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Access, Fairness, and Transaction Costs: Nikophon's law on silver coinage  
(Athens: 375/4 BC)

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**Abstract:** Several distinctive, and initially puzzling features of Nikophon's law on silver coinage (Rhodes/Osborne 25) become clear in light of the Athenian state's attempt to drive down transaction costs in order to maintain Athenian public revenues and private profits in the post-imperial era. I suggest that the law was explicitly intended to even the playing field of trade by ensuring non-citizens access to an impartial system of coin verification (the *dokimastai*), and to dispute resolution mechanisms (the People's courts). Nikophon's law is a relatively early example of the Athenian state's concern for adjusting established institutions with an eye toward lowering the transaction costs associated with trading in the Athenian market through reducing information and legal asymmetries. A similar concern recurs in the mid-fourth century "maritime cases" (*dikai emporikai*) and in Xenophon's mid-century text, the *Poroi*. Adapted from Ober, *Democracy and Kowlege*, chapter 6

## **Access, Fairness, and Transaction Costs: Nikophon's law on silver coinage (Athens: 375/4 BC).\***

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(3 tables, 2 figures, bibliography, and notes at end).

Among the questions that can be asked of a state's public policy is whether, over time and in comparison with rivals facing similar opportunities and constraints, policy hindered or promoted the state's capacity to do well. I take doing well to include ensuring security, influencing neighbors, and promoting the welfare of residents. A policy decision (say, a new law) gains purchase on people's future behavior when it is codified as a potentially accessible item of public information. In classical Athens, policy was codified as laws (*nomoi*) and decrees (*psêphismata*). Fourth-century Athens arguably did very well when compared to rival poleis (Ober 2008, chapter 2), in part because of Athenian public policies regulating the conditions of exchange in Athenian markets.

This paper proceeds as follows: *Section 1* defines transaction costs and argues that certain Athenian policies served to lower transaction costs and thereby enabled Athens to do relatively well in the post-imperial fourth century B.C. *Section 2* introduces Nikophon's silver coinage law, and describes the varieties of coinage circulating in Aegean markets in the fourth century. *Section 3* analyzes the categories into which coins were sorted by of the new Approvers of silver coinage under the rubrics of approval, confiscation, and certification, and demonstrates that the Approval system was designed to lower transaction costs for traders by testing the actual provisions of the law against counterfactual alternatives. *Section 4* considers how buying and selling in the Athenian market would be carried out by recourse to the approval process. *Section 5* considers residual status inequality and concludes.

### **1. Transaction costs**

The productivity of a society is, in large part, a function of how well that society captures the benefits of social cooperation (Benkler 2006). Voluntary exchanges of goods and services – that is, transactions regarded as beneficial by all parties to the exchange – are an important kind of productive cooperation. Exchange is more productive when the costs associated with transactions are lower. This means that one determinant of the effect a new policy will have on a state's productivity is whether it serves to raise or to lower the costs of transactions -- that is, the *ex ante* and *ex post* costs to individuals of making potentially profitable contracts or bargains. Information is a central element in

the transaction-cost/productivity equation: If both parties to an exchange share full and transparent access to all the information relevant to the exchange, their transaction costs drop accordingly. When transaction costs are lowered, productivity is raised (at least potentially) because the increased profit from low-cost bargains increases the value and the frequency of transactions. But under conditions of incomplete information – and especially of asymmetrical access to important information -- transaction costs increase.<sup>1</sup>

The basic idea behind transaction cost economics is simple: if the costs of doing business are low, more business will be done and, all other things being equal, this will benefit the society as a whole – it will raise the society’s aggregate of material goods by allowing society to reap more benefit from the socially cooperative activity of free exchange. Of course, whether that larger basket of goods is distributed fairly and what fairness in respect to distribution means to a give society, is extremely important, but those are different questions, centered on distributive rather than procedural justice. Here, the fairness I am concerned with is procedural impartiality and its role in increasing goods, not fairness in respect to distribution of the surplus goods thereby gained.<sup>2</sup>

How then might decisions made by Athens, as a state, affect the transaction costs incurred by the members of the extended Athenian community -- understood as those persons doing business and making their living within Athenian territory? In the fifth and fourth centuries Athens was extremely productive in comparison with rival poleis. For much of the fifth century superior Athenian productivity was at least in part a function of coercive imperialism and violent (or at least potentially violent) resource extraction. But in the early democracy (ca. 506-478) that preceded the imperial period and in the post-imperial fourth century, Athens had no substantial empire from which to extract major resources. During these pre- and post-imperial eras, Athenian economic performance depended primarily on domestic production and exchange.<sup>3</sup>

Athenian material flourishing, especially in the fourth century, can be explained in part by its success in lowering transaction costs. Low transaction costs in turn encouraged traders to do their business to Athens, which benefited the Athenian state and individual Athenians in various ways: the advantages were enumerated by Xenophon’s mid-fourth-century treatise, *Poroi*. I will argue that the Athenians recognized that non-citizens would choose to do business in Athens if transaction costs were relatively lower there than elsewhere. Of course, this assumes that Athenians had at least a rough and ready conception of what is now called transaction costs economics; Xenophon’s text allows a prima facie case that this was so.

Transaction costs can be lowered through standardizing and publicizing rules and practices that in turn helped build and maintain a relatively reliable and secure exchange environment. We can test the idea that Athenians grasped the value of lowering transaction costs by, first, specifying how various instruments available to a participatory democracy *should* operate if the state’s goal were optimizing (i.e. driving down and keeping down) transaction costs; and then asking how far Athens conformed to or diverged from that optimal position (see Table 1). We should keep in mind, however, that in light of the various non-material ends sought by the democratic polis, low transaction costs must be thought of as what economists call a “satisficing condition” – a condition that is necessary for the achievement of a general goal (e.g. polis flourishing), but one that is not subject to true optimization because it must be somehow limited in order to allow for the presence of other necessary conditions (Simon 1955). Thus, we

ought not expect Athenian institutions (or those of any other state) to do everything that might be done to minimize the costs of transactions.

Among the instruments available to participatory democracies (as well as to more hierarchical organizations) are clear and accessible codes of formal rules (laws, customs, administrative protocols) designed to protect persons and their property; standardized and easy-to-use dispute-resolution procedures (mandatory or optional modes of binding or nonbinding arbitration, courts of law); and dependable state-imposed sanctions for punishing delinquents. A second set of instruments includes established standards for weights and measures; standardized exchange media (government-issued and guaranteed currency, standard forms of contract); convenient facilities, such as centralized market places, well-designed transport and communication networks; and effective policing. Finally, the state can keep transaction costs low by keeping down the rents it extracts (directly or indirectly) on exchanges, or that it allows others to extract.

Each of these various instruments must manifest two general properties if it is to work effectively to lower transaction costs: It must be *open* and it must be *fair*. By open, I mean that that the instrument is accessible in respect to entry (as opposed to restricting entry according to extraneous criteria) and clear in respect to interpretation (as opposed, for example, to being interpretable only by insiders “in the know”). By fair, I mean that the instrument is impartial in its effects in that it distributes goods and bads according to criteria that are even-handed (as opposed to criteria that are arbitrary or “loaded” in favor of insiders) and impersonal in that it does not identify and pre-select particular categories of individuals for special treatment (good or bad) on the basis of extraneous criteria. These various optimizing criteria are laid out schematically in Table 1.

