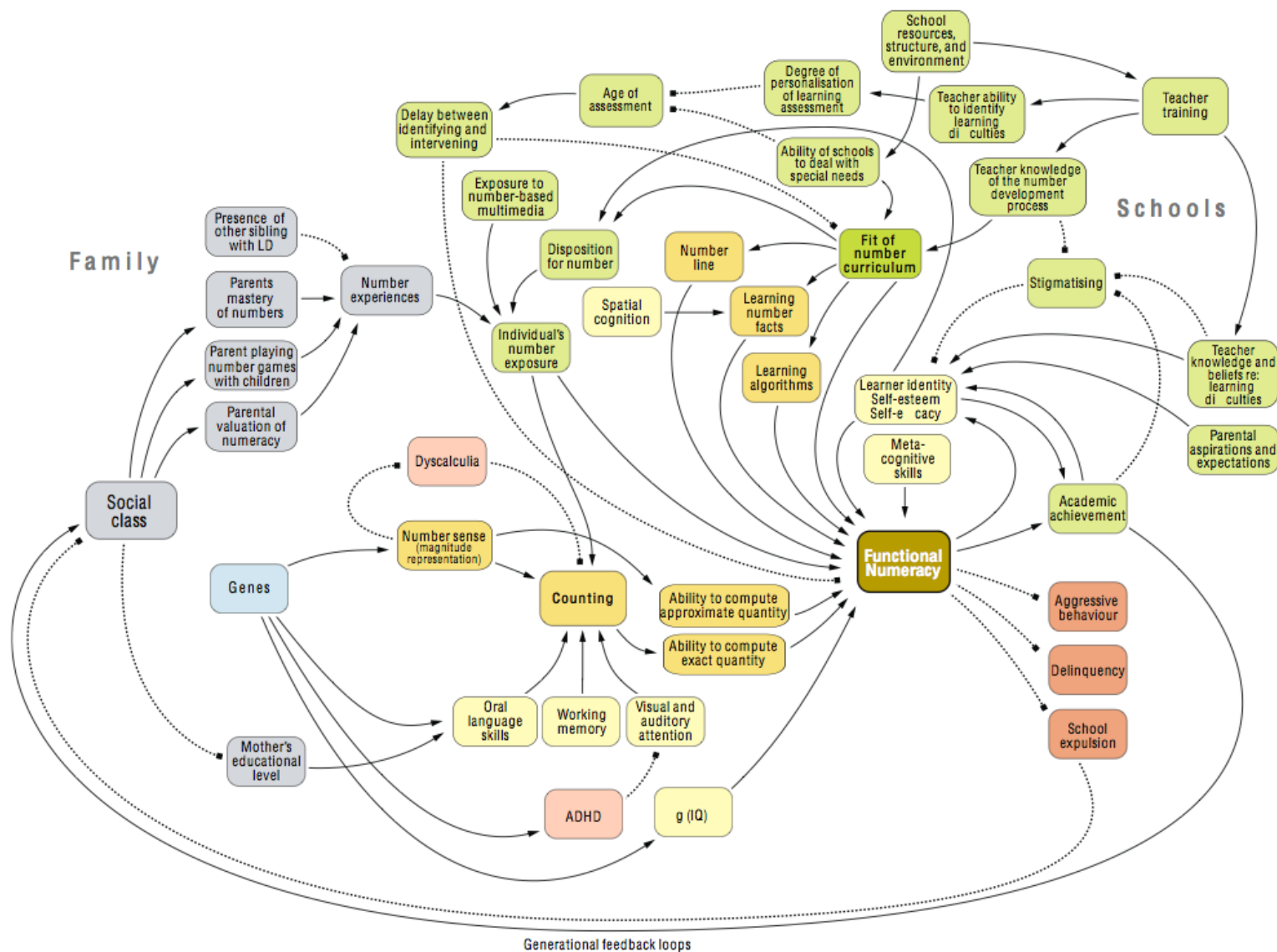


Exploring ancient Greek and Roman numeracy

Serafina Cuomo
Birkbeck College London



Functional numeracy – influence diagram

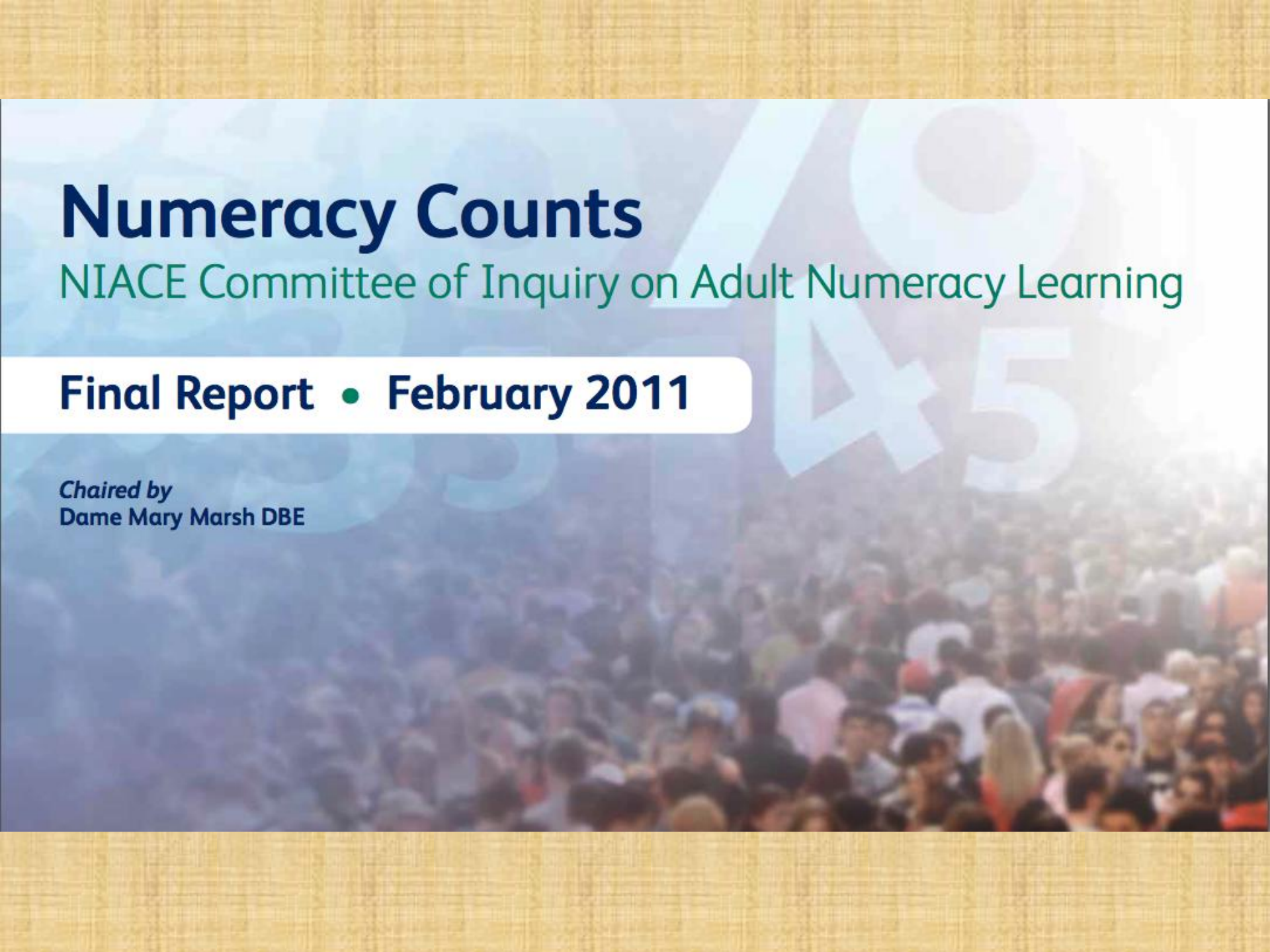


Numeracy Counts

NIACE Committee of Inquiry on Adult Numeracy Learning

Final Report • February 2011

Chaired by
Dame Mary Marsh DBE



What is numeracy?

Greek Anthology XIV 127

Demochares lived for a quarter of his

Παντὸς ὅσου βεβίωκε χρόνου παῖς μὲν τὸ τέταρτον
Δημοχάρης βεβίωκε· νεηνίσκος δὲ τὸ πέμπτον·
τὸ τρίτον εἰς ἄνδρας· πολὺν δ' ὅτ' ἀφίκετο γήρας
ἔζησεν λοιπὰ τρισκαίδεκα γήραος οὐδῶ.





Mathematics in Ancient Iraq

A SOCIAL HISTORY

Eleanor Robson

What sources for numeracy?

Texts

Hero,

Metrica

1.8

There is a general method to find the area of any triangle whatsoever, given the three sides and without the height; for instance let the sides of the triangle be 7, 8, and 9 units. Add 7, 8 and 9; it makes 24. Of these take the half; it