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"Qui imperitus est vestrum, primus calculum omittat". *Aristotelis Sophistici Elenchi* 1 in the Boethian Tradition*

1. Prolegomena

Aristotelian texts dealing with language are not hard to come by. In fact, they are quite common, liberally interspersed throughout the Aristotelian corpus. They occur not only in works on dialectic, rhetoric and poetry, but in a variety of other writings as well, ranging from the books on the soul to the treatises on natural history, politics and first philosophy. That being said, for all that they bear witness to Aristotle's keen interest in language and language-related issues, within and across different disciplines, these texts are for the most part digressive in nature and auxiliary in purpose. That is, however straightforward and to the point Aristotle's remarks about linguistic matters actually are, they leave the distinct impression that he never broaches, let alone studies, the topic of language for its own sake[1]. Needless to say, however, a few texts come close enough. The prologue of the *Sophistici Elenchi* ([Ur-Text^{A}] below) is an excellent case in point, on at least two counts.

First, [Ur-Text^{A}] showcases the soundness and relevance of a 'reverse approach' insofar as the upsides and downsides of language turn out to be the opposite sides of the same coin. Indeed, linguistic pitfalls and snares provide pristine evidence for the principles and standards they are judged by to begin with – the 'reverse' part being there precisely to remind us that misuse and abuse of language reveal good linguistic habits and practices to the same extent that they themselves are revealed by the rules and norms they violate. It then stands to reason to assume that the better we get to know how words can be misleading or

* For, as the saying goes, the author of the essay catches up fast but one has to explain it to him a long time, he is most grateful to Sten Ebbesen for indulging his obsession with pebbles and for showing his pupil the error of some of his ways on three different occasions, without losing patience or hinting that enough is enough.

1. This peculiar, if unsurprising, feature of Aristotle's treatment of language is expounded upon in some detail in Gazziero 2021a (with relevant literature on p. 1).

«Ad Argumenta», 4 (2024), 75-118 • 10.1484/m.adarg-eb.5.137517

downright deceptive, the more likely we are to learn important lessons about at least some of the laws we want our reasoning and discussion to abide by. And this is precisely what [Ur-Text^{A}] is all about: if language is factored in at all, it is to the extent that dishonest contenders and unsportsmanlike fellow-dialecticians exploit some of its features to lure the unwary and the untrained into believing that whatever goes for words and word-compounds (sentences and the like) also goes for the things and facts they stand for – which, of course, is tantamount to asking for trouble and leads to all kinds of errors, confusions and mystifications. Conversely, if we manage to get the hang of how unsavoury characters equivocate their way through conversations, we might just get better at catching them in the act – and, if we feel so inclined, at giving them a taste of their own bad medicine.

Second, [Ur-Text^{A}] allows us to appreciate the exegetical proficiency and technical expertise typically displayed by mediaeval commentators whose views are still largely ignored and whose solutions to perplexities – which often coincide with our own – are usually overlooked[2]. In this particular instance, the level of sophistication the Latins achieved is nothing short of remarkable, for they managed to build compelling cases both in favour of and against the reading of [Ur-Text^{A}] that was to become – and still is – the standard story.

2. *Expositores latini nostri*[3]

As a general rule, Latin commentators on Aristotle's *Sophistici Elenchi* never grew tired of asking the same questions all over again; moreover, they seemed to par-

2. The point is altogether germane to Sten Ebbesen's suggestion that mediaeval commentaries not only bring to our attention issues we chose to ignore or whose complexity we have underestimated, but also help us push our analysis of problematic texts further than we could possibly go by simply "sticking to contemporary or near-contemporary" literature (Ebbesen 2017, p. 187).

3. The Western mediaeval reception of Aristotle's tract on fallacies is well-charted territory – courtesy of Lorenzo Minio-Paluello (Minio-Paluello 1952; 1954; 1955), Lambertus Maria de Rijk (de Rijk 1962-1967) and, most notably, Sten Ebbesen who in his monumental opus on commentators and commentaries on Aristotle's *Sophistici Elenchi* (Ebbesen 1981), as well as in a wealth of authoritative contributions (just to name a few: Ebbesen 1979, 1982, 1987a, 1993, 1996 and forthcoming, which I was most kindly allowed to peruse over the years), has almost single-handedly retraced its evolution as early as the corpus of the first Byzantine glosses and as late as the more recent Greek and Latin interpreters. Therefore, for the time being, the briefest bibliographical summary will do. Besides, no matter the amount of scholarly scrutiny one throws at the matter, some seem simply unable to get the facts right, while others are stuck in another century. Just to mention a couple of recent gems, Uckelman 2021, p. 34 seems to believe that Boethius did not translate the *Sophistici Elenchi* and adds insult to injury by suggesting that she has it on the good authority of none other than Bernard G. Dod (who, of all people, she should have left alone, since he did provided us with the standard critical edition of Boethius' translation): "the *Sophistical Refutations* were not translated by Boethius but were newly translated in the middle of the twelfth century by James of Venice (Dod 1982)". In like manner, Ramirez Vidal 2021 has debunked the standard story of fallacies in the Latin West – most notably Boethius' part in it – while relying on Migne's 'editions' of Boethius' translations, where the word *fallacia* does not appear as prominently as in the *Aristoteles Latinus* edi-

ticularly enjoy picking each other's arguments apart. As a result, they not only routinely covered – both as individuals and as a group – a lot more ground than we are used to nowadays, but they also came up, more often than not, with the right answer (usually, by working through all possible solutions). Every now and then, however, they just weren't aware of all the possibilities. When this occurred, it mostly came down to either some oddity in the Latin translation of the original Greek or some peculiar association in processing earlier scholarship. As it happens, a missing piece of information in the Latin text ([Ur-Text^{B}]) and a sound, albeit misguided, connection in the logical literature available to Latin commentators ([T7] below), made it very hard for them to read anything but the contrary of an analogy – in fact, a disanalogy – into Aristotle's well-known comparison between the way we handle (mark my words), on the one hand, pebbles or counters in our calculations and the way we misuse, on the other hand, words in our verbal dealings ([Ur-Text^{A}]).