Table 1 is meant to specify the ways that government actions in respect to a market would render bargaining in that market as close to frictionless as possible – thus as close as possible to the ideal conditions of exchange imagined in what has become known as the Coase Theorem. As Ronald Coase himself (1988) emphatically pointed out, the ideal conditions of the Coase Theorem do not and could not exist in the real world – and thus, even with the best possible will, no government could *eliminate* transaction costs. A government, to exist and thereby facilitate the low transaction costs regime, must have some way to maintain itself, which makes it very likely that it will need to levy taxes of some sort on at least some kinds of exchange (row 3).

Every real-world government falls short of achieving perfect access and impartiality. This shortfall is at least in part because governments attempt to achieve a variety of ends in legislation. Lowering transaction costs is balanced against other goals of state policy. In modern governments, for example, the principle of openness, both in terms of entry and clarity, is compromised not only by security considerations but by rules created by legislative enactment and by administrative protocols developed and administered by professional bureaucrats. These rules are intended to fulfill important public purposes; they are meant (inter alia) to protect consumers from fraud or safety risks. The net result of the complexity of modern rules, and the technical legal language in which they are cast, is to raise some transaction costs. Complex rules require (inter alia) that those making bargains employ legal specialists to design contracts and to defend the principals to exchanges against charges of having violated rules that are far from transparent to non-experts lacking the necessary technical training. This in turn bars entry to those who cannot afford to purchase the requisite legal expertise.<sup>4</sup>

Athenian legislative processes produced government rules and other instruments that, in comparison to modern legislation, were publicly accessible, simple and clear. Athenian laws and decrees, for example, were relatively brief and composed in ordinary language, posted in public places, and available for consultation in standard forms.<sup>5</sup> Nor is there any reason to suppose that there were complex administrative protocols working in the background. Athenian government instruments were not, however, completely open and impartial. As noted on Table 1, various Athenian instruments discriminated, in one way or another, according to the status of the individual in question. Athenian rules sought to enhance the value of non-citizen others to the polis. In practice this entailed a compromise between greater openness in respect to access, and the maintenance of some long-established legal distinctions between citizens and others. Because it is the greater openness that is the most relevant *change* in Athenian institutions in the post-imperial fourth century B.C., the open-access side of the equation is the primary focus of this paper.

Obvious examples of “post-imperial” fourth-century Athenian state policies for lowering transaction costs include the new legal category of “commercial cases” (*dikai emporikai*) instituted in the mid-4<sup>th</sup> century (Lanni 2006, 149-74), and the planned operation against pirates in 325 B.C. (Ober 2008, chapter 4). The commercial cases were specifically designed to avoid costly delays in dispute resolution, and to place foreign traders on an even footing with native Athenians in resolving contract disputes. The anti-pirate operations of 325 were aimed specifically at enabling both Athenian and non-Athenian traders to move their goods safely (Rhodes and Osborne 100).

## 2. Nikophon’s law and Athenian coinage

The turn to developing policy that would lower transaction costs of exchanges in the Athenian market antedated the mid-fourth century. The publicly stated goal of well known silver law of Nikophon of 375 B.C (see Appendix for text of the law), which revised the arrangements for approvers of silver coins circulating in Athens was to facilitate mercantile exchange: The new Piraeus Approver (*Dokimastes*) mandated by the law is explicitly (§11: sections are per translation in Appendix, in lieu of line numbers) established for the convenience of ship-owners, traders, and “others.” The law’s aim is that silver coinage remains a reliable exchange medium. The law details the responsibilities of by two state-owned Approvers of coins. Both in the Agora (as before the new law) and (after the law) in Piraeus an expert state official was made freely available to any party uncertain about the provenience of silver coins that appeared to be Athenian “owls.” The law mandates that those trading in Athens accept Athens-produced silver coins bearing the standard “kharater”: bust of Athena obverse/owl reverse (§1). It specifically requires the acceptance of owls that have been approved by the Approvers (§5). It provides for the tacit certification of certain “owl-like” silver foreign coins as good, and for the confiscation of bad coins. Finally, it provides incentives and sanctions so that that Athenian officials involved in the process (the Approvers and others) are motivated to fulfill their duties. The intended result is that all persons involved in exchange in Athenian markets are provided in common with an essential item of information: that the currency in circulation in Athens is trustworthy.

The “owl brand” of Athenian silver coinage very well established and stood for solid quality: Athenian tetradrachms were nearly pure silver and in weight (17 g ±.15 g

for post-Persian war coins). A genuine “owl” was thus dependable as an exchange medium, a dependability that served to lower transaction costs. Exchanging goods for owls eliminated the steps of assaying the purity of silver and weighing bulk silver. Although Athenian owls (like all Greek silver coins) were exchanged primarily on the basis of their commodity value (the worth of the silver itself), they also possessed a “fiduciary value added” in the Athenian state’s guarantee of precious metal content and standard weight.

In the fourth-century, Athenian owls remained among the most common coins in circulation in the eastern Mediterranean region (Table 2).<sup>6</sup> A market favoring Athenian coinage was beneficial to Athens in a number of ways: The state probably made a small profit on each coin it produced. Mining enriched many individual Athenians. It supported local deme economies, like that of Thorikos, in south. Perhaps most importantly it helped attract traders and their business to Athens – where they knew that they would be contracting their bargains in a reliable exchange medium.<sup>7</sup>

The esteem in which owls were held in the eastern Mediterranean led to the production of “owl-like” coins outside of Athens. By the mid-370s substantial numbers of *imitation owls* -- that is, coins with the “Athenian stamp” but not issued by the Athenian state -- were circulating in eastern Mediterranean markets, including Athens. The phenomenon of “pseudo-owls” has been well documented by numismatists; imitations of owls begin to appear in the fifth century, but become very common only in the early fourth century. Some pseudo-owls were good coins, in that they were comparable in silver content to Athenian-produced owls. Other pseudo-owls were bad coins in that they looked like real owls but had a much lower silver content. An important part of the Approver’s job was discriminating between good and bad pseudo-owls and treating them accordingly (§2).<sup>8</sup>

In economies where the value of money is fiduciary, it is natural to think of *all* imitation money as counterfeit: produced with the intention to deceive and thereby defraud. Yet clearly Athenian law did not treat all imitation owls as counterfeits in this sense. Peter van Alfen has recently brought greater terminological precision to the numismatic discussion of imitation by distinguishing between seven categories of ancient coins:

1. **Prototypes** (state-issued originals: in this case real silver owls: Fig. 1.1-2).
2. **Artistic imitations** (e.g. medallions that are clearly distinguishable from prototypes and may have had different functions).
3. **Anonymous imitations** (close copies, that may, at the margin, be indistinguishable from the prototype: Fig. 1.4).
4. **Marked imitations** (relatively close copies of prototypes that are clearly distinguished by their producers from prototypes, e.g. by the addition of a special symbol, and therefore unlikely to be confused with prototypes by experienced traders: Fig. 1.5).
5. **Perfunctory imitations** (not close copies of the prototype in any sense. Fig. 6.2.6).
6. **Official plated and debased coins** (e.g. the emergency Athenian war issues of plated bronze owls; Fig. 1.3).
7. **Counterfeit plated and debased coins** (privately manufactured for the purpose of deception).<sup>9</sup>