makes 12. Subtract the 7 units; the remainder is 5. Again subtract 8 from 12; the remainder is 4. And further <subtract> 9; the remainder is 3. Multiply 12 by 5; they make 60. These by 4; they make 240; these by 3; they make 720; take the root of these and it will be the area of the triangle. ... The geometric proof of that is this: ... And the synthesis is like this: ...

Lysias, *Against Diogeiton* 19-26

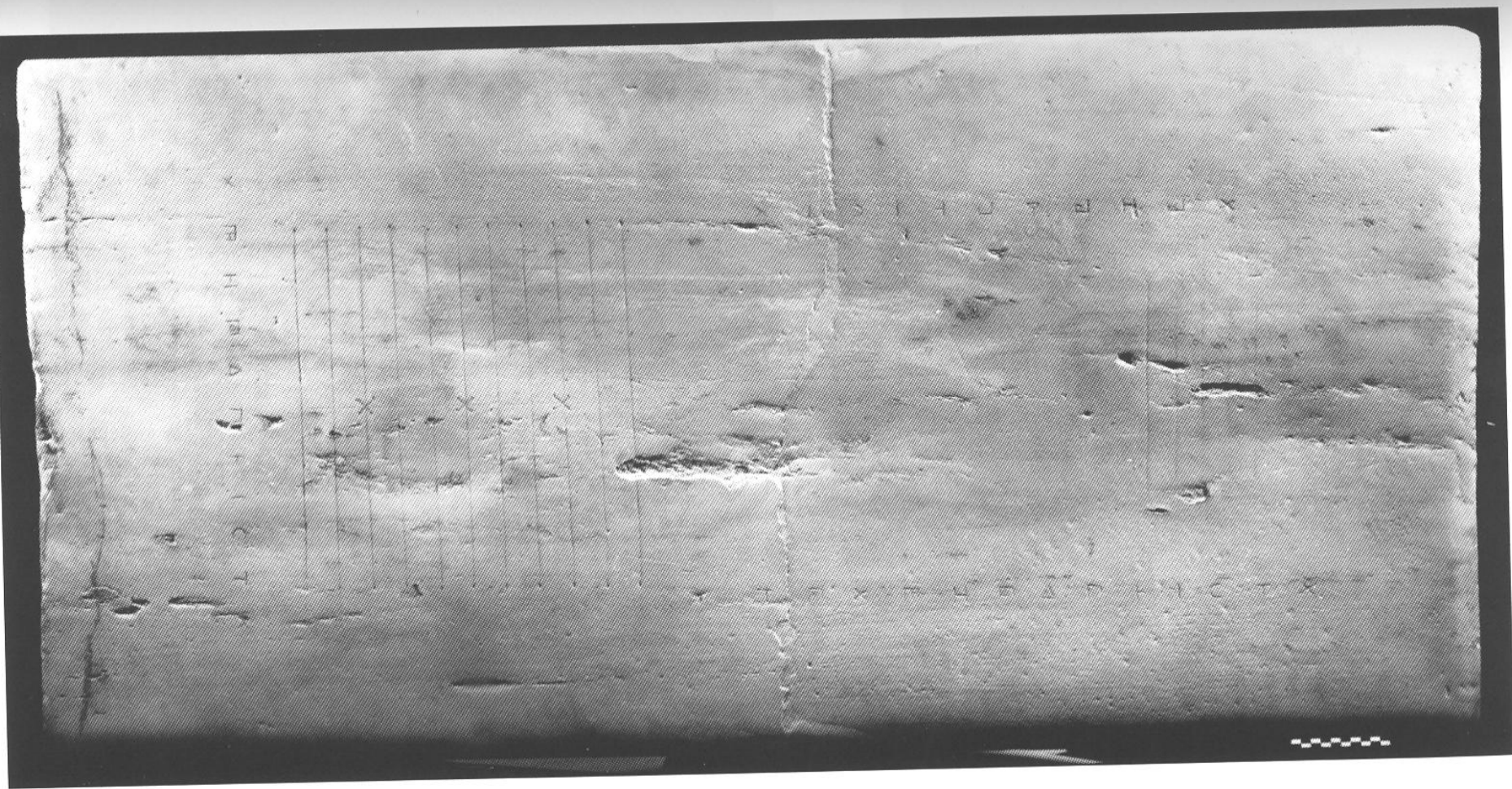
Gentlemen of the jury, I ask that due attention be given to this calculation ... Diogeiton has had the face to ... make out a sum of 7 talents of silver and 7,000 drachmae as receipts and expenses on account of two boys and their sister during 8 years. ... he showed 16 drachmae as the price of a lamb ... he added a multitude of things which he counted in to make up his total, as though he had been named in the will as guardian of the children merely in order that he might show them figures instead of the money.

