

And now for something completely different. . .

On the Origin of Specie

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Motivation

- ▶ coinage (canonical form of money) has been with us for 2600+ years
- ▶ how did it get started?
 - ▶ it turns out that the circumstances are a little surprising ...
- ▶ my attempt at stylizing the facts:

Motivation

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- ▶ how did it get started?
 - ▶ it turns out that the circumstances are a little surprising ...
- ▶ my attempt at stylizing the facts:
 - ▶ multiple issuers
 - ▶ full range of denominations, precisely weighed
 - ▶ intrinsic content appears random and “information-sensitive”
 - ▶ no good theory, but the facts are still changing. . .

1. Introduction
2. Historical evidence
3. Physical evidence
4. Facts and theories
5. Conclusion

The Context



The Cities



Historical evidence

The context



The Lydians

- ▶ geography
 - ▶ inland region of Western Turkey centered on Sardis, at foot of Mount Tmolos, river Pactolus flowed through the city
- ▶ history
 - ▶ Lydians had been living in the area around Sardis since at least 12th century BC
 - ▶ language related to Hittite, Luwian (Anatolian languages)
 - ▶ dynasty change: Gyges (680–644 BC) πολύχρυσος, attested in Assyrian sources as “Gugu”
 - ▶ he and his successors (the Mermnads) fight with Greek cities repeatedly
 - ▶ Alyattes (610–560 BC) and Croesus (560–546 BC)
 - ▶ destruction of the Lydian Empire by the Persians in 546 BC

The Lydians (2)

- ▶ economy
 - ▶ rich agriculture (wheat, barley, olives, figs, nuts, wine)
 - ▶ skilled in weaving (legend of Arachne)
 - ▶ population of Sardis estimated at 20,000+
- ▶ money
 - ▶ King Midas (of neighboring Phrygia) washed away his accursed gift in the Pactolus
 - ▶ Herodotus (1.94.1): the Lydians were the first retailers (πρῶτοι κάπηλοι)
 - ▶ Herodotus (ibid.): “the first men whom we know who coined and used coins of gold and silver”
 - ▶ Xenophanes of Colophon, c570–c475 BC, cited in a 1st c. AD dictionary: the Lydians were the first to strike coins (but other theories existed)
 - ▶ that's it for the historical sources!

Birthplace of coinage



Before coins

- ▶ gold used in jewelry since 5th millennium BC, silver since 4th millennium BC
- ▶ Egyptian did not use coins until Alexander the Great (4th c. BC)
- ▶ Mesopotamia: silver used as unit of account to express prices almost exclusively after c1500 BC
- ▶ prices always expressed as “1 shekel is equivalent to X units of ...”
- ▶ silver hoards (10th-8th c. BC) found in Middle East, chunks of silver of random weights (*Hacksilber*)
- ▶ gold-silver ratio: 8–10 to 1

The first coins

- ▶ What is a coin?
 - ▶ medium of exchange
 - ▶ lumps of metal whose observable characteristics make them interchangeable

The first coins

- ▶ What is a coin?
 - ▶ medium of exchange
 - ▶ lumps of metal whose observable characteristics make them interchangeable



This is not a coin.

The first coins

- ▶ What is a coin?
 - ▶ medium of exchange
 - ▶ lumps of metal whose observable characteristics make them interchangeable



This is a coin.

Characteristics of the first coins

- ▶ The first coins = collection of objects that share certain characteristics
 - ▶ Context: Western Turkey (Asia Minor), 7th–6th century BC
 - ▶ Weight: weights appear to be normalized
 - ▶ Physical appearance: obverse and reverse
 - ▶ Content: made of a mixture of gold and silver

Location of finds



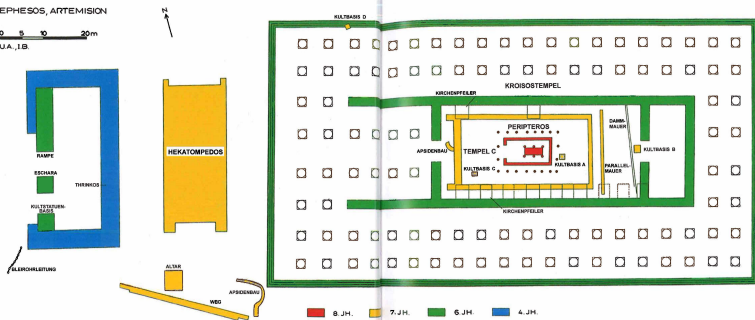
Dating

- ▶ in general, dating ancient coins relies on
 - ▶ archaeological finds to provide absolute anchor points for the chronology
 - ▶ designs: stylistic correspondences with dated objects (jewelry, pots, sculptures)
 - ▶ designs: stylistic evolution to which some speed is assigned
 - ▶ dies: large number of dies for a given series suggests large quantities and/or long time period
- ▶ electrum coins:
 - ▶ very few coins have been found in archaeological contexts
 - ▶ most famous “hoard”: the Artemision in Ephesos, a major cult center of the goddess Artemis
 - ▶ several successive early temples, one destroyed by a flood; “Croesus temple” built c560 BC (controversial)
 - ▶ in the basis of the sanctuary, large number of electrum coins found in 1904–05
 - ▶ “hoard” very rich (dozens of types, including plain) but difficult to interpret
 - ▶ original theory: foundation deposit placed at one time
 - ▶ most recent theory: remains of past sacrifices (over a potentially long period of time) swept into the foundation of the reconstructed sanctuary
 - ▶ more recent finds near the temple are dated to 630–615 BC: *terminus ante quem* but no *terminus post quem*
- ▶ numismatists tend to think that the electrum coins were produced during a relatively short span of time (a few generations)