Nikophon's law seeks in the first instance (§1) to ensure that prototypes (Athenian state-produced silver owls: van Alfen category 1) are accepted in Athens. The law then refers to two primary categories of imitations. Section 2.a of Nikophon's law mentions foreign silver coins that possess the two *bona fides* characteristics possessed by prototypes: the public stamp and (apparently – there is a lacuna in the text of the law) the right silver content. These coins, which we may call “good fakes,” are to be returned by the Approver to the individual who brought them forward. Van Alfen's category 3 and 4 (anonymous and marked imitations) are presumably the primary categories involved, although coins in categories 2 and 5 might also fall into this category. The good fake owls are contrasted with bad coins: counterfeits of van Alfen's category 7 and perhaps still-circulating state-produced plated coins from category 6.<sup>10</sup> The law (§2.b) mentions clads (lead- and bronze-core coins) and “fraudulent” coins – presumably referring especially to counterfeits made from alloys of silver and base metal. These low silver content coins were presumably being passed off as solid silver owls, with the intension of defrauding naïve traders. In contrast to the good fakes, these bad coins are to be confiscated by the Approver.

### 3. Approval, confiscation, certification

It is a notable feature of Nikophon's law that it does not lump all pseudo-owls into a single category of bad (because “non-prototype”) coinage. Good fakes, i.e. coins that look like owls and are presumed by the Approver to have silver content similar to real owls, are to be “handed back” to the individual who presented them for approval. There has been much debate over the question of whether the good fakes were handed back to their owners *as approved*. Although the wording of the law is not decisive on this point and scholarly opinion differs, I think that there is good reason to believe that pseudo-owls that were handed back were not “approved” – and thus their acceptance by sellers was not mandatory.<sup>11</sup> Yet it is clear that good fakes are not being pulled out of circulation by the Athenian state, nor are their owners penalized. Indeed, by returning it to their owner, the Approver may be said to have “certified” a given pseudo-owl by issuing his expert opinion that it was good (*kalon* – on Stroud's restoration). The bad fakes (clads and counterfeits: §2.b) and presumably also Athenian-produced plated coins (the emergency issue of the late Peloponnesian War, now no longer regarded as legal tender: Fig. 1.3) are not only to be confiscated by the Approver, they are to be cut through (as has the plated coin 1.2.3) , and then dedicated by the Council of 500 to the Mother of the Gods. This apparently meant storing them in the Metroon.<sup>12</sup>

Table 2 lays out a schematic judgment-grid for the Approvers, on the dimensions of origin (Athenian or foreign: column) and quality (good or bad: row). Upon making his expert judgment regarding the “box” into which the coin should fall, the Approver takes a mandatory action. That action results in the coin remaining in circulation or being removed from circulation. In the case of good coins (left column), the buyer is either legally required to accept the coin in payment for goods (if it is certified as good *and* approved as Athenian) or, according the most likely interpretation, he is left free to accept or not (if it is certified as good, but *not* approved as Athenian).

Box 1 is straight forward: the law's explicit intent is to protect the value of Athenian-produced silver by guaranteeing its quality and mandating its acceptance in

trade. Box 4 is equally unproblematic given that counterfeits posed an obvious threat to the Athenian owl brand. Likewise, box 3: It was essential to distinguish between the state-produced but now-withdrawn emergency war series and silver owls. If coins that looked like owls and were passed off as owls but did not have the silver content of owls, proliferated in the polis and were allowed to circulate freely, traders would lose faith in owls as a means of exchange and in Athens as a market. If the state ignored fraud based on the passing of counterfeits, the danger arose that, according to Gresham's Law, bad money would drive out good. This would in turn drive up the transaction costs that had been lowered by the reputation of owls for purity because traders would be hesitant to accept genuine owls on the chance that they were counterfeit. The state absorbed the costs of an official no-fee approval process in order to combat that deleterious outcome.

Ordering the Approver to confiscate bad fakes without reimbursement to their owners imposed a cost on their owners – who can be roughly divided into cheats (those who knew the coins were bad) and naives (those who had taken counterfeit coins from others, believing them to be good coins). Given the sanction entailed by confiscation (at minimum: the loss of the residual silver content), and the likelihood that bad coins would be identified and confiscated by the expert Approver, cautious cheaters were likely to be discouraged from trading *ex ante*. Bolder cheaters would be weeded out *ex post*. In either case their removal helped to optimize the market. Naives for their part were penalized for their folly by the state rather than by opportunistic and better-informed traders. Given the existence of the Approvers, naive traders in Athens always had recourse to the services of an expert and so had only themselves to blame if they ended up in possession of counterfeits. Any injustice associated with penalizing the innocent naïf whose coins were confiscated was apparently countered by the gains associated with quickly removing bad fakes from the system and efficiently punishing cheaters.

Box 2 is initially puzzling. It is not immediately obvious why the law should have allowed coins (like those in Fig. 1 nos 4-5) that might be confused with real owls (nos 1-2), to remain in circulation. A “handed-back” pseudo-owl was, in effect, given expert certification as “good” (*kalon*) – i.e. pronounced by a state-appointed currency expert to be “neither clad, nor fraudulent.” And thus the production of “sincere imitations” of Athenian coinage was not criminalized by the Athenian state, nor was trade in pseudo-owls discouraged. Indeed the fact that the law makes a point of stating that good pseudo-owls were exempt from confiscation may be regarded as an explicit guarantee to the trading community that Athens will protect the property rights of those in possession of good fakes. All of this would be inexplicable if we were to think of pseudo-owls simply as counterfeits.

Assuming the owl “brand” was important to the Athenian trading environment and the gains to the Athenian community from the production of silver coins were considerable, why allow “generic” owls to circulate in the city without penalty? Why not protect the brand by confiscating pseudo-owls as fraudulent or (on the Egyptian model: see paper of Bresson) by charging their owners a reminting fee? I would suggest that the law's framers realized that penalizing “good fakes” would drive up transaction costs, by burdening legitimate transactions. The Athenians tacitly permitted “franchising” of their owl brand because doing so facilitated trade.<sup>13</sup>

A hypothetical decision tree (Figure 2) for the law's framers shows that the choices Nikophon's law actually makes -- confiscating bad fakes and allowing good



fakes to remain in circulation -- optimizes the trading environment by keeping transaction costs low for well informed and honest traders, while discouraging cheats and fools. Comparing the actual (in bold) and counterfactual branches of the decision tree strongly suggests that Athenian interest in protecting the state “brand,” and/or reaping profits by gathering rents from traders in the form of mandatory reminting costs, was trumped by a concern for keeping transaction costs low.<sup>14</sup>

Suppose, counterfactually, that the Athenians had chosen to confiscate all coins regarded as fakes, good and bad, without reimbursement. This would impose very high costs on honest traders who were in possession of good fakes and were offering their trading partners silver-value similar to that of real owls. Many good fakes are indistinguishable from real owls, except by experts – and even modern experts disagree on whether a given coin or coin series is Athenian prototype or sincere imitation. If honest traders, who were presumably no more expert than modern Greek numismatists at distinguishing real owls from “good fakes,” were at risk of losing good silver coins to confiscation every time they sought to make a bargain, it would be a severe damper to trade in Athens. Alternatively, suppose the state had demanded that when good fakes were presented to the Approver and identified as such, they must be exchanged for genuine Athenian coins. In this case, the Athenians would have to decide who should pay re-minting costs -- that is, the labor costs associated with gathering and transporting the good fakes, melting down the silver, recasting new blank flans, and re-stamping the blanks with official Athenian dies.