Seneca, *Letters to Lucilius* 88.10-3

A geometer teaches me how to measure my estate; but I should rather be taught to measure how much is enough for a man to own. He teaches me to do sums and put my fingers to the service of greed, but I should prefer him to teach me that those calculations have no importance ... You can measure curved things, you reduce any given shape to a square, you enunciate the distance of the stars, there is nothing which falls outside your measure: if you are so good at your art, measure a man's soul, say how big or how small it is. You know what a straight line is; what good is that to you if you do not know what a straight life is?

What sources for numeracy?

Archaeology





IMMEDIATE PRESENT : HYDROTHERMAL : ANOMALY
Bottom, back and left edge preserved.

Raised band down left side and across face
near bottom; above, a round hole going through
to the back.

One line: Figure 1; compare I 1097.

Of. I.O. II⁸, 8777-8781 (G.S.)

11,758: p. 201,
4.

A 1921



Section K # 1613
Removed from mar

February 21, 1951

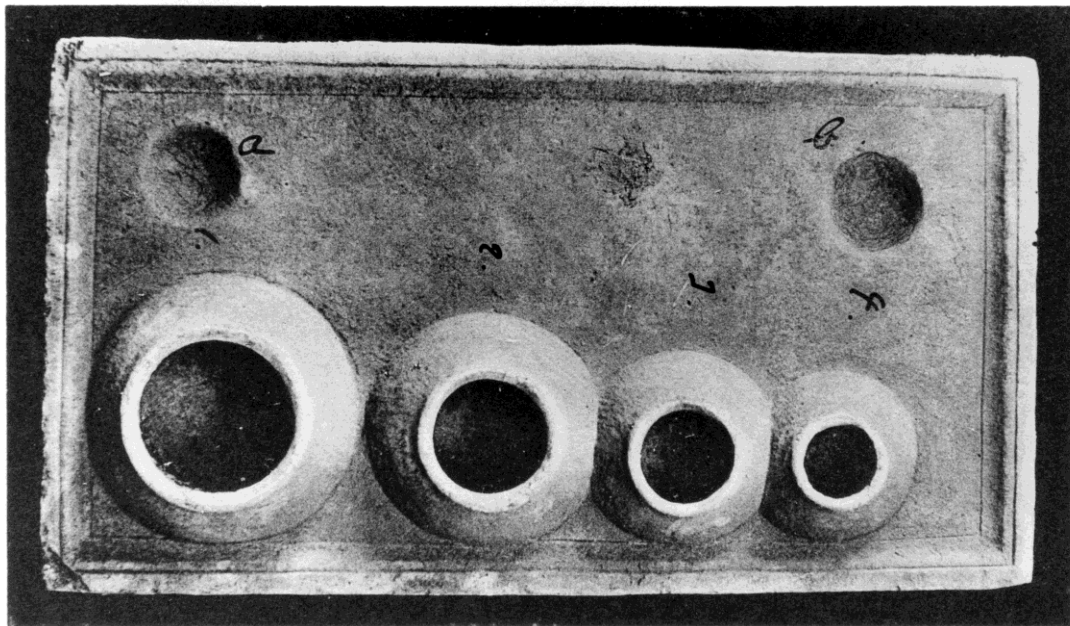
FL 0.22 m.; W 0.1

SEKOMA : FENTELIC

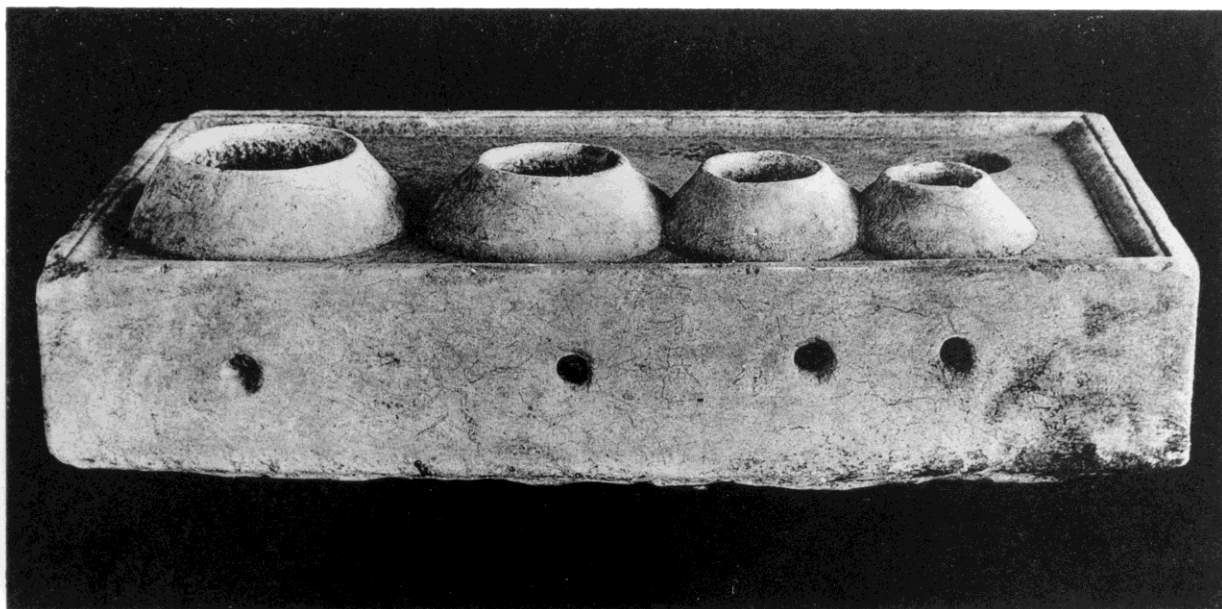
Two edges trimmed,
side rough picked.

A shallow basin, in
by a collar and a r
basin in the shape
round adjunct.