3. *Quandoque fidus dormitat Boethius*

To begin with, although Boethius has always come highly recommended as an Aristotelian interpreter[4], his translations sometimes turned out to be a bit tricky,

tions, whose very existence Ramirez Vidal either ignored or chose to disregard. Since Boethius and the Western tradition are to provide the bulk of evidence upon which our demonstration will rely upon, Latin-oriented scholarship will here receive the lion's share, all the more so on account of the derivative nature of some at least of the post-Ebbesen 1981 and pre-Vogiatzi 2019 (especially pp. 80-142) secondary literature on Byzantine fallacies. (If there's a special circle in hell for plagiarized and self-plagiarizing abominations, they're certainly saving a nice spot for Rita Salis' Michael of Ephesus redux: that is, Ebbesen 1981, I, p. 258 and p. 269 – cf. Salis 2007, pp. 378-385; 2008, pp. 16-19; 2009, pp. 430-431. How many times wilt thou lift thy neighbour's ideas before it's one too many? I lost count at three). Since 1975, we can rely on a dependable critical edition of Boethius' Latin translation (along with James of Venice's fragments and William of Moerbeke's revision) in the *Aristoteles Latinus* series, which also provides a comprehensive (in fact virtually complete) catalogue of surviving manuscripts (around 270), including reliable information on those which were most heavily glossed (whose number lies in the vicinity of 150). We have a score of editions of Latin commentaries as well – between one third and one half of the medieval Latin production, though with notable exceptions. Honourable mentions, hopefully soon to be awarded an edition of their own, include: Robert Grosseteste (*quod fertur*), Robert Kilwardby, Nicholas of Paris, Robert of Hautecombe and Giles of Rome. When no edition is available (cf. note 24 below for an updated list), at least we know where to look for the manuscripts – courtesy again of Sten Ebbesen, who accounted for all relevant unedited sources in his SE catalogue (Ebbesen 1993), which is also an invaluable study in typology, in so far as it classifies Latin texts in four main families or groups (scholia, literary commentaries, question commentaries and deviant materials).

4. Contemporaries and posterity alike had only praise for Boethius as a connoisseur of all things Greek. One can doubt Cassiodorus' good faith (if not actual expertise) and take with a grain of salt his celebration of Boethius as the equal to the great philosophers of old, namely Plato and Aristotle, whom he taught to speak better Latin than they spoke Greek (Cassiodorus Flavius Magnus Aurelius, *Variarum Librorum libri XII*, I, 45, 3-5). That being said, there must have been some truth in Cassiodorus' self-serving homage to Boethius, lest it have the opposite effect on the latter

all the more so when they neither advertised themselves as something else besides translations (word for word translations at that) nor looked suspicious in any way. Predictably enough, it is not the obvious rewriting nor the ambiguous wording and phrasing that got Latin commentators into trouble[5]. Rather, it is the casual

(who was being asked a favour or two on behalf of king Theodoric the Great, as one might recall). One may have qualms about Roger Bacon too, who might have praised Boethius only to come down harder on the translators of his time (especially his Flemish arch-foe, William of Moerbeke). Yet, Bacon's tone is so uncharacteristically subdued in his constant commendation of Boethius' remarkable knowledge of Greek (cf. Rogerus Bacon, *Opus Maius*, III, 67; Rogerus Bacon, *Opus Tertium*, XXV, 91; Rogerus Bacon, *Compendium Studii Philosophiae*, VIII, 472), that one is tempted to take Bacon's word for it and be happy he spared us another round of verbal abuse. Gazziero 2017 surveys recent – and not so recent – literature on Boethius as both a translator and a commentator of Aristotle (Ebbesen 1987b, 1990, 2008 and 2011 being the most essential reading).

5. Following a rule he had most emphatically set himself (cf. Boethius, *In Isagogen Porphyrii Commentum*, I, ed. Brandt, p. 135, ll. 2-13), Boethius usually delivered accurate word-by-word translations. Every so often, he even stuck to the original turn of phrase too close for his own good (as well as that of his Latin readers') – as Lorenzo Valla repeatedly blamed him for: "ita Graecos adscivisti ut a Latinis descisceres, et mores linguae alienae quam nostratis apud nos valere malles? [have you consorted with the Greeks to the point of rejecting the Latins and having their ways prevail among us over our own?]" (Laurentius Vallensis, *Disputationes Dialecticae*, II, 16, 116). However, this did not prevent Boethius from getting, now and then, a bit creative. For instance, to illustrate the fallacy of accent he replaced Aristotle's Homeric examples, which would not work in translation, with verses by Horace and Vergil (cf. Arist., *Sophistici Elenchi*, 4, p. 10, ll. 9-10), a fact Latin commentators had no problem figuring out (cf. *Anonymi Summa Sophisticorum Elenchorum*, ed. de Rijk, p. 326, ll. 1-8; *Anonymi Parisiensis Compendium Sophisticorum Elenchorum*, ed. Ebbesen / Iwakuma, p. 84, ll. 23-28 (Paris) - ed. Ebbesen, p. 284, ll. 20-26 (Uppsala); *Anonymi Aurelianensis I Commentarium in Sophisticos Elenchos*, ed. Ebbesen, p. 123, ll. 26-33; *Anonymi SF Quaestiones super Sophisticos Elenchos*, q. 73, ed. Ebbesen, p. 168, ll. 20-21; Aegidius Romanus, *Expositio super Libros Elenchorum*, ed. Venetiis, f. 14rb 5-7). Truth be told, they got a little carried away themselves and devised in the process a few unconventional ideas of their own: *e.g.*, along with the right explanation (*i.e.*, Greek and Latin being two different languages, the same example cannot be expected to work in both languages; thus, the Latin translator shrewdly turned for inspiration to Latin Poets rather than Greek ones), *Anonymi Cantabrigiensis Commentarium in Aristotelis Sophisticos Elenchos*, ed. Ebbesen, p. 146, ll. 16-24 suggested that it would not come as a surprise if it turned out that the examples are the same because "Latini nostri" borrowed them from their Greek predecessors; and, as a result, the same verse has simply been picked up twice. Likewise, every once in a while, Boethius' translations were open to more than one interpretation – a fact Latin commentators were also well aware of and largely took into account as demonstrated by the way they coped with the equivocal "note" in the text we're going to deal with in a moment. "ἐπεὶ γὰρ οὐκ ἔστιν αὐτὰ τὰ πράγματα διαλέγεσθαι φέροντας, ἀλλὰ τοῖς ὀνόμασιν ἀντὶ τῶν πραγμάτων χρώμεθα συμβόλοις, κτλ." (165a 6-8) reads in Boethius' translation "nam quoniam non est ipsas res ferentes disputare, sed nominibus pro rebus utimur notis, etc." (p. 6, ll. 3-5). Amongst others, *Anonymus Aurelianensis* (ed. Ebbesen, pp. 26-27) and *Anonymus Monacensis* (ms. München, Bayerische Staatsbibliothek, Clm. 14246, f. 4ra; ms. Admont, Stiftsbibliothek, 241, f. 6vb) did not fail to notice that it is not immediately clear whether *notis* should be understood as an adjective (qualifying alternatively *nominibus* or *rebus*) or whether it should be construed as a complement of the verb *utor* (*utimur* <*ut*> *notis*, that is <*ὡς*> *συμβόλοις*). The former set out the alternative quite nicely; moreover, he supported both alternatives by quoting Aristotelian parallels. On the one hand, we have "utimur [p. 27] pro rebus nominibus notis, id est cognitis [we use names instead of things, that is names we know]" (pp. 26-27), for "vitium enim, ut dicit Aristoteles, est uti in problemate ignotis nominibus [as Aristotle states <cf. *Topica*, II, 1, 109a27-33>, the fault lies in discussing the matter at hand with words which are unknown to us]". On the other hand, we have "vel notis ipsarum rerum, ut non dicatur 'notus -ta -tum', sed 'nota -tae' [or <we use them as> symbols for

omission or the smooth, inconspicuous shift from one simple, unassuming word to another that led them astray:

> [Ur-Text^{A}] Arist., *De Sophisticis Elenchis*, 1, 164b25-165a6-17: "τὸν αὐτὸν δὲ τρόπον καὶ συλλογισμὸς καὶ ἔλεγχος ὁ μὲν [26] ἔστιν, ὁ δ' οὐκ ἔστι μέν, φαίνεται δὲ διὰ τὴν ἀπειρίαν· οἱ [27] γὰρ ἄπειροι ὥσπερ ἂν ἀπέχοντες πόρρωθεν θεωροῦσιν. ὁ μὲν [165a] γὰρ συλλογισμὸς ἐκ τινῶν ἐστι τεθέντων ὥστε λέγειν ἕτερον [2] ἐξ ἀνάγκης τι τῶν κειμένων διὰ τῶν κειμένων, ἔλεγχος δὲ [3] συλλογισμὸς μετ' ἀντιφάσεως τοῦ συμπεράσματος. οἱ δὲ [4] τοῦτο ποιοῦσι μὲν οὔ, δοκοῦσι δὲ διὰ πολλὰς αἰτίας· ὧν εἷς [5] τόπος εὐφυέστατός ἐστι καὶ δημοσιώτατος, ὁ διὰ τῶν ὀνομάτων. [6] ἐπεὶ γὰρ οὐκ ἔστιν αὐτὰ τὰ πράγματα διαλέγεσθαι [7] φέροντας, ἀλλὰ τοῖς ὀνόμασιν ἀντὶ τῶν πραγμάτων [8] χρώμεθα συμβόλοις, τὸ συμβαῖνον ἐπὶ τῶν ὀνομάτων καὶ ἐπὶ τῶν [9] πραγμάτων ἡγούμεθα συμβαίνειν, καθάπερ **ἐπὶ τῶν ψήφων** [10] τοῖς λογιζομένοις. τὸ δ' οὐκ ἔστιν ὅμοιον· τὰ μὲν γὰρ [11] ὀνόματα πεπέρανται καὶ τὸ τῶν λόγων πλῆθος, τὰ δὲ [12] πράγματα τὸν **ἀριθμὸν** ἄπειρά ἐστιν. ἀναγκαῖον οὖν πλείω [13] τὸν αὐτὸν λόγον καὶ τοὔνομα τὸ ἓν σημαίνειν. ὥσπερ οὖν [14] κἀκεῖ οἱ μὴ δεινοὶ **τὰς ψήφους φέρειν** ὑπὸ τῶν ἐπιστημόνων [15] παρακρούονται, τὸν αὐτὸν τρόπον καὶ ἐπὶ τῶν λόγων οἱ τῶν [16] ὀνομάτων τῆς δυνάμεως ἄπειροι παραλογίζονται καὶ αὐτοὶ [17] διαλεγόμενοι καὶ ἄλλων ἀκούοντες [Hasper 2013, pp. 13-14: in the same way, one argument constitutes a real deduction or a real refutation, while another does not, even though it appears to due to our lack of experience. For those without experience are like people remaining at a distance and judging from far away. For a deduction is an argument based on certain granted points, such that it states, by way of necessity, something different from the points laid down, while a refutation is a deduction together with the contradictory of its conclusion. But some arguments do not achieve this, even though they seem to on various grounds – of which one type of argumentation is very fertile and popular, the one based on words. For since it is impossible to have a discussion while adducing the things themselves, and we use words as symbols instead of the things, we assume that what follows for words, also follows for the things (just as with stones for those who do calculations). It is not the same, however, since the words are limited, just like the number of sentences, whereas the things themselves are unlimited in number. It is then inevitable that the same sentence or a single word signify several things. Just as in calculation, those who are not versed in moving stones around are tricked by the experts, so too those without experience of the possibilities of words are deceived by means of fallacies, both when themselves participating in a discussion and when listening to others]".

the things themselves, as in 'nota -tae' (symbol), as opposed to 'notus -ta -tum' (known)]", for this is what *nota* means in a well-known Aristotelian text, that is "iuxta illud 'ea quae sunt in voce sunt notae eorum quae sunt in anima' [according to what Aristotle says in *Peri Hermeneias*, 1, 16a3-4: 'what we put into words is a symbol of what we have in our mind']" (*Anonymus Aurelianensis*, ed. Ebbesen, p. 27). *Anonymus monacensis* settled the question as permanently as the nature of the subject permits: "patet ad hoc solutio, quia notis idem est quod signis et sic eo utitur auctor, alio modo notis idem est quod cognitis et sic non utitur auctor eo [thus, the solution to our problem is clear, namely 'notis' is the same here as symbols and this is what Aristotle means by it; in another sense, 'notis' would mean known, but this is not the meaning it has here]" (*Anonymus Monacensis*, f. 4ra [Munich], f. 6vb [Admont]).

[Ur-Text^{B}] Arist., *De Sophisticis Elenchis Translatio Boethii*, ed. Dod, pp. 5-6, ll. 14-13: "eodem autem modo et syllogismus et elenchus [15] hic quidem est, ille vero non est quidem, videtur autem propter [16] imperitiam; nam imperiti velut distantes longe speculantur. [17] Nam syllogismus quidem ex quibusdam positis est ut dicatur [18] diversum quid ex necessitate ab his quae posita sunt, elenchus [6.1] autem syllogismus cum contradictione conclusionis. Illi vero hoc [2] quidem non faciunt, videntur autem ob multas causas, quorum [3] unus locus aptissimus est et publicissimus per nomina. Nam [4] quoniam non est ipsas res ferentes disputare, sed nominibus pro [5] rebus utimur notis, quod accidit in nominibus in rebus quoque [6] arbitramur accidere, velut **in compotis** ratiocinantibus. Hoc [7] autem non est simile. Nam nomina quidem finita sunt et [8] orationum multitudo, res autem **numero** infinitae. Necesse est ergo [9] plura eandem orationem et nomen unum significare. Quemadmodum [10] igitur illic qui non sunt prompti **numeros ferre** a scientibus [11] expelluntur, eodem modo et in orationibus qui nominum [12] virtutis sunt ignari paralogizantur et ipsi disputantes et alios [13] audientes".