The state could run this (counterfactual) reminting operation at a profit -- as did, later, the Ptolemaic state monopoly in Hellenistic Egypt – as detailed in Bresson’s paper.<sup>15</sup> Depending on the state’s profit margin this would have imposed fairly high costs on traders. Or the state could exchange real owls for good fakes at par, thereby eliminating costs to traders, but running a deficit-producing operation that could prove prohibitively costly to the state, given the large number of pseudo-owls in circulation. Finally, the state could charge just enough for exchanging good fakes for real owls to cover its reminting costs. This last option would impose moderate costs on traders. The point is that the actual law took the lowest transaction-cost approach: the approach most likely to be favored by the trading community, and thus most likely to attract trade to Athens’ market. Not enjoying the Egyptian quasi-monopoly on various commodities, the Athenians could not afford to do otherwise. The result was a relatively fair and open trading environment.

#### **4. Buying and selling in fourth-century Athens**

The law recognizes three distinct classes of coins: Prototypes (van Alfen category 1), good fakes (van Alfen categories 2, 3, 4, 5), and bad coins (van Alfen category 6 and 7). The box matrix (Table 3) indicates that each class was treated differently. But what of coins that are at the margin: say a good fake that was a bit off-color, possibly indicating a lower than standard silver content -- although equally possibly indicating some innocent environmental condition? Or what if a coin so accurately imitated a real owl that even an expert could not quickly decide whether or not it was a state-produced prototype? Some cases could not be objectively decided without resort to laborious tests. Yet the speed and clarity of the approval process was intrinsic to its economic value: a slow and uncertain approval process would be worse than none. All of this suggests that the expert Approver

should not be regarded merely as a sort of automaton, ordered to do a technically demanding but merely mechanical job. Rather, he was an umpire, empowered to make quick and absolute (confiscate vs. return; certify and approve vs. certify without approval) judgment calls on inherently ambiguous cases. Just as a pitch in baseball is a strike if and when the umpire has called it a strike, a foreign silver pseudo-owl circulating in Athens was good if and when the Approver called it good; a coin was a real owl if and when the Approver declared it real. In essence, then, by adding an expert to the system of exchange, the Athenian state added a marginal fiduciary value to coins about which there was always some inherent ambiguity.<sup>16</sup>

In order for this quasi-fiduciary system to work properly, both Approvers must judge consistently on similar cases: If the two umpires did not make their calls on the basis of very similar standards, the “spread” between them might be manipulated by more sophisticated traders to the disadvantage of the less sophisticated. This would in turn obviate the intended goal of equalizing information among traders. These considerations point to the need for expertise on the part of the Approvers and for close coordination between them. We can now begin to understand at least part of the reason why the Approvers were public slaves. The choice of public slaves for this vital office meant that Approvers could become true experts. Men who had engaged in the same demanding task for thousands of hours, who had looked carefully at tens of thousands of coins, could be expected to develop a high level of professionalism and consistency of judgment. That would have been impossible had the Approvers been lotteried citizen amateurs who held office only for a year. Moreover, as we shall see, the fact that the Approvers were slaves allowed for frightful sanctions if an Approver did not properly fulfill his duties.

With these considerations in mind, we can better imagine how the system worked in practice: Suppose that S(eller) is offered 100 drachmas by B(uyer) for a certain quantity of wheat. Because, if S demands an approval, any bad fakes detected by the Approver among B’s coins would be confiscated, B had a strong incentive not to offer S bad fakes in the first place (i.e. to be neither a dishonest nor a naïve possessor of bad money). S wants to make the deal but is concerned about the quality of B’s coins. Because they are trading grain in the Piraeus, B (or his agent), accompanied by S (or his agent), takes the coins to the Piraeus Approver. S and B can be quite sure that they will find the Approver sitting at his table in front of the stele of Poseidon, because they know he can be punished if he is not. The Approver examines the coins offered by B. Prototypes are certified and approved. Pseudo-owls that turn up in the process are returned to B unapproved. B may choose to offer them to S nonetheless, at a discount. S is within his rights to demand prototypes in payment and can walk away from the deal if they are not forthcoming. So B may need to exchange his pseudo-owls for real owls at money-changer: conveniently located nearby if the transaction was in the Agora, and presumably not hard to find in Piraeus. But S may not choose to exercise this legal option because S has received a tacit guarantee that he will in any case be receiving “good coins”: B and S now share symmetrical information about the quality of the coins and may be able to agree on a fair discount rate for good fakes.

Once enough coins have been reviewed to complete the sale, B proffers them to S. But suppose S now refuses to make the deal. Assuming all the coins involved in the sale had been approved, B (in person or via a third party) can “expose” S to the relevant

magistrate (§5a-c). Because the amount of the transaction is over 10 drachmas the magistrate refers the matter to a People's court. If the court sides with B, then S loses all the grain he offered for sale that day. The state takes half of S's grain, and B (or the third party) takes the other half of it. S therefore, has a very high incentive to accept approved coins without demur. The requirement that S accept the approved coins removes any incentive on S's part to use the official apparatus of the approval process as a delaying device – to tie up B's capital while S seeks a higher price for his goods. Thus B is protected from S's use of the referral to the Approver merely as a way to keep B's offer alive while seeking a better price from some other buyer. Because he understands S's incentives, and because his ownership of the coins is at risk only if they are bad, B need not fear that the transaction cost involved in bringing his coins before the Approver will be increased by the risk of losing either his bargain or his honestly-held property.

The mandatory acceptance provision means that S will not challenge B's coins unless he really doubts the coins' quality while sincerely wanting to make the deal. The transaction cost incurred by the resort to the Approver is not, therefore, built into every exchange. The office of Approver remains a state-provided third-party guarantee that works in the background to lower the information asymmetry that exists because B might know something about the quality of his coins that S does not. It does not become a burdensome mandatory bureaucratic step that must be factored into the cost of doing business in Athens.

An incidental benefit to equalizing valuable information is the common-knowledge gain that comes with the resort to the Approver: S and B (or their agents) are interpresent before the Approver and so they have common knowledge of the value of the coins and the *bona fides* of those offering and accepting them. That common knowledge extends to any interested bystanders because the process is carried out in a public place: B's incentive not to offer bad fakes is increased because he stands to lose his reputation for honesty if the Approver confiscates his coins. Likewise S stands to lose reputation if he seeks to welch on a deal after the approval process has been completed.