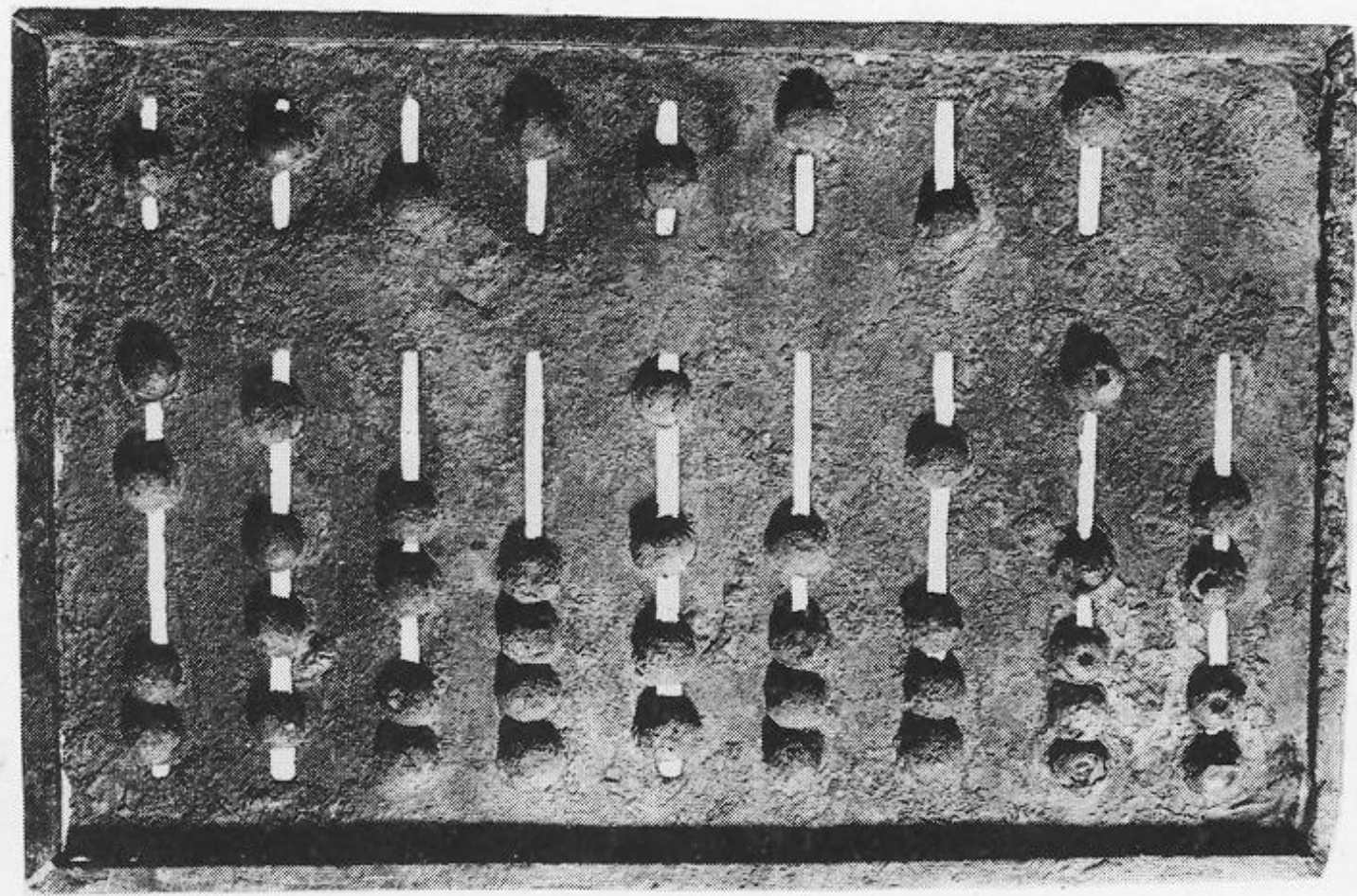
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529



ACIODIVS AFFLACCVS NARCAEVS NEARELLIAN CALEDVS
DAVID MENSVRAS EXAEQVANDAS EX DEC DECRA



D



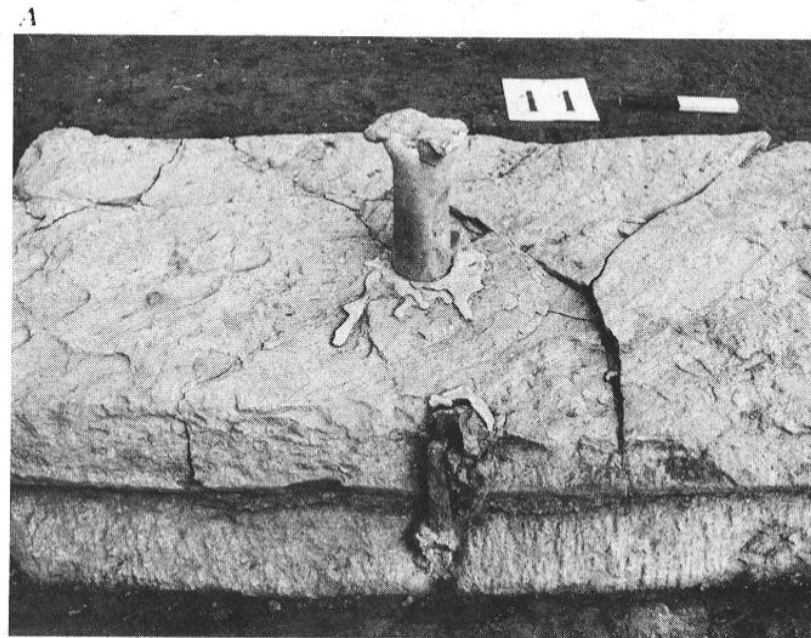
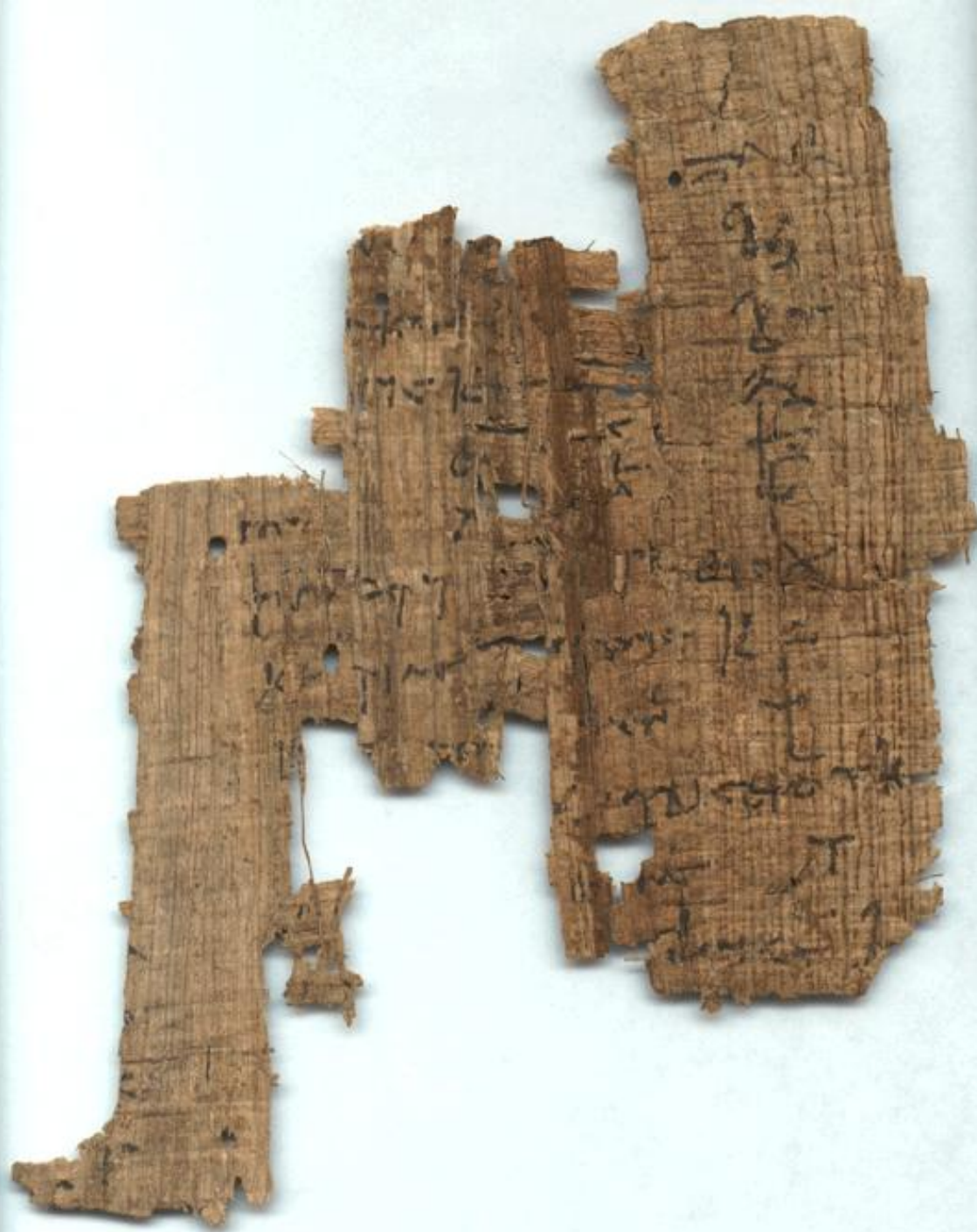