4. Can't we just call it a pebble?

While literal, or very close to literal, Boethius' translation parted ways with its source in at least one respect, and it happened to do so twice[6]. First, "καθάπερ ἐπὶ τῶν ψήφων τοῖς λογιζομένοις" ([Ur-Text^{A}] 165a9-10) became "velut in compotis ratiocinantibus" ([Ur-Text^{B}] p. 6, l. 6). Secondly, "οἱ μὴ δεινοὶ τὰς ψήφους φέρειν" ([Ur-Text^{A}] 165a14) endured a similar and – if anything, more radical – transformation, insofar as it read in Boethius' translation: "qui non sunt prompti numeros ferre" ([Ur-Text^{B}] p. 6, l. 10). On the face of it, both deviations from the original involved what we would call – in the parlance of our times – an "abstraction change" of sorts[7]. To be sure, Boethius shifted on both occasions from a rather concrete term (*ψῆφος*) to a more abstract one (*compotus*, first; *numerus*, next).

6. Aristotle's prologue and its Boethian translation have been recently compared by Crialesi 2020, who however has chosen a different path: "in translating this controversial passage of the *Sophistical Refutations*, Boethius follows the *verbum de verbo* method, reproducing the text with mirror-like symmetry. His argumentative patterns also follow the Aristotelian text, etc." (Crialesi 2020, p. 115). It is a bit odd, then, to collate the 'argumentative patterns' of the original and of its word-for-word translation: insofar as the translation is literal, the 'argumentative pattern' (whatever 'argumentative pattern' means here: presumably, the order or sequence of claims and the reasons that support them) is simply the same – they call it *verbum de verbo* for a reason. Accordingly, nothing meaningful will emerge from comparing the argumentative flows of the text, on the one hand, and of its word-for-word Latin translation, on the other hand. On the contrary, asking whether or not the right Latin word stands for the original Greek word, that's a different story altogether, worth telling in its own right... even if – God forbid – we get it wrong.

7. 'Abstraction change' is a loan from Chesterman 1997, p. 103. Last time we checked, his system of thirty-odd translation 'strategies' had won widespread acceptance amongst armchair translators and professional alike. Those interested in its peculiar contribution to traductology's metalanguage may consult Gambier 2008, who has a few suggestions of its own as to how implement Chesterman's strategy with proper 'tactics' (it figures).

Before arguing the merits and demerits of such move from one "level of abstraction" to another – mostly its demerits, insofar as a translation along Boethius' lines quite simply takes the symbolic dimension of Aristotle's analogy between counters and words out of the equation – one might wonder whether or not and to what extent Boethius' departure from the obvious Latin translation for *ψῆφος* (that would be *calculus*, as attested in [T1] below and the glossaries mentioned note 9), was more deliberate than a mere slip of the mind or the tongue would allow. Admittedly, the smart money is never on proving a negative and, indeed, short of asking Boethius himself, we'll never know for sure whether he deliberately avoided introducing the word *calculus* as a Latin equivalent for *ψῆφος*. If we go out on a limb and give it a shot here, it is simply because, whatever the result is going to be, there is a lesson to be learned. After all, textual interpretation being an exact science and all, when one tackles exegetical issues, a passably near miss is not as good as a mile.

To begin with, how likely, if at all, is it that Boethius simply ignored the basic meaning of *ψῆφος* and had to improvise? Not very likely. In fact, it is hard to believe that someone as fluent in classical Greek as he was – and a weight and currency expert to boot[8] – would have drawn this particular blank in the first place. It is even harder to think that he would not have set the record straight and checked whether or not his translations of *ψῆφος* made good linguistic sense – be it on his own or with the help of, say, either Symmachus, a native Greek tutor in his service or in Symmachus' household, a common friend or any Roman or Byzantine acquaintance of his with any training in literary Greek. All the more easily – one might add – since the association between *ψῆφος* and *calculus* was a matter of course in late ancient and early medieval Greek and Latin sources. Its only remarkable feature, as noted time and again, is that the gender shifts from feminine (in Greek) to masculine (in Latin)[9]. In fact, it was so trivial that no one pos-

8. At least on one occasion (Cassiodorus Flavius Magnus Aurelius, *Variarum Librorum libri XII*, I, 10), king Theodoric the Great called upon Boethius as a monetary consultant to inquire into the debasement which his palace guard's pay had – allegedly – suffered at the hands of the master of coin. Clipping, adulterating or counterfeiting coins were no trifling matter under Amal rule: they were all capital offences, punishable by death; and to be successful, the criminal investigation required some computational skills and the ability to crosscheck, on the one hand, non-decimal monetary exchange rates, and, on the other hand, non-decimal weight standards. (By the way, it is hard to say whether finger reckoning alone would have done the trick or not; an abacus would certainly have come in handy, but we know next to nothing about the way Boethius' investigation unfolded, if there ever had been one to start with). While the date of Boethius mission is controversial (cf. Shane Bjornlie 2013, p. 174), its importance is not, as suggested by Cassiodorus himself, for whom tampering with state coins becomes a threat to the whole order of Creation (you can hardly fault him for that: if you cannot trust the king's coin, everything else falls apart before you know it). On the manifold ramifications of the counterfeiting affair and its gravity in the Amal administration's eyes, cf. Pizzani 1978; della Corte 1981; Cuppo Csaki 1987; and, more recently, Lafferty 2013 (especially pp. 208-209).

9. 'Calculus ψῆφος' occurs in the *idiomata generum* section of the anonymous Bobiensis fragment (*Anonymi Ars Bobiensis*, ed. de Nonno, p. 32, l. 8), along with several scores of other "nomina quae

sessing the minimal education and slightest interest in learning Greek could have missed it and proven unable to tell apart – accordingly – numbers and counters. After all, we're talking textbook exercise here:

> [T1] *Colloquium Stephani*, ed. Dickey, pp. 21b-22b: "ὅσα πρὸς τοὺς ἀρχομένους κατελέχθη αὐτοῖς, [21c] καὶ τὰ χρήζοντα καὶ ἀριθμούς, δακτύλους καὶ ψήφους, [21d] ταῦτα, ἐν ὅσῳ ἀποδίδομαι, οὗτοι ἔπραττον. [22a] οἱ λοιποὶ δὲ ἐξηγήσεσιν καὶ ἐπερωτήσεσιν ηὐκαίρουν, [22b] κατὰ δύο τάξεις, βραδύτεροι καὶ ταχύτεροι – quaecumque ad incipientes praebita sunt eis, et necessaria et numeros, digitos et calculos, haec, dum reddo, ei agebant. reliqui autem expositionibus et interrogationibus vacabant, per duas classes, tardiores et velociores [Dickey 2012, pp. 239-240 (slightly modified): whatever was explained to them as beginners, that is essential things as numbers, fingers and counting-stones, these things they were doing while I was attending to my work. But the rest <of the pupils> had free time for explanations and for <asking> questions, in two classes, the slower ones and the faster ones]".