In sum, the Approver system protected both sellers and buyers. If we suppose that S and B had a choice of polis markets in which to do business, and if we assume that Athens was (at least initially) unique in its provision of expert Approvers, we can see why S and B would choose to trade in Athens. Thus we can begin to see how the democratic legal system provided Athens with differential advantages over its polis rivals.

The legal system of Athens provided traders with an incentive to trade in Athenian state-minted owls. By doing his business in approved prototypes in Athens, B is offered a sort of state-funded business insurance in the form of easy access to the legal apparatus of Athenian magistrates and courts. Traders' use of prototype owls is voluntary, in that there seems to be no Athenian sanction against the use of good pseudo-owls or, for that matter, the coinage of others states. Yet, given the choice, traders who knew that they might do business in Athens are likely to *prefer* prototype owls which would, therefore, have circulated in the Greek world at a premium. The fifth-century command-and-control imperial *requirement* that traders employ Athenian owls was thus replaced with an *incentive* that seems to have achieved very much the same end.

Table 2 shows that in the fourth century, as in the fifth, more Athenian coins appear in more Greek coin hoards than do coins of any other Greek polis. Athenian coins

were *more* heavily favored, relative to coins of other poleis, by hoarders of coins in the fourth century than had been the case in the fifth century. The percentage totals suggest that the growth of non-polis mints in the fourth century (especially under Philip of Macedon, Alexander, and the early Hellenistic dynasts) limited the “market share” of the polis mints, with the aggregate share of the ten top poleis in the total number of hoarded coins dropping from about 21 percent in the fifth century to about 11 percent in the fourth. One or more Athenian coins appears in about 10 percent of fourth-century hoards, down from 19 percent of hoards in the fifth century; all rival poleis also experienced declines in this measure. Meanwhile, however, the percentage of Athenian coins in all hoards *grew* from 3.7 to 6.5 percent; among rival mints, only Corinth similarly exhibits growth. This is noisy data, but the conclusion that Athenian coins remained very much in demand in the Mediterranean world long after the end of the imperial era is not in doubt.

### 5. Status inequality and unfairness

Among the notable aspects of Nikophon’s law is the way in which it takes account of the legal status of those whose behavior it regulates, even as it creates the conditions for impersonal, “status-blind” exchanges in the Athenian market. As we have seen, the Approvers were public slaves. This is made explicit in the provision (§11) for establishing a new Piraeus Approver. He is either to be selected from the existing body of state-owned slaves (presumably from among those working currently in the mint or as clerks in the magistracies), or to be purchased on the open market if there is no suitable candidate (i.e. no one with the necessary expertise) among the state’s current human inventory. We have already seen that the requirement for both expertise and consistency in the office of Approver made it preferable not to use lotteried annual citizen-magistrates for this job.

Unlike free persons, the slave Approvers can be whipped if they are derelict in their duties; the “parallel” legal penalty for free persons would be a monetary fine.<sup>17</sup> Likewise, if a slave-seller of merchandise is exposed as refusing approved coinage and convicted, whipping is added to the confiscation of goods (§9). There is a glaring asymmetry here: The sanctions are much more severe for slaves than for free persons. And yet slaves are otherwise assumed to be full parties to transactions. The public slave Approvers are, for example, to be paid a regular salary – section 14 of the law is devoted exclusively to the issue of paying the salary of the two Approvers, and to ensuring that the new Piraeus Approver is properly compensated for the partial-year service that is anticipated. How, then, is the asymmetry to be explained in a system that seems to be so concerned with creating symmetry in the conditions of exchange?

A seller-slave (§9) might well be using his or her own capital, and acting as an independent agent – slaves who “lived apart” from their masters and paid over a portion of the earnings of their own privately-owned businesses are well documented in Athens.<sup>18</sup> In this case, the function of the additional punishment would be expressive: Whipping the slave reminds all parties of the yawning gulf between slaves and the free. In other cases, however, the slave-seller might be acting as an agent for his or her owner. In this latter circumstance, in addition maintaining the expressive purpose of enforcing status distinction, the legal threat of beating has a rational purpose.

A slave acting entirely as an agent for a master might choose to engage in fraudulent (and thus transaction-cost increasing) business practices. Given that the goods

confiscated by the state were not his or her own, the slave's material incentive not to defect from ordinary and honest business practices depended on the unpredictable monitoring and response of his master. Recognizing this, the state adds a severe physical sanction, one that would operate irrespective of any sanction that the slave's owner might or might not choose to impose.

Alternatively, a slave owner, as an "invisible" third party and thereby insulated from suffering reputation losses, having calculated the risks of losing goods to confiscation, might seek to coerce his slave into fraudulent market practices by the threat of punishment. The state matches that (potential) threat with its own coercive threat while also (in other legislation) limiting the absoluteness of the coercive authority exercised by masters over slaves.<sup>19</sup> Nikophon's law thus creates a "rational choice" situation for the seller-slave: choose between being punished by the state or by his or her masters. The obvious fact that both choices are fundamentally bad (even if not *equally* bad) vividly illustrates Terry Moe's argument for why rational choice theory must take structural power asymmetries into account. The Athenian system of slavery allowed choice-making by slaves, but treating a slave's choice between his torturers simply as a subset of choice about economic risk would obviously obscure essential moral as well as functional features of the system.<sup>20</sup> Athenian fairness had strict limits.

## APPENDIX. NIKOPHON'S LAW: 375/4 B.C. (Rhodes/Osborne 25).

Resolved by the *nomothetai* in the archonship of Hippodamas [375/4 B.C.]; Nikophon made the proposal:

1. Athenian [*Attikon*] silver [coin] shall be accepted [by all sellers of goods] when
  - a. it is found [by the Approver] to be [solid] silver and
  - b. has the public stamp [*dêmosios charaktêr*]
2. The public Approver [*dokimastês*: a public slave, see below] shall sit between the [banker's] tables [in the Agora] and approve [coins] on these terms every day except when there is a deposit of money [state revenue payment], in which case [he sits] in the Council-building [*bouleutêrion*].
  - a. If anyone brings forward [to the Approver] foreign [*xenikon*] silver [coin] having the same stamp as Attic [coin], *e[an kalon]*: <if it is good> [the Approver] shall give it back to the man who brought it forward [for review];
  - b. but if it has a bronze core or lead core or is fraudulent [*kibdêlos*], he [the Approver] shall cut through it immediately and it shall be [confiscated as] sacred property of the Mother of the Gods and he shall deposit it with the Council [of 500].
3. If the Approver does not sit, or does not approve in accordance with the law, he shall be beaten by the *syllogeis tou dêmou* with 50 lashes of the whip [i.e. punished as a slave].
4. If anyone does not accept the silver which the Approver approves, he shall be deprived of what he is selling that day.
5. Exposures [*phaseis*] shall be made [by individuals, to magistrates, as follows]
  - a. For matters in the grain-market to the *sitophulakes*
  - b. For matters in the Agora and the rest of the city to the Conveners of the People
  - c. For matters in the import market [*emporion*] and in [the rest of] the Piraeus to the *epimêlêtai tou emporiou* – except for matters in the grain-market, since [*phaseis* about matters] in the grain market are [to be made] to the Grain-guardians [per 5a, above].
6. For matters exposed [by the legal process described in 5], those that [concern sums that] are up to 10 drachmas the relevant magistrates [listed in 5] shall have the power to decide. Those that are beyond 10 drachmas they [the magistrates] shall introduce to the *dikastêrion*.
7. The *thesmothetai* shall provide and allot a People's court for [the magistrates named in 5 a-c] whenever they request, or shall be fined 1000? drachmas.
8. For the man who exposes [wrongdoing, per 5], there shall be a share of a half [of the assessed penalty] if he [serving as legal prosecutor] convicts the man whom he exposes.
9. If the [exposed and convicted] seller is a slave-man or slave-woman, he/she shall be beaten with 50 lashes of the whip by the magistrates [in 5a-c] with responsibility in the matter.
10. If any of the magistrates does not act in accordance with what is written [here], he shall be legally denounced [*eisangellein*] to the Council of 500 by *ho boulomenos* of the Athenians who have the legal right to do so [*exestin*];
  - a. if he [the accused magistrate] is convicted he shall be dismissed from his office
  - b. and the Council of 500 may levy an additional fine up to 500 drachmas.
11. So that there shall also be in the Piraeus an Approver for the ship-owners [*nauklêroi*] and the traders [*emporoi*] and all the others [involved in exchange], the Council of 500 shall [either]
  - a. appoint [an Approver] from the [existing] public slaves if available
  - b. or shall buy [a slave in which case] the *apodektai* shall allocate funds [for his purchase].
12. The Overseers of the Import-market [see 5c, above] shall see that he [the Approver in Piraeus] sits in front of the stele of Poseidon, and they [the Approver in the Piraeus and responsible magistrates] shall use the law in the same way as has been stated [above] concerning the Approver in the city.
13. Write up this law on a stone stele and set it up [*katathenai*]
  - a. in the city between the [bankers'] tables [i.e. where the city Approver sits]
  - b. and [set up a copy] in Piraeus in front of the stele of Poseidon [i.e. where the Piraeus Approver sits]
  - c. The secretary of the Council of 500 shall commission the contract from the *pôlêtai*, and the Sellers shall introduce [the contract] into the Council.

14. The salary payment [*misthophoria*] for the Approver in the Import-market [in Piraeus] shall be [in the current year, prorated] from when he is appointed; and the Receivers shall allocate as much [salary for him] as for the Approver in the city.
- a. [after the current year] the salary payment [of both Approvers] shall be from the same source as for the mint-workers [i.e. a specific budget controlled by some board of magistrates, not specified here but presumably ascertainable by Athenians].
15. If there is any *psêphisma* written on a stele contrary to this *nomos*, the secretary of the Council of 500 shall demolish [*katheletô*] it.
- (Translation Stroud 1974, slightly emended. Section numbers by author)

**Table 1.** State-determined conditions for low transaction cost bargain-making  
*Italics* = substantial and systematic Athenian deviations from optimal conditions.

<b>Instrument</b>	<b>Openness: Access</b>	<b>Fairness: Impartiality</b>
<b>1a. Formal rules</b> (laws, decrees, customs)	Publicly posted or common knowledge, stable, archived, legible, simple, non-contradictory, comprehensive, relevant to current conditions.	Apply impartially to all parties; protect bodily integrity, property, dignity of all. <i>Bodily integrity and dignity of citizens favored.</i>
<b>1b. Dispute procedures</b> (litigation, arbitration)	Swift, reliable, easy to use, difficult to abuse, available to all. <i>Non-citizens without standing in some legal procedures.</i>	Treat similar cases and similar disputants similarly.
<b>1c. Sanctions</b> (punishments, limitations)	All delinquents are liable to punishments that are standardized, appropriate to the infraction, widely publicized.	Applied similarly to similar infractions. <i>Intentional murder of citizen punished more severely. Slaves liable to beating as additional or replacement penalty.</i>
<b>2a. Exchange media</b> (coinage, weights, measures, contracts, sureties)	Readily obtainable, comprehensive, stable, recognizable, reliable, standardized.	Impersonal, used by all. <i>Only citizens (with some exceptions) may own real estate.</i>
<b>2b. Facilities</b> (market-places, communications, transport, storage, security)	Centralized open-access markets, low cost communication and transport systems, reliable and secure storage. Housing, religious apparatus readily available.	Available for use by all on similar terms.
<b>3. Third-party rents</b> (taxes, bribes, protection)	Taxes on exchanges low, simple, centralized, returned to productive system. Restraints on corruption, violence, rent-seeking, misuse of government apparatus.	Applied similarly to similar cases. <i>Most metics pay special taxes. Athenian settlements abroad and tax-farming favor citizens.</i>

**Table 2.** Comparison of polis coins found in datable coin, fifth and fourth centuries B.C. and percentage of total number hoards, ten top poleis.

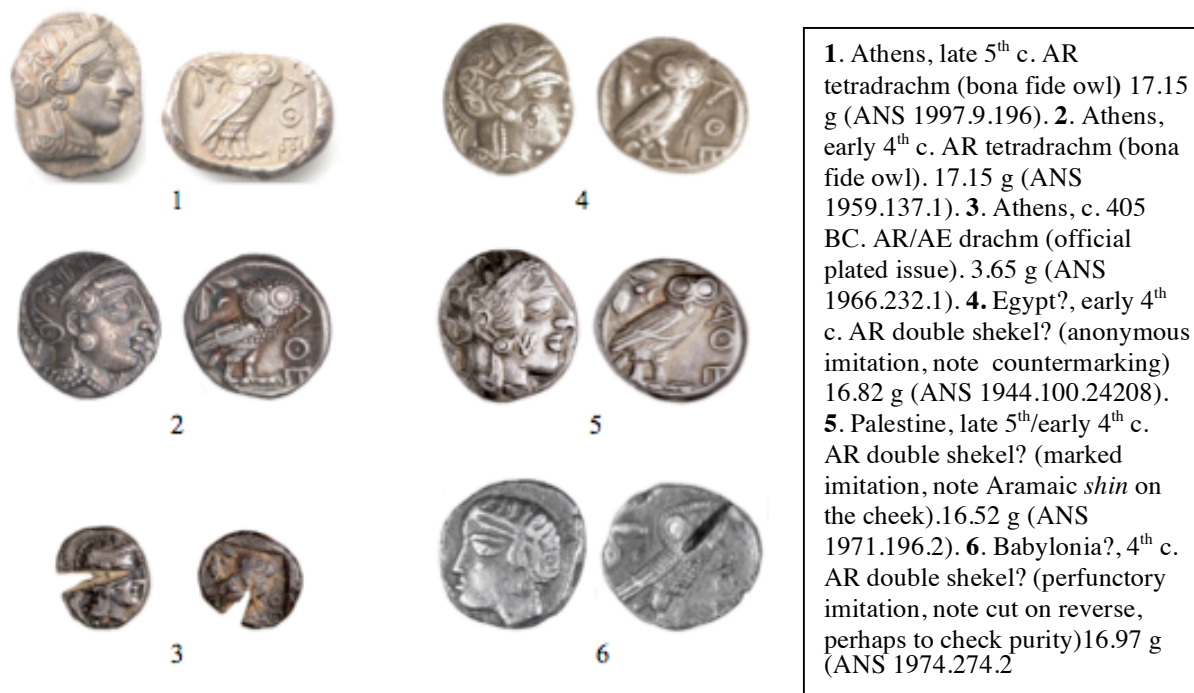
POLIS	Hoards 5th		Hoards 4th		Coins 5th		Coins 4th	
	Count	%	Count	%	Count	%	Count	%
Athens	45	18.9	56	9.9	1284	3.7	7152	6.5
Syracuse	48	20.2	33	5.9	963	2.8	793	0.7
Aigina	24	10.1	25	4.4	960	2.8	535	0.5
Akragas	35	14.7	8	1.4	698	2.0	22	0.0
Taras	20	8.4	23	4.1	593	1.7	1426	1.3
Kroton	21	8.8	18	3.2	466	1.4	155	0.1
Metapontion	19	8.0	20	3.5	1017	3.0	226	0.2
Gela	30	12.6	9	1.6	565	1.6	72	0.1
Olbia	11	4.6	21	3.7	456	1.3	813	0.7
Corinth	10	4.2	19	3.4	197	0.6	1145	1.0
All hoards	238		564		34385		109433	
10-polis %						20.9		11.3