Fig. 24 - Necropoli St-Martin-de-Corléans. Tomba 11
A - Lastra di copertura con tubo per libazioni funerarie
B - Interno della tomba 11

What sources for numeracy?

Papyri (and ostraka and tablets)

[illegible]



[illegible]





В НАЗРАДКЕ
НА НАЗРАДКЕ
НА НАЗРАДКЕ

What sources for numeracy?

Epigraphy

ΜΥΡΙΝΑΙΟΙ

ΠΑΡΑΚΥΜΕΝ ΔΠΗΙΙ

ΔΔΗΗΙΛΡΥΝΕΙΕΞ

ΔΠΗΙΙΙΞΙΝΔΙΟΙ

ΠΗΙΙΙ, ΚΑΡΠΑΘΟ

ΔΡΚΕΞΕΙΑ

ΠΥΛΑΛΕΞ

ΚΑΜΙΡΕΞ

ΙΕΛΥΞΙΟΙ

ΔΔΠ ΚΑΛΥΔΝΙΟΙ

ΛΙΝΔΙΟΙ

ΔΔΔ ΠΕΔΙΕΞ

ΠΗΗ ΕΛΛΙΝΔΟ

ΔΔΗΗΧΑΛΚΕΑΤΑΙ

ΧΑΛΚΕΑΤΑΙ

ΕΠΙΦΟΡΑΣ

ΠΗΗ ΧΕΡΡΟΝΕΞΙΟΙ

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ΜΕΝΔΑΙΟΝ

ΛΑΛΕΦΞΙΟΙ

ΒΕΡΛΑΙΟΙ

ΘΡΑΜΒΑΙΟΙ

ΜΕΝΔΑΙΟΙ

ΗΑΒΔ

ΝΕΟΡΕ

ΠΑΡΑΝΤ

ΑΚΑΝΘΙΟΙ

ΞΤΑΔΙΡΙΤΑ

ΤΟΡΟΝΑΙΟΙ

ΣΚΙΟΝΑΙΟΙ

ΙΚΙΟΙ

ΔΙΝΕΑΤΑΙ

ΠΕΓΑΡΕ

ΣΤΕΡΜΑ

ΣΤΕΡΜΑ

ΣΤΕΡΜΑ



Questions about numeracy

How did they do it?



*Maasai counting with
hand signals*

COMPTER AVEC DES CAILLOUX

ALAIN SCHÄRLIG

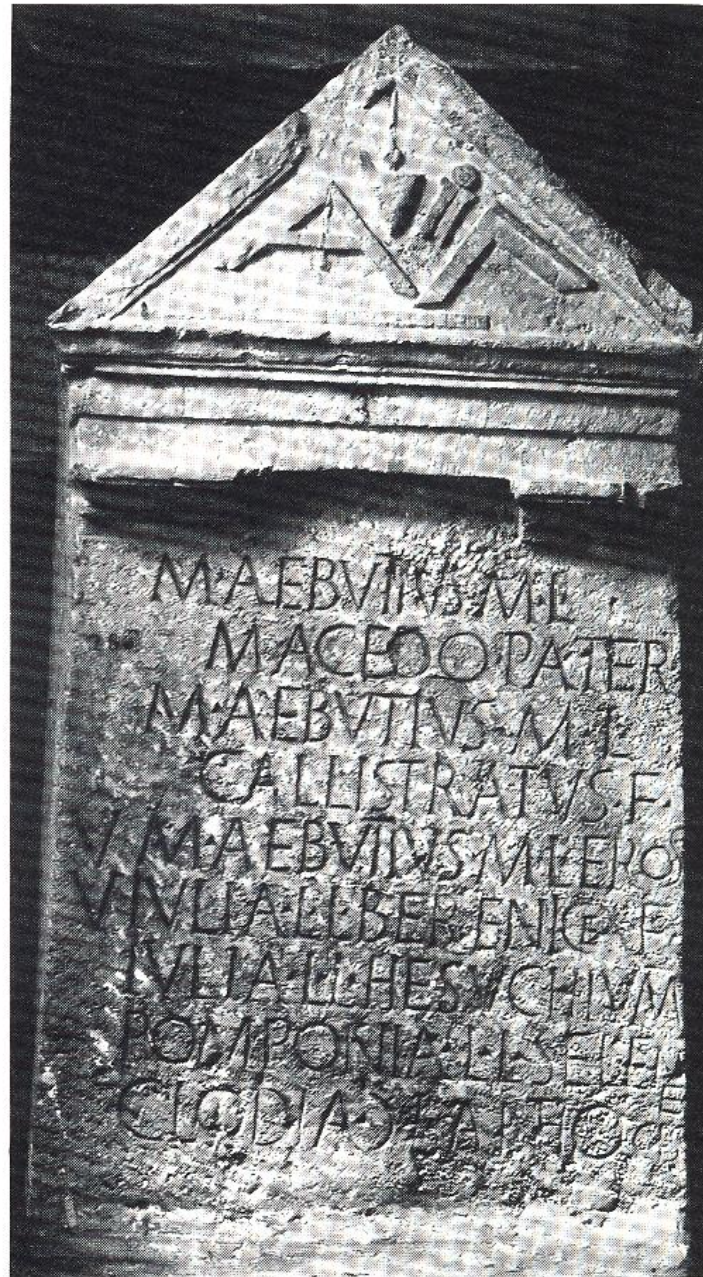


Le calcul élémentaire
sur l'abaque chez les anciens Grecs

PRESSES POLYTECHNIQUES ET UNIVERSITAIRES ROMANDES

Questions about numeracy

Who were they?