Admittedly, bilingual conversation manuals hardly make for exciting reading, nor are they the stuff of great scholarship[10]. True to their nature, [T1]'s subject, vocabulary and narrative are so flat and so ordinary that they certainly were within everyone's reach. Of course, Boethius was not your average educated man; nor was he an ordinary Greek language student. Hence, one might take exception to

apud Romanos masculina, apud Graecos feminina [names which are masculine amongst Romans and feminine amongst Greeks]"; *Hermeneumata Pseudodositheana Leidensia*, I, p. 12, l. 322: 'ψῆφοι calculi'; *Hermeneumata Stephani (Glossae Stephanis)*, ed. Loewe / Goetz, p. 440b, ll. 55-59: "calculatio, ψῆφος, λόγος. [56] calculator ψηφιστής. [57] calculi, ψῆφοι. [58] calculus, ψῆφος. [59] calculor ψηφίζω"; *Hermeneumata Amploniana (Hygini)*, ed. Loewe / Goetz, 81a10-12: 'psefos calculus'. Informal, utilitarian, and/or educational, sub-literary texts in general are notoriously difficult to stemmatize, or even simply to date and locate with any certainty (and bilingual wordlists belong, if not to all, at least to one or two of the aforementioned categories). As far as these and germane collections are concerned, however, a tentative consensus has been reached, suggesting that, whatever their geographical origin, these materials were available for recycling and adaptation in the Latin-speaking West no later than the fourth century AD (cf. Dionisotti 1982, p. 123; Rapp 2004, pp. 1244-1245; Dickey 2012, p. 52; Zetzel 2018, p. 113 with relevant bibliography pp. 240-242).

10. One should not be too quick to condemn and dismiss, though – one can't help noticing that the account of the unknown pupil's daily routine both at home and at school (especially the "at home" part) bears an uncanny resemblance to Scarry 1969 account of Huckle Cat's "getting ready for school" morning drill (one of little Nahida's favourites): they both get up in the morning ("ἠγέρθην πρωΐ – surrexi mane" – "Huckle got up"), put their pants on ("ἤτησα ὑποδήματα καὶ περικνημῖδας – poposci calciamenta et ocreas" – "then Huckle got dressed. This is not the way to put on your pants, Huckle!"), wash their face ("προσηνέχθη ὕδωρ πρὸς τὴν ὄψιν εἰς ὀρνόλην – allata est aqua ad faciem in urceolum" – "he washed his face with soap and warm water"), scrub their teeth and gums ("ὀδόντας ἔτριψα καὶ οὖλα – dentes fricui et gingivas" – "he brushed his teeth") and leave for school under escort ("ἑτοιμασθεὶς οὖν εἰς πάντα, προῆλθον καλῇ κληδόνι, ἀκολουθοῦντός μοι παιδαγωγοῦ – paratus ergo in omnia, processi bono auspicio, sequente me paedagogo" – "Mother Cat walked with Huckle to the school bus stop"), etc. Apart from timeless habits, the text tells us very little about its meaning and purpose and nothing at all about its origin. However, as convincingly argued by its editor, Dickey 2012, p. 227 on stylistic grounds, the "colloquium Stephani" looks like a Western piece no later than the fourth century AD, quite possibly, a schoolbook excerpt.

treating him like one and object that – even if the existence of such linguistic aids in the Latin West as well as their circulation in Boethius' time and age, are more or less uncontroversial – we have no definite proof that he ever used them or that he ever felt the need to consult anything of the sort. A man of Boethius' upbringing, status and means simply did not need them to straighten out petty linguistic issues. Although we can confidently dismiss as mere fiction anecdotal reports about aid from Boethius' alleged associates – like, for example, the story that one Flavius Theodorus Dionisii, a distinguished trainee of Priscian's turned civil servant, "assisted Boethius with his translation of Aristotle's *Categories*" (or any other translation, for that matter)[11] – there's nothing wrong with the idea itself. Had he wished, Boethius would have been able to get the best linguistic advice that family, friendship, influence and money could buy. It simply defies imagination to think that a man of his wealth, cultural background and political connexions both in Rome and Constantinople would have had any problem finding out what precisely *ψῆφος* stood for – had he put his mind to it, that is[12].

5. "'Calculum ponere' *eigentlich* 'die Rechensteinchen aufs Rechenbrett setzen'"[13]

All of the above is merely academic, however. Boethius knew exactly what *ψῆφος* meant and what it was used for – abacus reckoning, what else? As it happens, we

11. Cf., e.g., Bjornlie 2013, p. 135 for a lively and up-to-date version of this particular fairy tale – with kindred scholarship and tentative evidence. For the record and future reference, the anonymous subscription – if genuine, as opposed to being a forgery by some unknown scribe (as Cameron 2011, p. 433-434 suspected) – namely, Paris, Bibliothèque nationale de France, Nouvelles acquisitions latines 1611, 51r: "contra codicem Renati viri spectabilis correxi, qui confectus ab eo est Theodoro antiquario qui nunc Palatinus est [I corrected <my copy> against a manuscript owned by the illustrious Renatus and copied by Theodorus the copyist who is now an official at court]" (cf. https://gallica.bnf.fr/ark:/12148/btv1b10037292c/f53) has little to do with Boethius' translation of Aristotle's *Categories* anyway, for it occurs as an afterthought to the colophon of one of his logical opuscula, that is Boethius, *De Hypotheticis Syllogismis* (for this and other subscriptions, see Zetzel 1981, p. 219-220).

12. The most likely scenario, I surmise, is Boethius' family by alliance. By the time Boethius got around to translating the *Sophistici Elenchi* – his collaboration with Symmachus was already tried and proven: all Boethius had to do was ask for Symmachus' expert opinion. Nothing out of the ordinary, there – that is, nothing Boethius had not already done in the past, most notably when he turned to his illustrious relative for advice about his first literary effort, a loose translation of Nicomachus of Gerasa's *Ἀριθμητικὴ εἰσαγωγή* (Boethius, *De Institutione Arithmetica*, 2-3). His foster father (and eventually father-in-law) – who, as Boethius himself put it, was "most proficient in both Greek and Latin" and a great patron of Byzantine scholars to boot – would certainly have indulged him and solved the riddle without breaking a sweat. If, for whatever reason, Boethius did not feel like asking Symmachus himself, he surely would not have had to look far in the company of trusted friends (the "honestissimorum coetus amicorum" he's reminded of in Boethius, *De Consolatione Philosophiae*, I, 4, 40, ed. Moreschini, p. 17, ll. 137-138) where, a few years earlier, he had learnt enough Greek to set his mind on translating word-by-word no less than all of Aristotle's works and of Plato's dialogues (Boethius, *Commentarii in Librum Aristotelis ΠΕΡΙ ΕΡΜΗΝΕΙΑΣ. Editio secunda*, ed. Meiser, pp. 79-80, ll. 9-9).