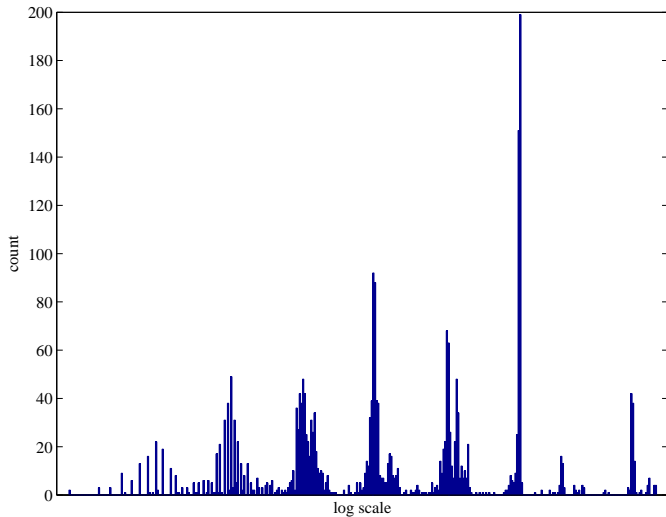
Dating

EPHESOS, ARTEMISION

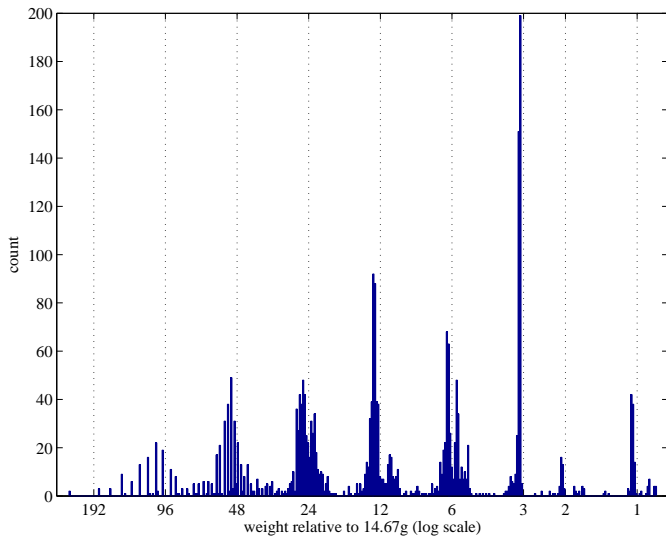
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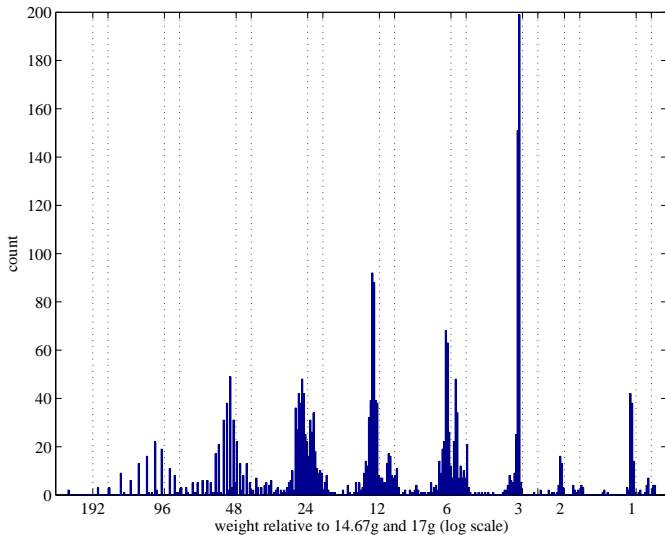
Coin weights



Coin weights



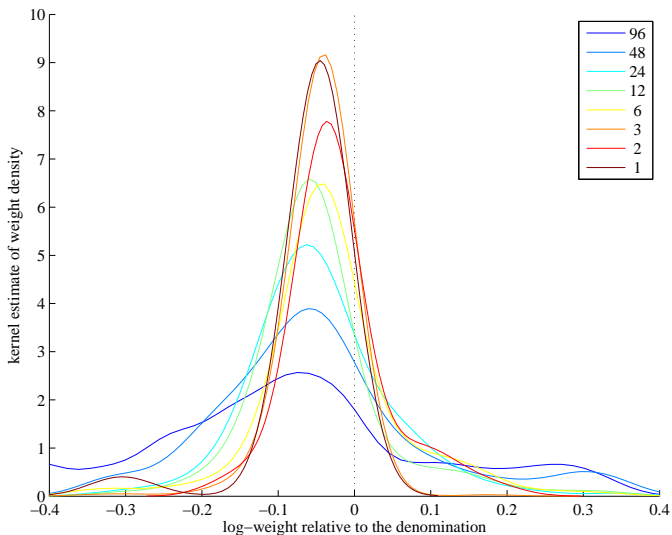
Coin weights



Coin weights (Milesian standard)

denomination	96	48	24	12	6	3	2	1
<i>all coins</i>								
number	103	243	329	383	273	341	44	92
mean weight (g)	0.14	0.29	0.59	1.17	2.38	4.68	7.19	13.88
coefficient of variation (%)	22.77	14.79	9.17	8.92	8.97	3.12	6.11	4.90
<i>royals</i>								
	5	12	13	103	32	268	-	-
	0.15	0.28	0.61	1.16	2.34	4.71	-	-
	8.2	9.46	9.8	5.39	2.65	0.91	-	-

Precision



Weights

- ▶ coins cluster by weight
- ▶ clusters can be collected into two (or three) weight standards
- ▶ call each cluster a denomination
- ▶ for each standard, an extended suite of denominations spanning two orders of magnitude, based on powers of 2
 - ▶ contrast with medieval evolution (Redish-Weber)
- ▶ for each denomination, the range of observed weight is very narrow (1% STD for the trites)
- ▶ slight difference between Milesian and others: no halves in the Milesian, no thirds in the others

Physical Appearance

- ▶ Obverse
 - ▶ either smooth, striated, or design (geometric, floral, animal, mythological)
- ▶ Reverse
 - ▶ set of (mostly) square punches (there are exceptions)
 - ▶ the pattern or punches matches well with the weight standards

Standards and reverse punches

standard	weight	1	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{12}$ — $\frac{1}{48}$
(Lydo-) Milesian	14.0–14.3	■ ■	■ ■	■ ■	■ ■	■
Phocaian	16.2–16.5	■ ■			■	■
Samian (Euboic)	17.0–17.5		■		■	■

A full house (the Phanes series)



stater, 14.01g (British Museum): ΦΑ.ΝΟΣ ΕΜΙ ΣΕΜΑ

A full house (the Phanes series)



trite (1/3), 4.72g: ΦΑΝΕΟΣ

A full house (the Phanes series)



hekte (1/6), 2.35g

A full house (the Phanes series)



hemihekte (1/12), 1.17g

A full house (the Phanes series)



myshemihekte (1/24), 0.59g

A full house (the Phanes series)



1/48, 0.29g

A full house (the Phanes series)



1/96, 0.14g

The Samian standard



1

ΑΙ



stater, 17.32g (Paris)

The Samian standard



hemi-stater (1/2), 8.76g (Paris)

The Samian standard



hekte (1/6), 2.86g (Boston)

The Samian standard



hemihekte (1/12), 1.39g (British Museum)

Series

- ▶ observed weights and reverse punches allow to sort into three standards
- ▶ obverse designs allow to sort into series
- ▶ there are many series (up to 100) and very few can be traced to a specific location