Ranking is by total number of hoards in which one or more coins of that polis appears). Hoards count = number of dated hoards in which at least one coin of the polis occurs. Hoards % = percentage of total dated hoards in which at least one coin of the polis occurs. Coins count = number of polis coins in dated hoards. Coins % = percentage of polis coins in all coins in dated hoards. Total count = total dated hoards, total coins in dated hoards (from all mints, both polis and non-polis). 10-polis % = aggregate percentage of coins from ten top polis coins in all dated hoards. Data derived from Thompson, Mørkholm and Kraay 1973. This data is noisy, because, inter alia, some of the coins described as owls in the inventory may be pseudo-owls.

**Table 3.** Approvers' judgment matrix, mandatory actions taken (**bold**), and consequences for subsequent circulation and use as legal tender (**bold italic**).

1. Athenian ( <i>Attikon</i> ) Good (silver) <b>Certify and approve (as <i>dokimon</i>)</b> <b><i>Remains in circulation</i></b> <b><i>Mandatory acceptance</i></b>	3. Athenian ( <i>Attikon</i> ) Bad (plated bronze = w/drawn war issue) <b>Cut, confiscate, dedicate</b> <b><i>Removed from circulation</i></b> <b><i>Unacceptable</i></b>
2. Foreign ( <i>xenikon</i> ) Good (silver) <b>Certify (as <i>kalon</i>), return to owner</b> <b><i>Remains in circulation</i></b> <b><i>Optional acceptance</i></b>	4. Foreign ( <i>xenikon</i> ) Bad (plated bronze or lead, fraudulent) <b>Cut, confiscate, dedicate</b> <b><i>Removed from circulation</i></b> <b><i>Unacceptable</i></b>





**Figure 1.** Athenian state-issued owls (left column: 1-3) and imitation owls (right column: 4-6), era of Nikophon's law. Courtesy of Peter Van Alfen and ANS.

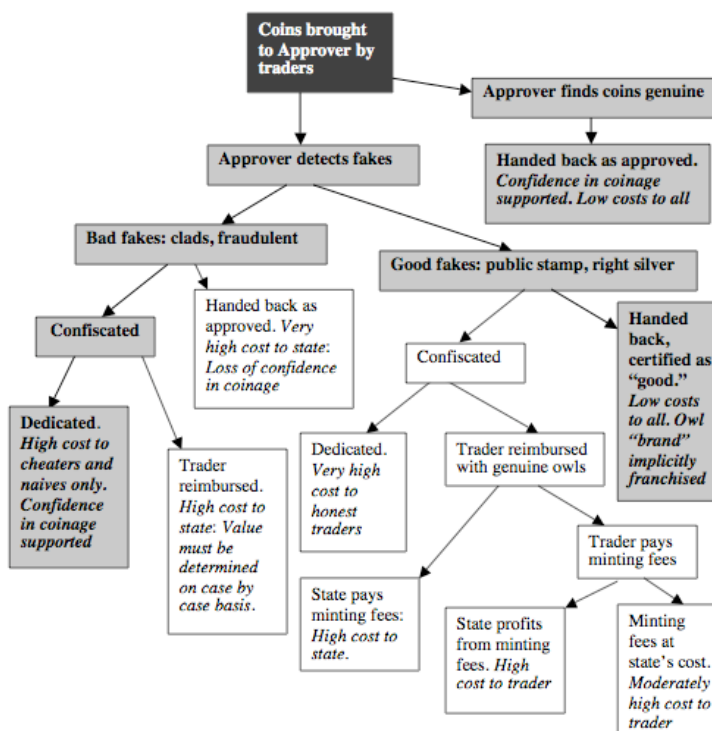
**Figure 2.**

Nikophon's Law on Silver Coinage. Decision tree.

Grey boxes with boldface: Actual decisions made by the law.

White boxes: Counterfactuals: possible policies rejected by the law.

Italics: Costs to individuals and to the Athenian state.



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## Notes.

\*Adapted from Ober 2008, chapter 6.

<sup>1</sup> Transaction-cost economics: Coase 1988; Williamson 1981; Benkler 2006, 106-116. Application of transaction-cost principles to questions of state formation and international institutions: North 1981; Keohane 1984.

<sup>2</sup> The ancient Greeks understood justice both as procedural fairness, and as fairness in respect to distribution in ancient Greek moral thought and law: Ober 2005.

<sup>3</sup> It is wrong to imagine that Athens had *no* imperialistic ambitions or tendencies in the fourth century: see Buckler 2003 for detailed discussion. But in any event, with the exception of the control of three Aegean islands, Lemnos, Imbros, and Skyros which were regular sources of revenue from a grain tax (Stroud 1998), Athenian imperial enterprises before and after the period of the fifth-century “high empire” neither produced net revenue gains nor promoted overall Athenian material flourishing. See further Griffith 1978; Oliver 2007; Moreno 2008. .

<sup>4</sup> Huber and Shipan 2002 offer a comparative analysis of the choice of modern legislators to draft detailed legislation or to leave the details to administrative rules drafted by unelected civil servants – in either case the result is that the end users are subject to rules that require expert interpretation.

<sup>5</sup> See, for example, Thomas 1989: 60-93, 2005; Harris 1994; Hedrick 1999, 2000; Richardson 2000; Davies 2003.

<sup>6</sup> The wide extent of the circulation of Athenian owls, especially in the fourth century, is evident in even a superficial perusal of the coin hoard evidence collected in Thompson, Mørkholm, and Kraay 1973. See, in detail, Flament 2007 (catalogue of hoards that include Athenian owls), and further discussion of the hoard evidence in Ober 2008, chapter 2, and Table 2, below.

<sup>7</sup> Xenophon, *Poroi*, written in the mid-fourth century makes a point of the desirability of silver as a medium of trade. Cf. Aristotle, *Nicomachean Ethics* 1133a.