13. Gruber 2006, p. 188.

do not even need to look for bits of classical lore Boethius might have gleaned out of Roman golden and silver age literature – which, of course, one is going to dig out, eventually. In this particular instance, Juvenal – only to pick up a household name from a large pool of usual suspects[14] – will conveniently provide a solid precedent.

Juvenal is as good a classic as any and, if you ask me, a lot more fun than most. Boethius must have kept a copy of his satires in his prison's library[15] – the obvious choice to lift his spirit after things had definitely taken a turn for the worse:

14. Even if, for the time being, one leaves Cicero (Cicero, Marcus Tullius, *De Amicitia*, 58, ed. Powell, p. 345, ll. 18-26), Livy (Livius, Titus, *Ab Urbe Condita*, V, 4, ed. Ogilvie, p. 325, ll. 5-18) and a few others aside, Juvenal would still be in excellent company with the like of Seneca and Petronius who also used the counters metaphor as a vivid reminder of how decent people cope with grief and loss (the former) or put up a brave face when they are past consoling (the latter). Since Boethius – for reasons unknown – related more directly to Seneca's existential predicament (Boethius, *De Consolatione Philosophiae*, I, 3, ed. Moreschini, p. 10, ll. 28-37) and foreseeable outcome of falling out of royal favour (III, 5, p. 69, ll. 27-34), let's Nero's mentor speak for himself first – we'll go back to Petronius in a moment, for our own pleasure. Seneca, Lucius Annaeus, *Consolatio ad Polybium*, 9, 1, ed. Reynolds, p. 275, ll. 20-26: "illud quoque magno tibi erit levamento, si saepe te sic interrogaveris: utrumne meo nomine doleo an eius qui decessit? Si meo, perit indulgentiae iactatio et incipit dolor, hoc uno excusatus quod honestus est, cum ad utilitatem respicit, a pietate desciscere; nihil autem minus bono viro conuenit quam in fratris luctu **calculos ponere**. Si illius nomine doleo, etc. [Hine 2014, p. 88: you will also find it a great relief if you frequently ask yourself, am I grieving on my own account or on the deceased's account? If on my own, my display of devotion is meaningless; grief is only justified when it is honourable, so it begins to part company with love when it takes self-interest into consideration; and when it comes to mourning for a brother, nothing suits a good man less than being calculating. If I grieve on his account, etc.]". Sure enough, Seneca's advice hit a bit too close to home for Boethius-the-prisoner's comfort – after all no one, trained philosophers least of all, fancies being reminded that he's grieving for himself. That being said, the abacus counters image must have stuck with Boethius who, in [T3] below, will resort to the same metaphor in order to convey the idea that bereavement and accounting do not belong together. As one may expect from Petronius Arbiter, his reference to the abacus is a model of clarity and elegance: "nomen amicitiae si quatenus expedit, haeret; / calculus in tabula mobile ducit opus. / Dum fortuna manet, vultum servatis, amici; / cum cedidit, turpi vertitis ora fuga [if what we call friendship stays true to its meaning only for as long as one benefits from it, then it is like a counter doing volatile work at the board. While my fortune holds, you – my friends – you stick around; as soon as I am out of luck you shamelessly turn tail and run]" (Petronius, Gaius Arbiter, *Satyrica*, 80, ed. Schmeling, p. 236, ll. 1-4). While it is just possible that Petronius was consciously playing with two metaphors at once (the gaming board's, on the one hand, and the abacus', on the other), *quatenus expedit* fits better the accounting metaphor, which then runs along the same lines of Cicero's false friendship (referred to above) and its calculated balance between profits and losses as displayed by the counters on the counting board. Although she points out the ambiguity of the "calculus in tabula" analogy, Connors 1998, pp. 80-81 eloquently translates as we did in her footsteps "the calculating pebble does volatile work at the board". For the record, Habermehl 2006, p. 28 and Schmeling / Setaioli 2011, p. 339 rather favour the ludic version of the simile.

15. "The Highway Rat". As a matter of fact, one of Boethius' prose pieces is quite possibly – in fact, almost certainly – purposely reminiscent of the poet's tenth satire: "atqui divitiae possidentibus persaepe nocuerunt, cum pessimus quisque eoque alieni magis avidus quicquid usquam auri gemmarumque est se solum qui habeat dignissimum putat. [34] Tu igitur, qui nunc **contum gladiumque** sollicitus pertimescis, si vitae huius **callem vacuus viator intrasses, coram latrone cantares** [Watts 1999, p. 36: but wealth very often does harm its owners, for all the most criminal elements of the population who are thereby all the more covetous of other people's property are convinced

[T2] Iuvenalis, *Saturae*, IX, ed. Morton Braund, 38-41: "quod tamen ulterius monstrum quam mollis avarus ? 'haec tribui, deinde illa dedi, mox plura tulisti'. Computat et cevet. Ponatur calculus, adsint cum tabula pueri; numera sestertia quinque omnibus in rebus, numerentur deinde labores [Morton Braund 2004, pp. 353-355 slightly modified: yet what monstrosity is worse than a stingy pervert? 'I paid you this, then I gave you that, and later you got still more'. He computes it while wiggling his arse. All right, let's set out the counters, call in the lads with the reckoning board: count five thousand paid in total and then let's count up my exertions]".

Truly, no good deed ever goes unpunished; and Juvenal's ranting character is not the only one who – going through a rough patch – feels more than a little cheated for all his efforts and hard labour[16]. Boethius too must have felt he came up short despite his good will and moral integrity. More to the point, the idea of doing some existential reckoning might well have crossed his mind, for Philosophia set out to dismiss the whole notion of him playing accountant with personal profits and losses:

[T3] Boethius, *De Consolatione Philosophiae*, II, 3, ed. Moreschini, p. 35, ll. 35-38: "visne igitur cum Fortuna calculum ponere? Nunc te primum liventi oculo

that they alone are worthy to possess all the gold and precious stones there are. You are shuddering now at the thought of club and knife, but if you had set out on the path of this life with empty pockets, you would whistle your way past any highwayman]" (Boethius, *De Consolatione Philosophiae*, II, 5, 33-34, ed. Moreschini, p. 45, ll. 94-100) – "pauca licet portes argenti vascula puri nocte **iter ingressus**, **gladium contumque** timebis et mota ad lunam trepidabis harundinis umbra: **cantabit vacuus coram latrone viator** [Morton Braund 2004, pp. 367-369: though you're carrying only a few cups of plain silver when you set out on a journey at night, you'll be terrified of swords and sticks, and you'll panic at the twitch of a reed's shadow in the moonlight. A traveller who is empty-handed can sing in the mugger's face]" (Iuvenalis, *Saturae*, X, ed. Morton Braund, 19-22). A Juvenalian overtone is discernible in other passages, though less conspicuous – compare, for instance, Boethius, *De Consolatione Philosophiae*, IV, 5, 11-12, ed. Moreschini, p. 120, ll. 36-37 with Iuvenalis, *Saturae*, VI, 441-442. Juvenal's fourth-century revival is a matter of some controversy, depending upon how much stock one is willing to put in Servius (either as the main inspirator or one of several witnesses – along with Ammianus, Ausonius, Claudian, Prudentius, et alii – of the renewed general favour Juvenal was enjoying amongst well-read people): in a nutshell, are Servius' eighty-odd quotations from Juvenal mostly derivative (cf. e.g. Cameron 2011, pp. 452-453) or do they imply a marked interest in the great poet of the silver age (*ab una disce alios*: Monno 2009)? *Grammatici certant et adhuc sub iudice lis est* – even if it seems more plausible to assume that Juvenal was pretty much in the air du temps and needed no rescue when Servius' came of age. Be that as it may, by Boethius' era Juvenal's reputation had been firmly re-established for some time, and this is enough for the sake of our argument.