Series and denominations

Weidauer Münzstätte	Serie	Denominations represented							Colophon	Artemision		
		1	1/2	1/3	1/6	1/12	1/24	1/48			1/72	1/96
Sardes	XV Löwenkopf m. 4-strahliger Warze			x	x	x						x
	XVIIa Valvel			x								x
	Kar I.4 Löwenpranke					x	x			x		x
	XVI Löwenkopf m. mehrstrahliger Warze		x		o							x
	Kar I.6 Löwenpranke					x	x	x			x	x
	XVIIb Valvel				x	x						x
	XVIIc Valvel				x	x						x
	XVIIId Valvel		x									x
	XVIII kall			x								
	unbestimmt	XIII Eberköpfe			x	x	o	o	o			
Milet	XIV Löwenprotome	x			o	o						
	XX Liegender Löwe	x		o	x							x
	XXI Stossender Tier	x										
Ephesos	XXIV Liegendes Pferd	x		x								
	V Biene			x	o	o						
	VI Eingerahmte Biene			x	o	o						
	VIII Hirschprotome			x	x	o	o					x
	VIII Phanes	x		x								
unbestimmt	IX Gorgoneia	x		x								
	XIX Linearer Löwenkopf	x		x	x	x	x	x		o		x
	XXVI Pferdekopf			x	x	o	o				x	x
	XXVII Pegasosprotome			o	x	x	o					x
	unbestimmt	XXXIII Löwenkopf von vorne und Skorpion					o	x				
	XXXVI Löwenkopf und Skorpion					o	x					
	XXXIV Löwentatze und Skorpion						o	x				
	XXXV Löwentatze und Löwenkopf						x					
unbestimmt	I Typenos	x		o	x	o						x
	II Geriefelt	o	o	x	x	x	o	o				x
	III Ziegenprotome	o	x	x	x	x						x
	IV 2 Hähne	x	x	x	x	x						x
	X Widderköpfe	x		o								
	XI Widderprotome			x	x	x	o					
	XII Kniender Widder	x										
	XXII Löwen-Stier-Protome	x										
	XXIII Weibliches Raubtier	x										
	XXV Pferdeprotome	x										
	XXVIII Schreitender Pegasos		x									
	XXIX Swastika im Quadrat					x	x					

Identifying a few types



Identifying a few types



ΜΙΛΗΣΙΩΝ = Miletos, 2nd c. BC

Identifying a few types



Identifying a few types



ΕΦ[ΕΣΟΣ] = Ephesos, 4th c. BC

The Lydian or “royal” series

- ▶ one group of series has been attributed to Lydia (cf. historical sources)
- ▶ it belongs to the Milesian standard
- ▶ one series features a lion head in profile with distinctive “wart” or “globule”
- ▶ some of the coins have an inscription: $\text{F}\Lambda\text{F}\text{E}\text{T}\Lambda\text{I}\text{M}$ = “[I am] of Walwetās” (Alyattes?)
- ▶ another die-linked series bears: $\text{K}\Upsilon\text{K}\Lambda\text{I}\text{M}$ or $\text{K}\text{P}\text{K}\Lambda\text{I}\text{M}$ = “[I am] of Kukās/Krkās” (Gyges? Croesos?)
- ▶ another boar-head series (die-linked) has $\text{L}\text{A}\text{T}\text{E}$ or $\text{F}\text{E}\text{T}\text{A}$ or $\text{T}^{\epsilon}\text{E}$ (???)
- ▶ smaller denominations: the “lion’s paw” series
- ▶ no stater ever found

The Lydian series



The Lydian series



The Lydian series



The Lydian series



my coin!

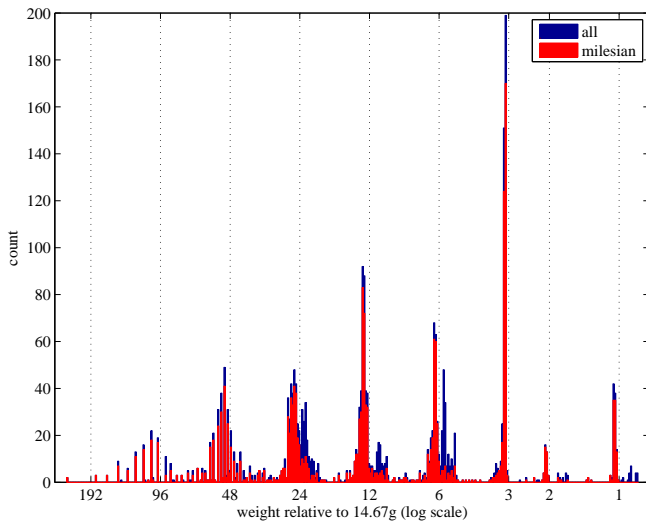
The Lydian series



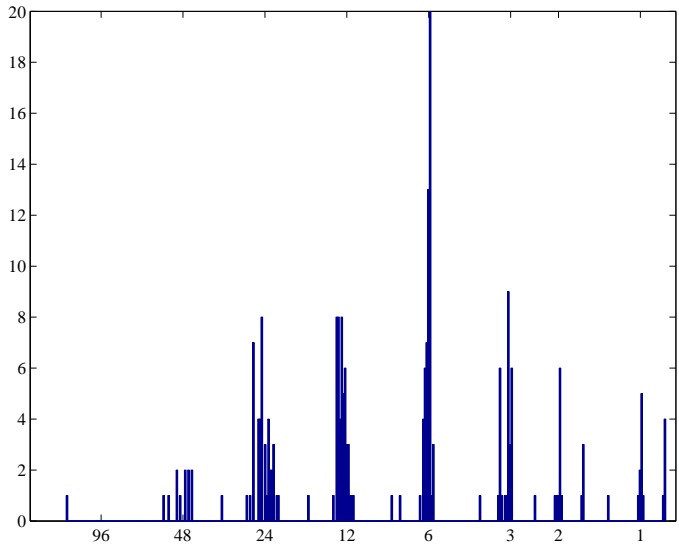
The Lydian series



Series and weights



Series and weights



plain and striated coins

Gold and Silver in Mesopotamia

- ▶ gold was a commodity (except for the Kassite period, middle of 2nd millennium BC)
- ▶ silver was the numeraire
- ▶ gold assumed to have come from Egypt/Nubia
- ▶ silver came from the Taurus mountains, Iran, the Aegean
- ▶ evidence on the assaying of gold (18th c. BC), different grades of gold ("shiny", "red" twice as valuable, 15th c. BC)
- ▶ quality of silver indicated in Assyrian sources from 700 BC
 - ▶ standard was 87.5%
 - ▶ other grades: 91.7% (between 605 and 579BC), 83.3% (599BC), 80% as the silver used in trade (572–562BC)
- ▶ technology for assaying?
 - ▶ 18th c. BC touchstone found in Sumeria
 - ▶ Greek sources: Theognis (6th c. BC): βάσσανος, Bacchylides (5th c. BC): Λυδία λίθος
 - ▶ Theophrastus (early 3d c. BC) claims precision of 1/288
 - ▶ defeated by ternary alloy (copper)