IBGLAVDIA
AEBVTIVSLE
AVSTVSMENSE
T VIR & SIBLET
ARRIAEQLAVCTAI
VXORIETSVIS EI

SEPUL
LIBERT
V F

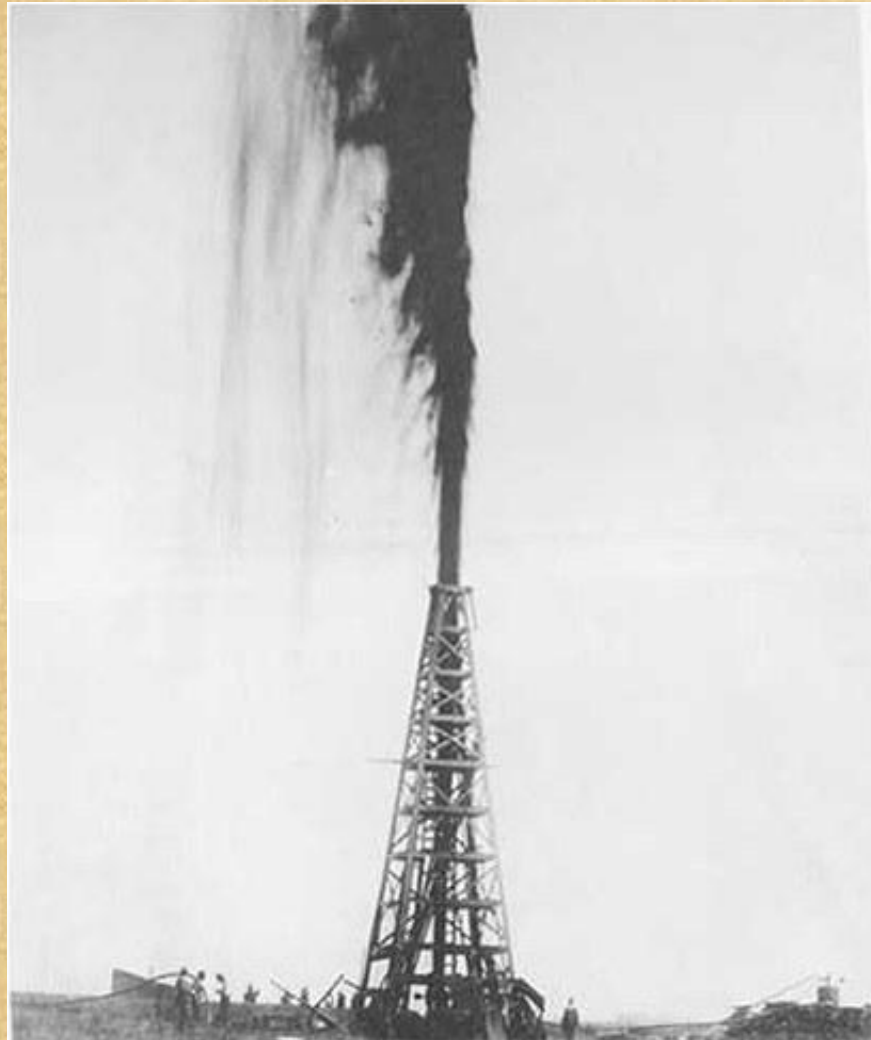
CLAVDIA

Questions about numeracy

What did they do with it?

*“Competent, confident and comfortable with one’s judgements on **whether** to use mathematics in a particular situation, and if so, **what** mathematics to use, **how** to do it, what **degree of accuracy** is appropriate, what the answer **means** in relation to the context, whether/how to communicate the answer appropriately, and what (if any) action to take in the light of the analysis.”*

Case one:
Cicero and the scribae





Cicero, *Pro Roscio Comoedo* 7

Why is it that we write down memoranda carelessly, but we make up account-books carefully? For what reason? Because the one is to last a month, the other for ever; these are immediately expunged, while those are religiously preserved; these embrace the recollection of a short time, those pledge the good faith and honesty of a man for ever.

Cicero, *Against Verres* II 1.57

The statues and works of art that P. Servilius, according to the law of war ... removed from the enemy city, ... he brought back to the Roman people, displayed in triumph, took care to write down in the public accounts of the treasury. Acknowledge from public documents the diligence of this eminent man. Read. RENDERED ACCOUNTS OF P. SERVILIUS. You see that not only the number of statues, but also their size, shape and posture is specified ... I declare that Servilius had noted down and recorded the loot of the Roman people much more diligently than you have your own stolen goods.

Cicero, *Ad familiares* 128

It would be easier for me to reply in detail if my clerk was here. As to him, I am fully assured that so far as the rendering of accounts goes ... he has not intentionally done anything contrary to your financial interest or reputation. ... I put y clerk ... entirely in your hands. ... The accounts were made up in my absence with your cooperation. All I did was read them ... At any rate what the law required was done ... So on this point my first answer is that, although for good reasons I was in a hurry to present my accounts, I should have waited for you.



C. ALLIVS · C · L · NIGER
 II · DECVR · QVAE · STOR · DECVR ·
 II · HELVIAE · L · ASTERIONIS · VXOR · I · QVAE ·
 ANNIS · XXXII · SV · SOVE · OMNIBVS · POS ·
 NIDIAE · SE · L · PRIMAE · VXORI · ET · C · ALLIO · CLIP ·
 PATRONO · ET · ALLIAE · C · L · NYSAE · MATRI · L · ALLI ·
 GAVIDIAE · TL · CHARMO · SYNAE · SOGR · V · MAIR · HELVIAE · A ·
 C · ALLIO · C · L · HERMOGENI · FRATRI ·
 T · S · NIDIO · TL · GALLO · FRATRI · HELVIAE · ASTERIONIS ·
 ONICIAE · L · C · ALLIOPAE · VXORI · GALLI · BEN · MERITAE ·
 L · EPHORO · L ·
 L · CENI · L ·
 ANANTRO · L ·
 TICMENT · L ·
 HERODINI · L ·
 ANATHONI · L ·
 REES · L ·
 ILL · ECOTI · L ·
 HADLI · L ·
 PRIMO · L ·
 L · L · SO · L ·