16. Unsurprisingly, Naevolus' postprandial ploughing and his longing for wealth (which – as Saller 1983 suggested – might just be a trifle more reasonable than generally assumed) and a better status than his current one (he describes himself as a *bipes asellus* – which, in his line of work, might be a trifle less self-deprecating than one may think at first) seem to have got everyone's undivided attention. As a result, the abacus is hardly mentioned at all (Courtney 1980 scarce remarks, pp. 431-432, are the – not so exceptional – exception). At any rate, *Satura* IX has got more than its well-deserved share of excellent scholarship: cf. e.g. Bellandi 1974; Cecchin 1982; Braund 1988, pp. 130-177; Notter 2008; etc.

praestrinxit. Si numerum modumque laetorum tristiumve consideres, adhuc te felicem negare non possis [and now you want to set out the counters <and square accounts> with Fortune? now that, for the first time, she has cast a malicious eye on you. If you were to sum up the number and fashion of things that brought you either joy or sorrow, you could not deny that you've been happy so far]".

The gist of Philosophy's rebuke is as powerful as it is plain: Boethius should count his blessings before he sits with Fortune at the abacus table and let the counters do the math. He's done very well for himself, up to that point – and the counters would certainly show that there's nothing wrong with his balance, so far.

Latin commentators had the truth of it, for they consistently endorsed the accounting image in its most ordinary and most familiar sense (as opposed to resorting to more subtle readings)[17]:

[T4] Guilelmus de Conchis, *Glosae super Boethium. Accessus ad Consolationem*, II, 3, ed. Nauta, p. 109, ll. 38-44: "visne igitur quandoquidem tot bona tibi contulit fortuna, cum ea calculum ponere id est computare? calculi sunt brevissimi lapides dicti a calcando. Sed quia in abaco sunt quidam caracteres ad modum aliorum calculorum qui ponuntur in abaco ad computationem faciendam, inolevit consuetudo ut calculum ponere diceretur pro computare [since indeed Fortune has granted you so many good things, 'now you want to' set out the counters with her, that is to square the accounts? 'calculi' are small stones which get their name from being tread upon. Since there are markings on the abacus which allow one to use a stone as if it had the same value as several others that are set on the counting board for the reckoning, it has become a habit to use 'to set out the counters' as a synonym for 'reckoning']".

[T5] Nicolaus Trevetus, *Expositio Super Boethio De Consolatione*, II, 3, 37, ed. Silk, p. 212, ll. 12-16: "visne igitur cum Fortuna calculum ponere id est computare ? calculus est parvus lapillus qui calcando non sentitur et quia talibus lapillis utebantur antique in computando pro uno solido ponendo lapillum unum pro duobus duos, ideo ponere calculum vel calculare idem est quod computare ['and now you want to set out the counters with Fortune?', namely to square accounts with her? a 'calculus' is a small stone which we do not feel under our feet

17. "As if four eyes were better than two". Practical and down-to-earth though it may be, the mediaeval understanding of Boethius "chance reckoning" is so far ahead of the modern competition that it hardly bears comparison with rival solutions, e.g. contemporary statistical drivels in the same vein as, say, Lüthy / Palmerino 2016. For all their supposed faults, mediaeval readers – the whole lot of them – had at least one redeeming quality: even the more biased ones read the text before having it say whatever their agenda called for. Lüthy / Palmerino 2016, on the contrary, simply do not have a clue about what the text is actually about – starting with who's talking to whom: "In Boethius' *Consolation* (II.3p), we have Fortune itself asking defiantly: 'do you wish to count out the score with Fortune?' (*visne igitur cum fortuna calculum ponere ?*). Through the mathematization of probability, we are attempting to do just that: 'reckon with fortune' etc." (Lüthy / Palmerino 2016, p. 17). Best of luck with that!

when we tread upon it. Since in ancient times such pebbles were used as counters – for instance, setting a pebble for a shilling, two pebbles for two shillings – it follows that 'to set out the pebbles' or 'to calculate' and 'to reckon' mean the same]".

For present purposes, William of Conches' and Nicholas Trivet's etymological concerns are of no great consequence. Suffice it to say that, as proven by recent developments, their views are as sound (or as far-fetched) as they come[18]. On the other hand, it is definitely worthwhile noting that both glosses – which, needless to say, belong to popular collections (both in their own right and in various revised forms)[19] – treat as a matter of course the association of *calculi* with ancient and traditional instruments and methods of calculation as well as (and the detail is far from being insignificant) most ordinary reckoning, that is accounting or computations involving money. Typically unafraid of stating the obvious, both commentators laid stress on two essential features, which spring to mind when Latin speakers (or Latin writers) encountered the word *calculus* or availed them-

18. As a matter of fact, traditional views on *calculus* etymology have been questioned and a new consensus has been gathering momentum for some time. Since Loicq 1960, the Latin words *calculus* and *calx* have steadily drifted apart (in particular, the former is not considered a diminutive of the latter any more). Moreover, Meid 2012, p. 150, note 9, has suggested an etymology along the lines of the pre-Indo-European root '*kar- / *kal-' 'stone' (most notably friable, calcareous rock eroded by water as pointed out by Alessio 1935-1936), whose reduplicated form '*kal-kal (= pile of stones)' occurs in 'calculus' (with a collective connotation which, by the way, has not been lost to specialists, cf. e.g. André 1978, p. 55). As a healthy memento of the old etymological rule of thumb ("vowels matter naught and consonants hardly at all"), Perono Cacciafoco 2015, p. 122 reminds us in an exquisite scientific english (no capital needed here) that "According to Villar, completing the Tovar discourse, in any case, it is questionable the opinion inherent in a possible pre-Indo-European origin of these roots".