Mixing and Separating Gold and Silver

- ▶ separating gold/silver from base metals (Cu, Pb) is easy
- ▶ *cupellation* process known since 4th millennium
- ▶ separating gold from silver is different
- ▶ evidence for burnishing gold/silver alloys to obtain a surface richer in gold (Babylonia)
- ▶ *cementation* process:
 - ▶ gold is hammered in thin strips, mixed with salts and brick powder
 - ▶ heated between 500C and 800C (below melting point), silver forms silver chloride gas, absorbed in brick and clay vessel
 - ▶ silver can be extracted by cupellation from brick and ground clay
 - ▶ First archaeological evidence for cementation in 575–550 BC Sardis
 - ▶ Lydian coinage after 560 BC is pure (98–99%) gold and silver
 - ▶ no clear-cut evidence for systematic use of pure gold before (New Dynasty Egypt had close to pure gold, could be from better sources)

Electrum

- ▶ ἤλεκτρον (amber for Homer and Hesiod, metal for Sophocles): alloy of gold and silver
- ▶ natural gold (placer or reef) naturally contains a variable quantity of silver (+ a little copper, PGE inclusions for placer gold)
- ▶ Herodotus (1.50) tells of a gift by Croesus to Delphi of
 - ▶ ingots of (ἄπεφθος χρυσός = "boiled gold") weighing 2.5 talents each, ingots of alloy (λευκός χρυσός = "white gold") weighing 2 talents each → 70% gold
- ▶ placer gold from Pactolus: 17–24% silver (modern test), two nuggets found in Sardis have 30% and 16% silver

Metallic content of gold ores

Morrison, Barrandon and Breudot (1987)

Data on the Composition of Gold Ores

Country and Place				Percentage					
				Au	Ag	Cu	Fe	Other Metals	
Placer gold	Africa	Senegal	nuggets	94.6	5.85			Pt:0.15	
			nuggets	86.8	11.8	0.9			
			powder gold	84.5	15.3	0.2			
	Asia	Guinea	nugget from the Ashanti country	90	9.55	traces	traces		
			Afghanistan	96.97	3.02				
		Burma	Schusse-Gyeng	92	8		2.9 (Cu + Fe)		
			Biver Tayoy	87.9	9.2				
		India	Jashpur—nugget	94.64	5.15				
			Babkad, Udaipur	91.7	3.6		4.7 (Cu + Fe)		
			Wynaud district	91	8.7				
		Siberia	Boruschka, Nijni-Tagilsk district	83.85	16.15				
			Boruschka	91.36	8.35		0.29 (Cu + Fe)		
			Boruschka	94.14	5.23		0.39 (Cu + Fe)		
			Perroe Pawlovsk, near Beresow	92.6	7.08	0.02	0.03		
		Europe	Great Britain	Alexander Andrejewsk, near Miosk	87.4	12.97	0.09		
				Biver Mowddach, Wales	84.9	14.7	0.34		SiO ₂ : 0.4
Kildonan Burn, Sutherland, Scotland	81.1			18.4			SiO ₂ : 0.4		
Italy	Po valley		92	4.5	3.5				
	India		86.9	11		2.1			
Reef gold	Siberia	Kiel	87.4	12.6					
		Berezow	91.9	8	0.09				
		Berezow	93.8	5.9	0.08	0.04			
			86.5	13.2		0.3			
	Europe	Bohemia	Emle	91.3	8.4	0.02	0.16		
			Transylvania	Verespotok	60.5	38.75	0.75		
				64.8	35.2				
	Ural	Fuses		84.9	14.7				
				70.9	28.8	0.8			

Methods of Analysis

- ▶ destructive (rarely an option)
- ▶ non-destructive
 - ▶ specific gravity (SG)
 - ▶ Archimedes: ξυρηκα!
 - ▶ good in principle for binary alloys

$$x = \frac{\frac{SG_{Au}}{SG_{Ag}} - \frac{SG_{Au}}{SG}}{\frac{SG_{Au}}{SG_{Ag}} - 1} \quad (1)$$

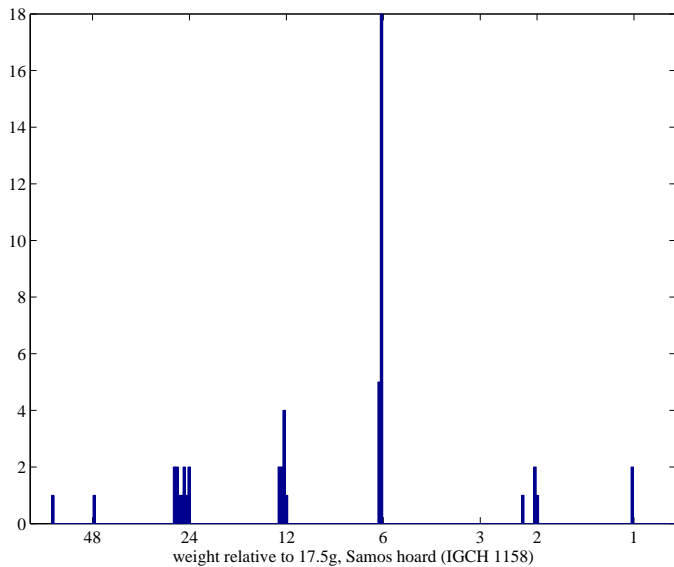
with $\frac{SG_{Au}}{SG_{Ag}} = 1.838$ (Herodotus example: 73%)

- ▶ not good for ternary alloys (copper), or when there are bubbles
 - ▶ has been shown to be misleading in practice
- ▶ X-ray fluorescence (XRF)
 - ▶ bounce high-energy rays on surface, atoms lose electron, emits radiation
 - ▶ available since 1950s
 - ▶ relatively cheap, portable
 - ▶ only analyzes the surface (problem of surface enrichment)
- ▶ proton activation analysis (PAA)
 - ▶ make the coin radioactive and measure the decay
 - ▶ analyzes the whole coin
 - ▶ more costly, not portable