<sup>8</sup> The imitation owl phenomenon: Thompson, Mørkholm, Kraay 1973: 154, cf. 200. Stroud 1974, 175-78 with plate 25 d-f; Figueira 1998 528-35; van Alfen 2000: 2002 32-48, and especially 2005. Stewart and Martin 2005 note that the jump in imitation owls ca. 400-375 B.C. coincides with a massive increase of imports Athenian-made pottery into Egypt. Kroll 1993: 4-5, reports that 22% of the 129 Greek silver coins found in the Athenian Agora excavations were “unofficial” (not “prototypes, in van Alfen’s typology, below): 22 of these were clads (“plated”), and between 5-7 were high-silver-content imitations. Van Alfen 2005: 344, notes that of 791 Athenian coin types in the American Numismatic Society collection, some 19% are high-silver-content imitations and 8% are plated. These are noisy statistics, as van Alfen points out, especially because one expert’s real owl may be another expert’s imitation, but they certainly show that pseudo-owls were circulating in Athens, and that the Approvers would have had some work to do.

<sup>9</sup> Van Alfen 2005, with excellent discussion of Nikophon’s law in the context of the problem of imitation coinages. Athenian law specified death for producing van Alfen’s category 7 counterfeits: Demosthenes 20.167.

<sup>10</sup> The law does not mention category 6 coins explicitly, and a strict interpretation of the grammar of the key sentence in section 2 of the law would mean that all plated and fraudulent coins are regarded as *xenikon* (i.e. not Athenian state produced). Yet the fact that section 1 of the law specifies Attic *silver* coins with the public stamp as the coins that must be accepted makes room for a category of Attic *non-silver* coins with the public stamp that are not approved. In any event, any war-issue coins still in circulation were clearly to be treated by the Approver *as if* they were foreign frauds.

<sup>11</sup> Stroud 1974: esp. 169 and 186 makes the argument for mandatory acceptance of good fakes – i.e. that being handed back means “approved.” This interpretation was vigorously challenged by (*inter alios*) Buttrey 1981 and 1982, who regarded it as impossible that any Greek polis would *mandate* the acceptance of imitations. The *phasis* dispute procedure might seem to favor Stroud’s interpretation: Assuming that approved coins and unapproved good fakes are both handed back by the Approver to the buyer, there is potential for post-approval dispute about which was which. But in Buttrey’s favor is the fact that mandatory acceptance of non-state produced coins opens a dangerous possibility for fraud: If *mala fide* counterfeiters produced 85-95% silver fakes perceptually indistinguishable from near-pure silver coins, the state could find itself in the untenable position of mandating the use of bad counterfeits. My thanks to Peter van Alfen for clarification of this point and other issues to do with Nikophon’s law and Athenian coinage.

<sup>12</sup> Stroud 1974, 177-78 discusses two plated coins found by excavators near the Metroon-Bouleuterion complex, and plausibly concludes that these had been confiscated by the Approver, and subsequently cut through and dedicated to the Mother of the Gods, as called for in Nikophon’s law. It is particularly notable that confiscated coins are deposited in a building used to house state archives – it is tempting to suppose that these bad coins were kept as a study collection that the Approvers could refer to when preparing themselves to deal with potentially suspect coin series; see below.

<sup>13</sup> On the likely negative impact of cutting a coin on its subsequent acceptance, see van Alfen 2002: 6, 2004/5:18. A modern analogy might be generic drugs, which lack the “brand” of the original but are chemically identical. Negotiations between drug makers eager to defend their profits and their brand, and public agencies eager to provide inexpensive health care are, in their turn, productive of complex rules. It is possible, based on the relatively few legible lines of an as-yet-unpublished Athenian law from 354/3 (Agora Inventory no. 7495), that there was a general recall and reminting of owls two decades after Nikophon’s law; see Kroll 2006. The law is explicitly attentive to the needs of private individuals and to the necessity of accomplishing its goals quickly. My thanks to Molly Richardson for allowing me to consult her in-progress transcript of this important inscription.

<sup>14</sup> Robert Keohane points out to me that maintaining currency liquidity (i.e. ready availability of coins) is another (in this case macroeconomic) public good that is supported by the official Athenian tolerance of the pseudo-owls. Currency liquidity is especially important for trading states and difficult to maintain in specie-standard currencies (cf. the practice of hoarding). It is implausible that the Athenians could have clearly understood the economic reasons *why* loss of liquidity would have deflationary effects (depressing production of goods, and potentially precipitating economic depression, as in Europe 1873-96). But the Athenians could certainly have noted the empirical fact that markets flourished when silver currency (even if not Athens-produced) was readily available, and they must have recognized that taxing “good fakes” would discourage the import of foreign silver to the Athenian market.

<sup>15</sup> Egyptian monopoly on coinage: Emmons 1954; Le Rider and Callataÿ 2006: 140-44. Reden 2007 Money provides the context. A mid-fourth century decree of Olbia (Dubois 1996 no. 15 = Austin and Vidal-Naquet 1977 no. 103), that is modeled on the Nikophon law (a copy of which was found in Olbia) stakes out of middle ground: mandatory use of Olbian gold and silver coinage, but restrictions on rents from reminting. At about the same time two Athenians (along with their kinsmen and slaves) were granted special traders privileges in Olbia (Dubois 1996 no. 21), suggesting that the dissemination of institutions (in this case, an adapted law) and close trade relations may be related.

<sup>16</sup> On the means that a *dokimastês* could use for quick judgment, see Bogaert 1976, citing [Arrian], *Discourses of Epictetus* 1.20.7-9, who notes that a silver-tester (*agurognômôn*) used sight, touch, smell, and hearing to test coins. It is tempting (although completely speculative) to guess that when they were not on duty at their tables, the *dokimastai* engaged in tests (by cupellation, a destructive method that allows for accurate determination of silver content) when examples came their way of new series of pseudo-owls. Once a few examples from a series had been tested “in the lab,” the *domikastai* would be able to deal efficiently with all coins from that series through visual inspection in their daily practice “at the table.” A

concern with standardizing assaying practices is not a uniquely ancient concern: In 1856 a British Parliamentary Committee found, “that the laws regulating the assaying of gold and silver are in a most confused state, and that almost every office is established and regulated by Statutes or Charters exclusively applicable to itself. The practice of assaying is to afford protection to the public against fraud, and the Committee believe that it ought to be maintained, and since it is a convenient mode of collecting the revenue. They suggest that several statutes should be repealed, to remove the anomalies and confusion on assaying, and the consolidation of the laws into one statute for the establishment and regulation of Assay Offices throughout the UK.” (HMSO 1856, paper 190: Select Committee on Silver and Gold Wares).

<sup>17</sup> Corporal punishment of slaves at Athens: Hunter 1994: 154-84. Hypothesis that a drachma is regarded as the equivalent a stroke of the whip: Hansen 1999: 121.

<sup>18</sup> Slaves living apart from the masters: Cohen 2000, with literature cited.

<sup>19</sup> Cf. discussion of the law on *hubris*: Ober 2000; cf. the establishment of the Theseion as an official slave-refuge: Christensen 1984.

<sup>20</sup> Moe 2005. Cohen 1997 offers a detailed and deeply insightful analysis of slavery along these lines.