use of coins.

And so: who and why? Was it for trade or for state payments? The trade hypothesis, with the pivotal role of private individuals, is sustained by two great voices: Aristotle (*Politics* 1257a-b), who clearly states that coinage was an invention superseding barter, and Herodotus (1.94.1), that sympathetic liar, who reports that the Lydians were the first retail traders. Facts, however, give little support to the commercial hypothesis. Electrum coins were not well suited for either retail trade or daily transactions because of their high value, nor for wider-scale trade because of their limited circulation. Above all, one is at pains to explain the mechanisms of how the coins entered circulation. For which commodities or services did the issuers exchange these coins? And for what reason did users accept what appears to be a very bad deal? Even the large set of denominations rather militates against the commercial hypothesis, since it implies an anachronistic level of monetization.

If for state payments, the natural target was the army, by far the greatest expense in any ancient society. Robert M. Cook (1958) and Martin Price (1983) already argued along these lines, suggesting that electrum coins were a form of bonus payment to soldiers. The soldier hypothesis is less difficult to admit in terms of the coins' denominational values and ranges, as well as their circulation. Also it nicely softens the distinction between the state and private individuals: Phanes may have been another Timotheus, with the means to enroll fighters, no differently than Alyattes, king of Lydia. Indeed, the first mention of Lydian staters, in the work of the archaic poet Alceus (fr. D11), concerns a military payment dated to around 580 BC. Not forgetting that teleological explanations are naturally welcomed with caution, this explanation fits with the main purpose of later Hellenistic royal coinages, which were mainly struck to pay the army. Unfortunately, we know very little about armies in the archaic period. What we think we know about later periods is that military coinages were often produced on a large scale in a short span of time. In the absence of a general die study of electrum coinages, any parallel scenarios must remain hypothetical, but it should encourage us to consider a more concentrated production process than is commonly assumed.

To conclude, debates about when, who, and why are not settled. Tomorrow might bring critical new information and reverse some of our beliefs. A die study is eagerly expected and new archaeological contexts could also shake our presumptions. But, due to the common efforts of all the speakers gathered in Jerusalem, we can claim to have greatly improved our knowledge. In short, "we are still confused but on a higher level!"

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Fig. 15: The pot hoard from the Temple of Artemis at Ephesus, c. 630 BC. According to the terms of the excavation permit granted by the Turkish government, the pot came to the British Museum, while the original coins are kept in the Archaeological Museum, Istanbul. The coins on display in the British Museum are electrotype copies. Image © Trustees of the British Museum.

Fig. 16: Lydia, Sardis. AV "croesid" stater (10.34 g), c. 550 BC (ANS 1977.158.438, estate of Robert F. Kelly) 17mm

Fig. 17: Lydia, Sardis. AR "croesid" stater (10.73 g), c. 550 BC (ANS 1975.218.51, gift of Burton Y. Berry) 21mm.

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