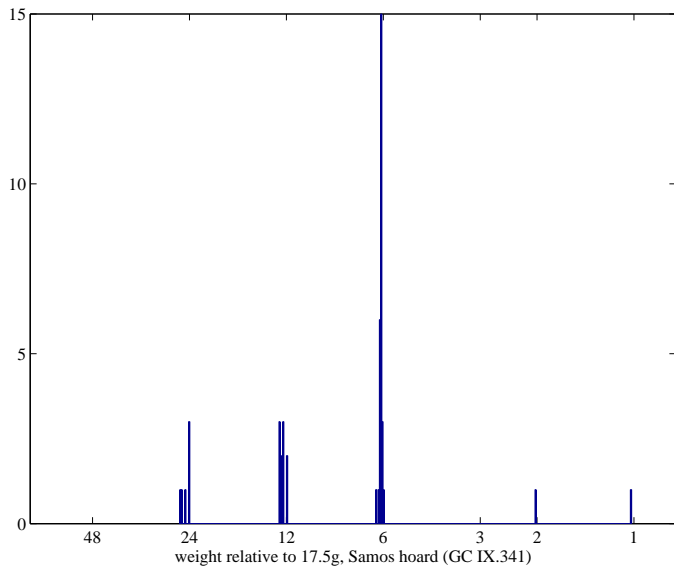
The Samos Hoards

- ▶ IGCH 1158
 - ▶ found in 1894 on the island of Samos; estimated to be 575–560 BC
 - ▶ most of the coins acquired by the Louvre and the British Museum
 - ▶ Paris coins analyzed by Nicolet-Pierre and Barrandon (1997)
 - ▶ over 60 electrum coins, in a variety of types and denominations (rough surface, lion's head facing, eagle, flying eagle, flower or wheel, ram looking back)
 - ▶ all coins appear to be on the Samian standard
- ▶ CH IX.341
 - ▶ found c1998, probably on the mainland facing Samos
 - ▶ coins dispersed in trade
 - ▶ over 45 electrum coins, variety of types and denominations (rough surface, lion's head facing, flying eagle, duck, square and radiating lines)
 - ▶ all coins appear to be on the Samian standard
 - ▶ analyzed by Konuk (2005)

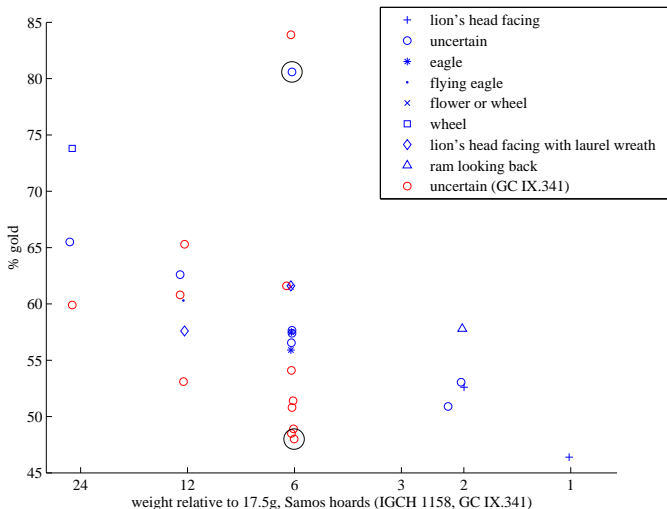
The Samos hoards (PAA analysis)



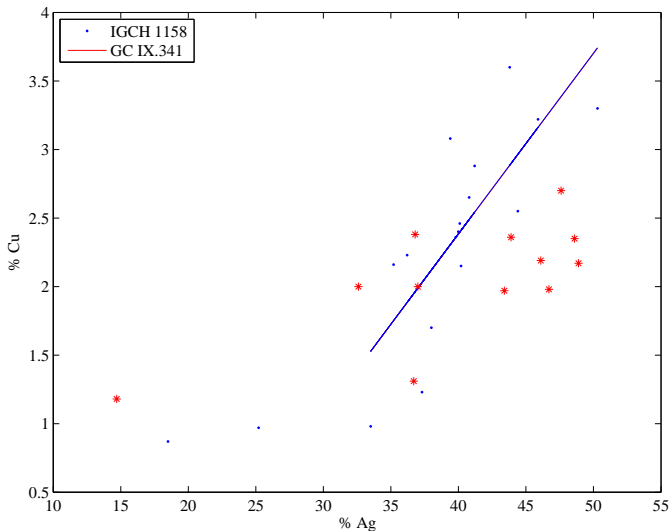
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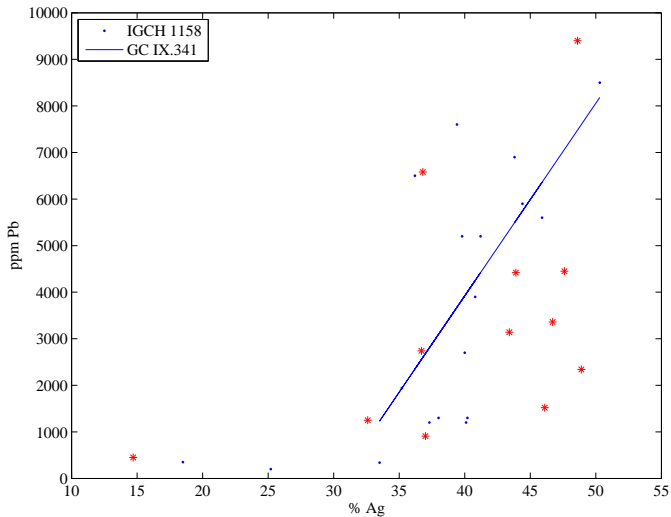
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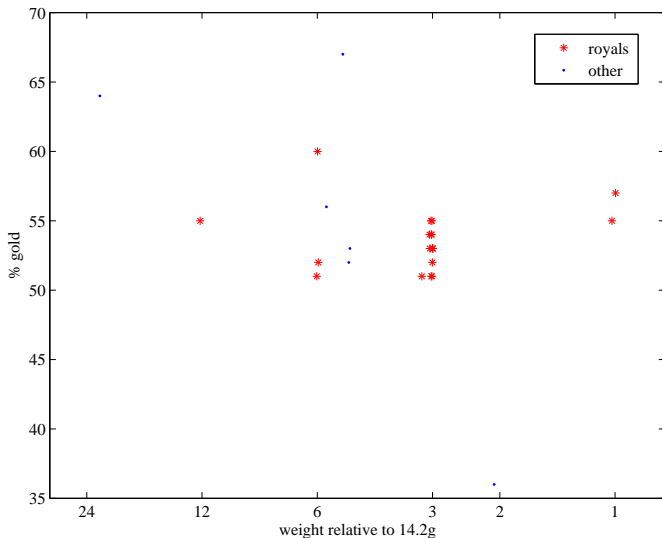
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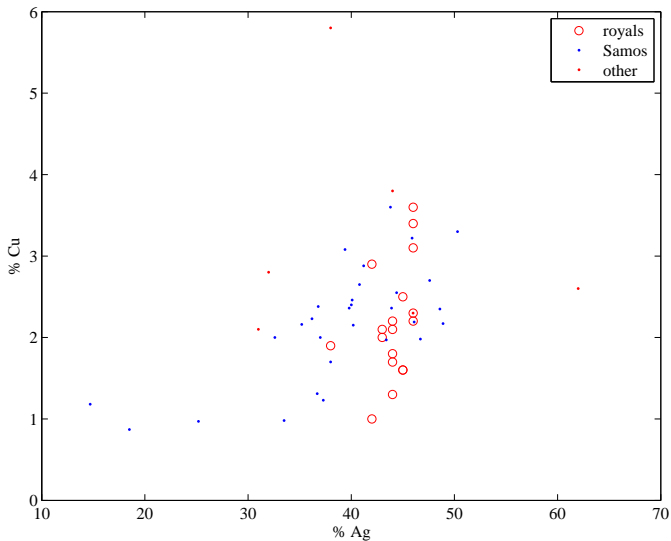
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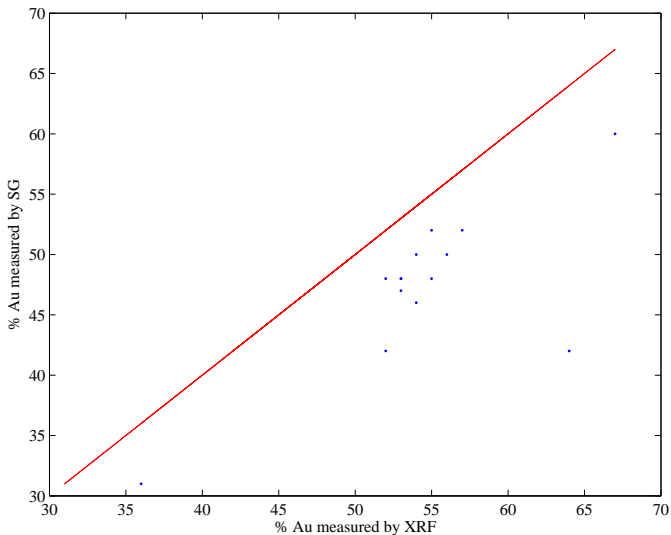
XRF analysis of "royals"