Case two:
Athenian account inscriptions







ΝΙΔΙΟΙ	ΕΡΑΜΙΟ	ΣΕΛΥΜΒΡΙΑΝ
ΜΑΧΣΙΑΤΑ	ΕΔΑΙΕΑ	ΗΗΗ ΚΥΪΙΚΕΝ
ΠΑΡΑΜΠΙ	ΔΔΗΗ ΜΑΡΑΘΕΣ	ΗΗΗ ΠΡΟΚΟΝΝΕΣ
ΠΡΑΗΗΚ ΚΟΙΟΙ	ΔΔΗΗΗ ΠΑΡΤΑΚΕ	
ΗΑΙΡΑΙΟΙ	ΟΡΑΙΚΙΟΣΦΟ	
ΗΗΗ ΦΟΝΙΟΙ	ΗΗΗ ΔΦΥΤΑΙ	
ΗΗΗ ΝΟΤΙΕΣ	ΔΓΗΗΗ ΣΚΙΔΟΙ	
ΔΓΗΗΗ ΕΡΥΘΑΙΟΙ	Π ΝΕΟΡΟΛΙΤΑ	
ΜΥΡΙΝΑΙΟΙ	ΜΕΝΔΑΙΟΝ	
ΠΑΡΑΚΥΜΕΝ	ΔΓΗΗΗ ΛΑΛΕΦΞΙΟΙ	
ΔΔΗΗΗ ΑΡΥΝΕΙΕΣ	ΠΗΗ ΒΕΡΛΑΙΟΙ	
ΔΓΗΗΗ ΞΙΝΔΙΟΙ	ΔΓΗΗΗ ΟΡΑΜΒΑΙΟ	
ΚΑΡΠΑΘΟ	ΠΗΗΗ ΜΕΝΔ	
ΑΡΚΕΞΕΙΑ	Χ ΗΑΒΔ	
ΠΥΛΑΛΕΣ	ΔΓΗΗΗ ΝΕΟΡΟ	
ΚΑΜΙΡΕΣ	ΠΑΡΑΝΤ	
ΙΕΛΥΞΙΟΙ	ΗΗΗ ΑΚΑΝΟΙΟ	
ΚΑΛΥΔΝΙΟΙ	ΔΓΗΗΗ ΣΤΑΛΙΡΙΤΑ	
ΛΙΝΔΙΟΙ	ΠΗΗ ΤΟΡΟΝΑΙΟΙ	
ΠΕΔΙΕΣ	ΗΗΗΗ ΣΚΙΟΝΑΙΟΙ	
ΕΛΛΙΝΔΟ	ΔΔΠ ΙΚΙΟΙ	
ΧΑΛΚΕΑΤΑΙ	ΗΗΗ ΑΙΝΕΑΤΑΙ	
ΧΑΛΚΕΑΤΑΙ	ΔΔΔΗΗΗ ΟΛΟΦΥΧΣ	
ΕΠΙΦΟΡΑΣ	ΗΗΗ ΠΕΠΑΡΕ	
ΧΕΡΡΟΝΕΣΙΟΙ	ΠΗΗΗ ΣΕΡΜ	
ΚΑΙΟΙ	ΠΗΗΗ ΟΑΣΙ	
ΜΙΛ	ΠΗΗΗ ΔΙΛΑ	
ΕΦΕ	ΠΗΗΗ ΔΙΚΑ	
ΜΥΕ	ΠΗΗΗ ΠΑΡΑΝ	
ΟΙ	ΔΓΗΗΗ ΑΙΣΟΝΙΟΙ	

Ⲭⲓⲣ

Δαρεικοῦ [χρυ]-
σίο στατ[εῖρες]

Ⲓ

Φοκαίδε[ς ἕκτ]-
α[ι] χρυσί[ο]

ΔΔΔΠΠΠ

φ[σεῖ]μα χρυσίο
σ[ταθ]μόν

Ⲭ. ΔΔΔ

— — — — —

[.]ΣΣ

σ.τ. [ατεῖρες]

ⲬⲬⲬ

Αἰ[γινάιοι]

ΔΔΔΔ

στα[τεῖρες]

ΗΗΗΗ

Χῖα[ι δραχμαῖ]

ΔΔΔΓΠΠ

ἀργυρ. [αἰ]

ΔΔ

Κορίνθιο[ι]

ⲣΣ

στατεῖρες

ΗΗΗ

Ἀκάνθιον

[Δ]ΔΔΓ

ἀργύριον

[Δ]ΔΠ

Σάμα ἐμίεκτα

— — — —

Ταρα{ρα}ντί-

[ν]ο — {² ⁶Ταραντίνο — }² ⁶ — —

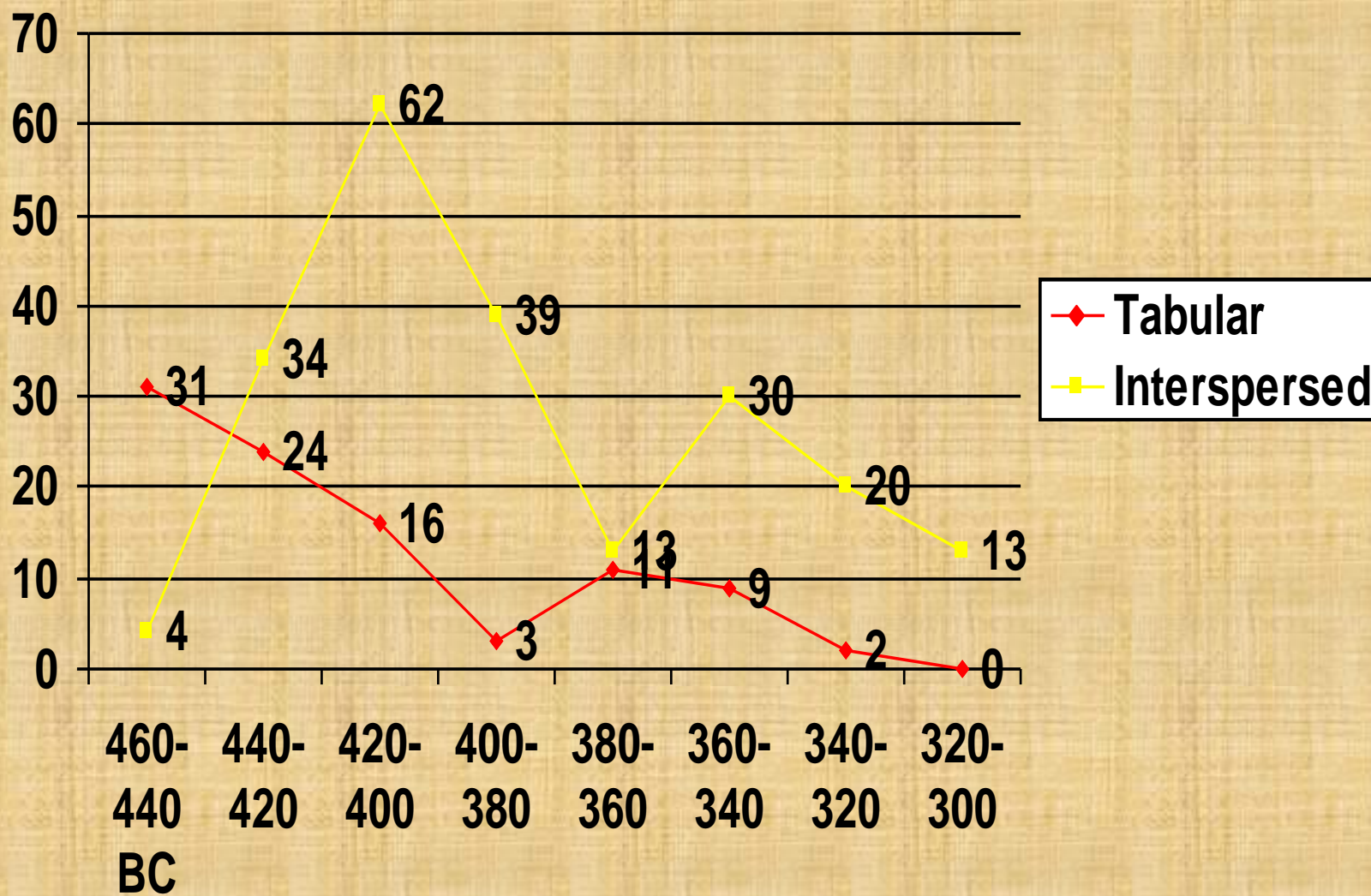
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lacuna