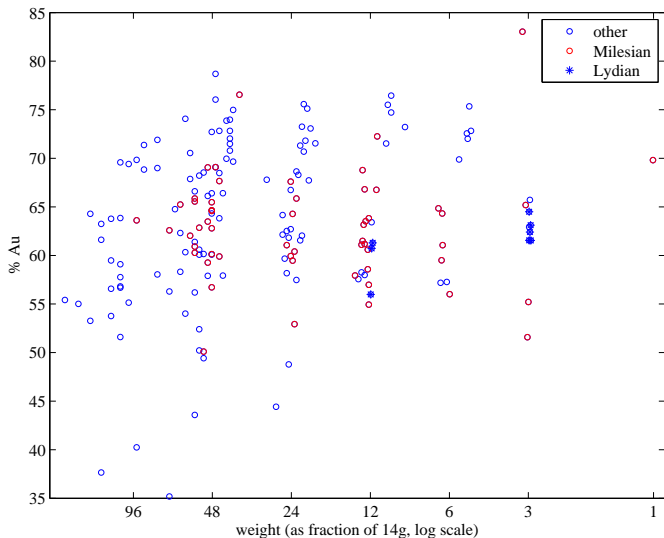
XRF analysis of "royals"



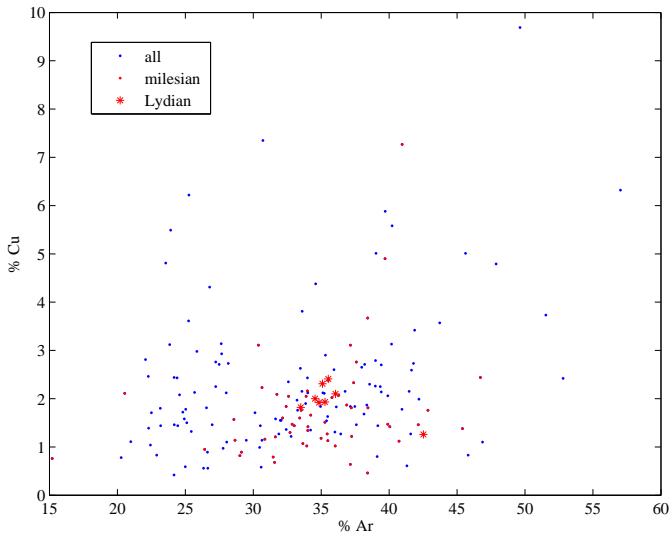
SG versus XRF



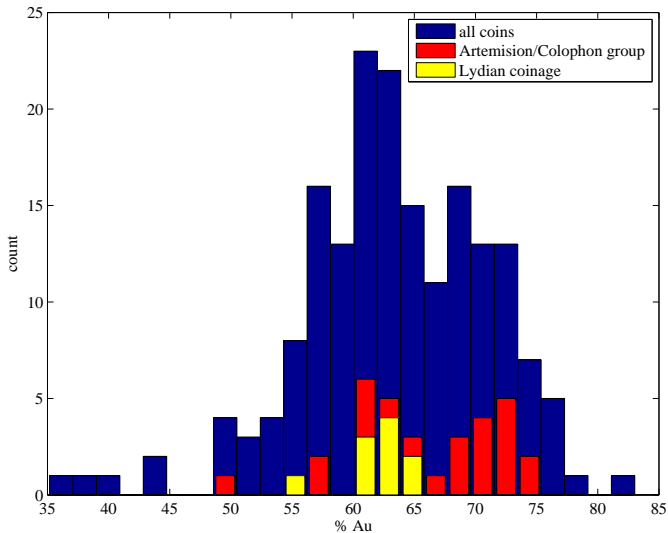
The Falghera collection (XRF analysis)



The Falghera collection (XRF analysis)



The Falghera collection (XRF analysis)



More recent results

- ▶ a third technique involves ablation of a micro-sample by laser, insertion into a plasma, and spectrometry (mass or absorption)
- ▶ laboratory at Orléans currently carrying out analyses on electrum coinage
- ▶ preliminary result: the Lydians controlled the fineness of their coinage to $55 \pm 2\%$

Evidence on circulation

- ▶ again, paucity of archaeological evidence
- ▶ hoard evidence: many different types circulated at the same time
- ▶ some hoards contain coins of different standards
- ▶ some hoards contain only Lydian coins
- ▶ absence of wear and clipping noted on the coins (worn appearance due to wear of the dies)
- ▶ intriguing presence of bankers' marks, mostly on "royals" (1/3 and 1/12) but also on plain types
 - ▶ could be periodic restampings to maintain legal acceptance?

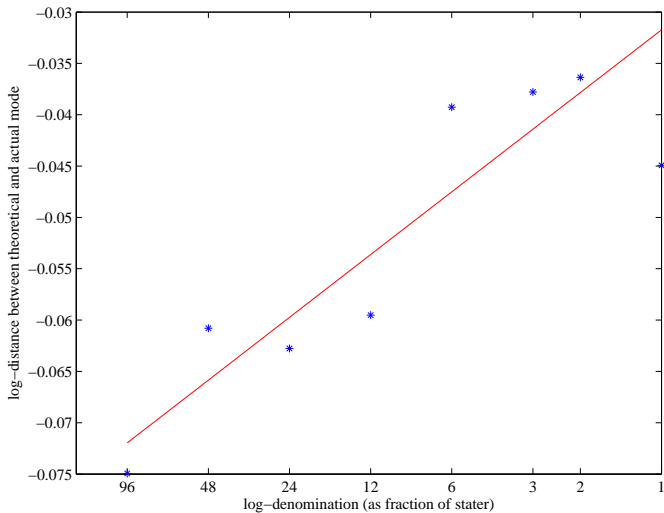
Bankers' marks



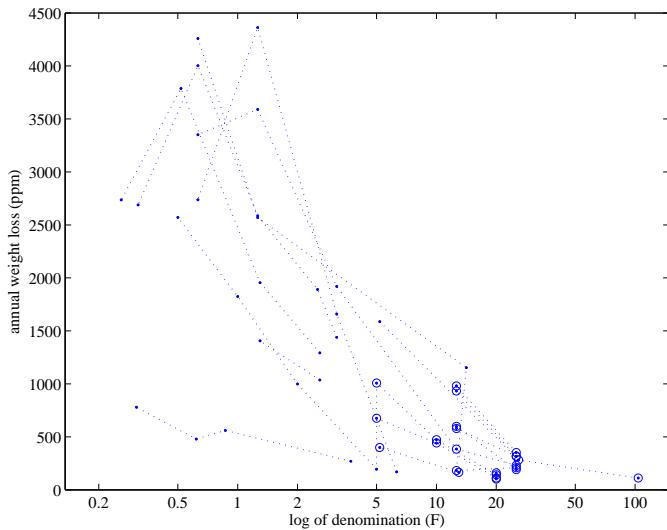
Bankers' marks



Shifting modes



19th c. data



Price data in Mesopotamia (7th–6th c. BC), Rome (301 AD), and Florence (14th c. AD)

	Mesopotamia (g silver)		Rome (g silver)		Florence (g silver)
barley (liter)	0.06		0.11		0.26
dates (liter)	0.04		5.1		
sesame oil (liter)	5.0				
olive oil (liter)			1.40		6.9
wool (kg)	4.2		2.45		2.8
ox	126		160		560
sheep	16.8		12.8		
wage (month)	8.4		16.0		42
adult slave	760				1500
largest and smallest coin					
stater	77	aureus	38.4	fiorino	37.2
hemihekte	6.4	argenteus	3.2	grosso	1.96
$\frac{1}{96}$	0.8	small laureate	.06	picciolo	.05

The rest is history. . .

- ▶ new gold/silver coinage appears with lion and bull (“Croeseids”)
 - ▶ Phase IA: naturalistic animals
 - ▶ gold: heavy stater (10.7g), fractions of $1/3$, $1/6$, $1/12$
 - ▶ silver: stater (10.7g), fractions of $1/3$, $1/6$, $1/12$, $1/24$
 - ▶ Phase IB: naturalistic animals
 - ▶ gold: light stater (8.06g), fractions of $1/3$, $1/6$, $1/12$
 - ▶ silver: stater (10.7g), fractions of $1/2$, $1/3$, $1/6$, $1/12$, $1/24$
 - ▶ Phase II: stylized animals
 - ▶ gold: light stater (8.06g)
 - ▶ silver: half-stater (5.35g)
 - ▶ dating: three coins (heavy gold $1/12$, silver $1/12$ and $1/24$) discovered in rubble of the destruction of Sardis (546BC)
 - ▶ Phase IA must date from reign of Croesus
 - ▶ Phase IB could be Persian, Phase II generally thought to be Persian
- ▶ gold/silver coinage of Darius (522 BC) with slightly modified weights, mainly produced in Western Asia Minor
- ▶ gold/silver ratio (assume 1 gold stater = 20 silver half-staters) of $13 \frac{1}{3}$, attested in sources

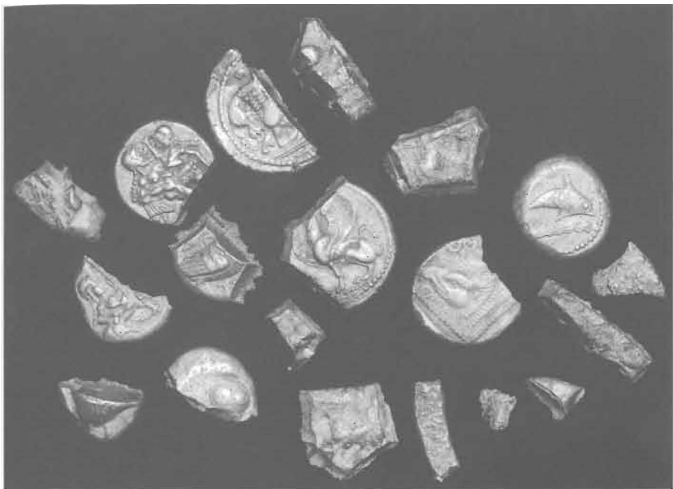
A Croeseid



Greek coinage

- ▶ Mainland Greece:
 - ▶ began coining silver ca 560 BC (Euboea, Athens, Aegina) on a different standard (either 17.4g like Samos, or 12.4g in Aegina)
 - ▶ vast expansion of coinage (100 cities mint coins by the 5th c.)
 - ▶ bronze coinage introduced in the 4th c.
 - ▶ gold coinage in Hellenistic period
 - ▶ debasements *rare*
 - ▶ again, contrast with medieval experience
- ▶ Asia Minor:
 - ▶ mintage of electrum during Ionian revolt against Persia (494–490 BC)
 - ▶ a few cities mint silver coins in 6th c. (Erythrae, Ephesus, Miletus, Teos, Colophon)
 - ▶ a few cities (Phocaea, Mytilene, Cyzicus) continue electrum (50–55% gold) until Alexander the Great
- ▶ East of Lydia: no coinage until Alexander the Great

coinage schmoinage



Hoard from Jordan, c450 BC

Summing up the facts (1)