ΕΓΓΡΑΜΜΗΝ ΕΙΣ ΤΟ ΛΕΥ-
ΚΟ ΑΡΧΟΝΤΟΣ ΚΕΦΑΛΑ-
ΙΟΝ ΠΑΝΤΟΣ ΤΟΙΣ
ΡΟΔΡΓΥΡΙΟΙΣ ΜΧΗ-
Η Η Ν Δ Δ Δ Π Γ Η Η Η
ΕΓΓΡΑΜΜΗΝ ΕΙΣ ΤΟ ΛΕΥ-
ΚΟ ΑΡΧΟΝΤΟΣ ΚΕΦΑΛΑΙΟΝ ΤΟΙΣ
ΡΟΔΡΓΥΡΙΟΙΣ ΤΟ ΓΑ-
Ρ ΤΟΙΣ ΤΛΕΔΙΑΚΟΙΣ

[τάδε παρέδωσαν ἡαι τέτταρες ἀρχαί, ἡαὶ ἐδίδωσαν τὸν λόγον ἐκ Παναθηναίων]
[ἐς Παναθήναια, τοῖς ταμίαις τεῖς θεοῖ Πυθ[οδόροι ἡαλαιεὶ καὶ χουνάρχοσι, ἡοῖ]-
[ς Φορμίων Ἀριστίωνος Κ]υδαθηναίεὺς ἐγραμμάτευσεν. [ἡοὶ δὲ ταμίαι, ἡοῖς Φορμί]-
[ον Ἀριστίωνος Κυδαθεν]αίεὺς ἐγραμμάτευσεν, παρέδωσαν τ[οῖς ταμίαις Ἀναχσ%⁸⁰]-
[ικράτει Λαμπρεὶ καὶ χ]ουνάρχοσι, ἡοῖς Εὐχσενος Εὐφάνος [Προσπάλτιος ἐγρ]-
[αμμάτευσεν, ἐν τοῖ πρόνε]οι· φιάλε χρυσεῖ, ἐχς ἐῖς ἀπορ. αἰνοντα[ι, ἄσταθος· φιάλα]-
[ι ἀργυραὶ ΗΔΔΙ, σταθμὸν] τούτον ΤΤΗΗΗΗΔΔΔΓΓΓ· κέρατα ἀργυρᾶ [ΙΙΙ, σταθμὸν τούτο]-
[ν ΠΔΔΓΓΓΓΓ· ποτέρια ἀργ]υρᾶ Γ, σταθμὸν τούτον ΗΠΔΓΓΓΓ· λύχνος ἀργυρ[ροῖς, σταθμὸν τ]-
[ούτο ΔΔΔΓΓΓΓΓ· φιάλαι ἀργ]υραὶ ΓΓΓ, σταθμὸν τούτον ΠΗΗ· στέφανος χρ[υσοῖς, σταθμὸν]
[τούτο ΔΔΔΓΓΓΓΓ· φιάλα ἀ]ργυρᾶ ΙΙ, σταθμὸν τούτοις ΗΗ· φιάλαι ἀργυρ[αῖ ΙΙΙ, σταθμὸ]-
[ν τούτον ΗΗΗΔΔΔΓΓΓΓΓΓ· ποτέριον ἀργυρ%⁸⁰ οῖν, σταθμὸς τούτο ΔΔΔΔ· φιάλ]αι ἀργυρα]-
[ῖ ΙΙΙ, σταθμὸν τούτον Π]ΗΗΗΗΔΔ· φιάλαι ἀργυραὶ ΙΙΙ, σταθμὸν τούτον [ΗΗΗΗΔΔ· ποτέ]-
[ριον ἀργυροῖν, σταθμὸν] τούτο ΔΔΔΔ· φιάλαι ἀργυραὶ ΓΓΓ, σταθμὸν το[ύτον ΠΗΔΔΔΔ]
[ΓΓΓΓ· φιάλαι ἀργυραὶ ΙΙΙ], σταθμὸν τούτον ΗΗΠΠ· ποτέριον ἀργυροῖν, [σταθμὸν τούτ]-
[ο ΠΔΓΓ· λύχνος ἀργυροῖς], σταθμὸν τούτο ΔΔΓΓ· φιάλαι ἀργυραὶ Ι.Ι.Ι., σταθ[μὸν τούτον]
[ΗΗΠΔΔΔΔΔΓΓΓΓ· φιάλαι ἀ]ργυραὶ Γ, σταθμὸν τούτον ΗΗΗΗΔΔΓΓΓ· ἀ[ργ]υρ[ις Ι, σταθμὸν]
[ταύτες ΗΔΓΓ· ποτέριον] ἀργυροῖν, σταθμὸν τούτο ΔΔΔΔΓΓΓΓ· ἀργυρ[ις Ι, σταθμὸν ταύ]-
[τες ΠΔ· ποτέριον ἀργυρ]οῖν, σταθμὸν τούτο ΔΔΔΔΓΓΓΓΓ· ἐπέτεια [ἐπεγένετο ν ἀργυρ]-
[ις Ι, σταθμὸν ταύτες] ΗΠΠΠ· ποτέριον ἀργυροῖν, σταθμὸν τούτ[ο Δ]Δ[Δ ννν ννν ννν ν]

vacat







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ⲛⲓ ⲁⲁ

ⲭⲣⲩⲥⲓ
Ⲉⲧⲟⲛⲛⲛ
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ⲟⲈⲕⲈⲛ

ⲁⲛⲁⲗⲟ

ⲛⲓ
ⲁⲗⲟ

Thank you!

Serafina Cuomo
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