- ▶ preferences
 - ▶ gold and silver were durable commodities yielding utility
 - ▶ fineness of gold and silver mattered
- ▶ technology
 - ▶ fineness of gold and silver was detectable, though not easily
 - ▶ gold and silver easy to separate from other metals; easy to mix with each other, hard to separate from each other
 - ▶ parting not firmly attested before 575BC: may or may not have existed
- ▶ endowments
 - ▶ Mesopotamia not endowed with either, acquired it by trade in plentiful quantities
 - ▶ Lydia endowed with large amounts of natural alloy (electrum) of uncertain fineness
- ▶ markets
 - ▶ long-distance trade existed for millennia
 - ▶ Lydians produced desirable goods and services that were exported (mercenaries to Egypt in 7th c. BC)
 - ▶ Ionian cities were active traders

Summing up the facts (2)

- ▶ numeraire and money
 - ▶ silver was in use as unit of account for millennia, ad-hoc medium of exchange for centuries
 - ▶ electrum (gold-silver) coins are the earliest coins
 - ▶ they come from Lydia and Ionia, starts sometime before 630BC, ends c550BC (except for a few cities)
 - ▶ produced in a broad range of denominations (from 1 to 1/96 or even 1/192)
 - ▶ many different designs/issuers, each with full range of denominations, coexisted (Samos)
 - ▶ precise weights contrasts with highly variable gold content
 - ▶ range of content exceeds natural variation of electrum, hence silver must have been added
- ▶ prices
 - ▶ purchasing power of largest coin was very large, smallest coin a few days' wages

Questions

- ▶ Who issued these coins?
 - ▶ States (Lydia, cities) or private individuals?
- ▶ Why were they so useful in Lydia/Ionia and later Greece, not in the East?
- ▶ why would the issuers take such care with the weights and not the fineness?
- ▶ why did they choose to make money out of a random variable instead of silver?
- ▶ was technology a constraint?

What do historians say?

Three broad categories of explanations for the birth of coinage (Le Rider, 2001)

1. commercial

- ▶ back to the intuitions of Aristotle (*Politics* 1257a, 4th c. BC) and Paulus (*Digest* 18.1.1, 2nd c. AD): solving the double coincidence of wants problem, without (Aristotle) or with (Paulus) State
- ▶ coinage would have had a private origin, its purpose was to facilitate commercial transactions (Babelon, 1894)
- ▶ objections: coins were too large (Cook, 1958), did not circulate outside Lydia/Ionia (Kraay, 1976), Mesopotamia did fine without it for many centuries before (and a few after)

2. accounting/payments

- ▶ coins were invented by the State to facilitate its accounting, make large and regular payments
- ▶ coins were paid out to mercenaries (Cook, 1958), as legal tender for payment to and by the State (Kraay, 1976) or as gifts (Price, 1983)
- ▶ objections:
 - ▶ the Babylonian and Assyrian empires had the same needs;
 - ▶ why would the recipients accept electrum coins as payments?
 - ▶ absence of clipping shows the coins were weighed, hence standardization of weights per se adds nothing

3. fiscal

Fiscal Theories of Money

Note that theories of the past 50 years have focused on the Lydian coinage

- ▶ the fraudulent-State theory
 - ▶ Bolin (1958) starts from the highly variable content of coins, believes that parting technology was available so that variation does not merely reflect the raw material (which he thought roughly constant)
 - ▶ assumes that it could not be detected by the public without difficulty
 - ▶ coins circulated as if they were made of natural alloy (70% gold), diluted content allowed the State to make a profit
 - ▶ precision in weight hid the variability in fineness
 - ▶ the birth of money was a “large-scale swindle”
- ▶ objections:
 - ▶ raw material was variable in content, not constant
 - ▶ parting technology was not available
 - ▶ fraud argument assumes that market value of electrum reflected its content

the State as guarantor

- ▶ Holloway (1978)
 - ▶ natural electrum was in fact highly variable and hard to assay: this made it unsuited as numeraire (like silver in Mesopotamia)
 - ▶ by stamping coins, the issuer provided a fixed value, and allowed itself some profit
 - ▶ but how?
- ▶ Wallace (1987) provides a mechanism for this fixation of value
 - ▶ (1) coins made of electrum, (2) had regularized weights, (3) were stamped
 - ▶ wants a story that explains supply of coinage (profit) and demand for coinage (acceptability)
 - ▶ rejects that parting was available, assumes that assaying was difficult (cf. variability of the coins themselves): (1) is an obstacle to turning electrum into money
 - ▶ coins were weighed in transactions: (2) adds nothing, but implies that coins of same weight were intended to have the same value
 - ▶ only (3) is left: since the stamp could not guarantee content (which was variable), it had to promise redeemability
 - ▶ multiplicity of types does not imply private issuers
 - ▶ Wallace (2001) twist: coinage began at 75%, progressively debased

Critiques/refinements of the R. Wallace theory

- ▶ Le Rider (2001)
 - ▶ rejects that parting was unavailable and assaying difficult
 - ▶ sees Lydia as a closed monetary system, State imposed overvalued coinage for profit
 - ▶ 55% coins circulated as if they were 70%
 - ▶ why did it stop? Switch to gold/silver coinage happened after Persian conquest
 - ▶ now disproved (Cahill and Kroll, 2005)
- ▶ Kroll (2001)
 - ▶ electrum was a failed experiment, quickly replaced by gold/silver coinage
 - ▶ Kroll (2008) broadly accepts the Wallace story, shorn of the “redeemability” aspect

Discussion

- ▶ Recognizability is typically a key characteristic of money (Nosal and Rocheteau 2010)
- ▶ Recognizability was not a key characteristic of the first money
- ▶ Key puzzle:
 - ▶ precise weights vs. random content
 - ▶ randomness was not natural
- ▶ Existing theories have no problem explaining why a state would want to issue overvalued coinage
- ▶ They tend to ignore competition among issuers, coexistence of different designs and standards
- ▶ Did technology play a constraining role? (electrum continued for 200 years in some cities)

Conclusion

- ▶ None (told you so)

Th-th-th-that's all folks!