19. Few late ancient texts have enjoyed throughout the Middle Ages (with the partial exception of the thirteenth century, that is) as much favour as Boethius' *Consolation of Philosophy*. A number of book-length studies bear witness to its mediaeval fortune: Courcelle 1967; Kaylor 1992; Hoenen / Nauta 1997; Glei / Kaminski / Lebsanft 2010. For readers in a hurry, King 2007 or Nauta 2009 should suffice. More to the point, on William of Conches' commentary, cf. Nauta 1999, pp. xv-cxxviii and on Nicholas Trivet's, cf. Brancato 2012, pp. 363-365. Considering that we know very little about its date of composition and the whereabouts of its author, we'll leave out, for the time being, the anonymous commentary sometimes ascribed to Thomas Aquinas (or to William Wheatley). All the same, its understanding of the issue at hand is as sound as William's and Nicholas': "nota, quod calculus in una significatione est parvus lapillus qui calcando non laedit. Et quia talibus lapillis utebantur antiqui in computando, ideo calculare vel calculum ponere ponitur pro computare vel pro rationem facere. Ergo dicit philosophia: vis ne cum fortuna calculum ponere? Quasi dicat: non debes: si computabis cum ea, ipsa inveniet te multo feliciorem quam miserum [you will notice that one of the meanings of 'calculus' refers to a stone that, when we tread on it, does not hurt <our feet>. Because in ancient times pebbles of the sort were used for reckoning, for that reason, the expression 'to calculate' or 'to set the counters' means 'to count' or 'to account for'. As if Philosophy were saying: you shouldn't. If you take up the counters with Fortune, she'll find out that you've had a lot more things to be happy about than to be sorry about]" (Ps. Thomas de Aquino, *In Boethii De Consolatione Philosophiae*, ed. Busa, p. 40b, ll. 27-34). Little has been published on the anonymous commentary (Courcelle 1967, pp. 322-323; King 2007, pp. 46-47; Lucia 2012) – a semi-published ANR by-product (Galonnier 2017) is the next best thing; and it would have been pretty good indeed, had it not suffered from a bad case of funded research deadline-frenzy by proxy.

selves of it, namely: (1) where we find *calculi* (on the counting board, with different values according to their different positions as possibly marked on the abacus itself) and (2) what we use them for (as symbols for what we count: first and foremost, coins).

6. Smoking gun

All of which brings us to our most compelling piece of evidence – internal evidence, that is. From the looks of it, Boethius did not care much for *ψῆφοι*. Indeed, on the few occasions he came across the word, it invariably got lost in translation, for Boethius came up every time with a different solution – other than simply calling a pebble a pebble, that is. For instance (and this is the only other example one will come by in his translation of the *Sophistici Elenchi*), Boethius must have thought that silver coins would catch the reader's imagination more than plain stones or tokens, for he translated *ψῆφος* as *denarius* in a well-known Aristotelian example of the fallacy of figure of speech:

> [T6] Arist., *De Sophisticis Elenchis*, 22, 178b11-13: "οἱ δὲ ὡς καὶ ὃ ἔχει ἔλαβεν· ἐδίδου γὰρ μίαν μόνον οὗτος ψῆφον·καὶ οὗτός γ' ἔχει, φασί, μίαν μόνον παρὰ τούτου ψῆφον [according to others, <the solution is> as in: what one possesses, he has received it. A man has given just one pebble to another, so – they say – this is what the latter has got, for he has received just one pebble from the former]".

> [T6B] Arist., *De Sophisticis Elenchis Translatio Boethii*, ed. Dod., p. 45, ll. 4-7: "quidam vero et ut quod habet accepit; dedit enim unum solum hic denarium; et hic habet, dicunt, unum solum ab hoc denarium; accepit enim ab hoc".

After all, it's no skin off anyone's nose whether someone gives someone else a rock or a chip – or more than one, for that matter. On the contrary, as soon as money changes hands, it's a different story altogether, even if we're talking small change here[20]. Be that as it may, [T6B] is as strong an indication as any that the tangible nature of *ψῆφοι* was all but lost to Boethius who was well aware that they could be handled (or mishandled, for that matter) as easily as

20. The same explanation (which is more of a suggestion) fits nicely a similar use of *digitus* as a translation for *ἀστράγαλος*: "εἰ ὅ τις ἔχων ὕστερον μὴ ἔχει, ἀπέβαλεν· ὁ γὰρ ἕνα μόνον ἀποβαλὼν ἀστράγαλον οὐχ ἕξει δέκα ἀστραγάλους [Hasper 2013: if someone possesses something and he does not possess it later on, he has lost it. In fact, someone who has lost just one knucklebone does not have ten knucklebones]" (Arist., *De Sophisticis Elenchis*, 22, 178a29-31; cf. 22, 179a21-22) – in Boethius' words: "si quod quis habens postea non habet amisit; nam unum solum amittens digitum non habebit decem digitos" (Arist., *De Sophisticis Elenchis Translatio Boethii*, ed. Dod., p. 44, ll. 13-15; cf. p. 46, ll. 24-25 where *denarius* translates *ἀστράγαλος*). At the end of the day, who cares if we are left with no dice to toss around... whereas it makes a heck of a difference whether you get to lose all your fingers or manage to keep most of them attached to your hands!

coins. In hindsight then, how could he have possibly got the *ψῆφοι* wrong? Let me spell it out for you: what is roughly the size of a coin and comes in handy when we have to work figures out? What else could it be, if not a reckoning-stone? My point exactly.

7. *Caveat*

While a good deal of the aforesaid is, if not indisputable, at least hardly controversial, is it enough to prove that Boethius dispensed with the word *calculus* on purpose and consciously omitted all reference to counters, counting boards and accounting still much alive, several centuries later, as attested by [T4], [T5] and cognate materials?

Probably not – on two counts.

First of all, even if one were to prove that Boethius could hardly ignore that *ψῆφος* in its most ordinary sense meant pebble or reckoning stone, this will get him only half way there. One still has to deal with the possibility that Boethius was aware of more than one meaning for the word *ψῆφος* – possibly "number" or "numeral"[21]. Accordingly, it is just possible that Boethius happened to learn some-

21. This is definitely a possibility, as suggested by slightly later Byzantine sources. Theophanes Confessor, for instance, recorded that, the same year the Umayyad Caliph expropriated the holy Cathedral of Damascus, he also replaced Greek with Arabic as the language of administration, except for the mention of numbers, that is: "καὶ ἐκώλυσε γράφεσθαι Ἑλληνιστὶ τοὺς δημοσίους τῶν λογοθεσίων κώδικας, ἀλλ' ἐν Ἀραβίοις αὐτὰ παρασημαίνεσθαι, χωρὶς τῶν ψήφων, ἐπειδὴ ἀδύνατον τῇ ἐκείνων γλώσσῃ μονάδα ἢ δυάδα ἢ τριάδα ἢ ὀκτὼ ἥμισυ [...] γράφεσθαι· διὸ καὶ ἕως σήμερόν εἰσι σὺν αὐτοῖς νοτάριοι Χριστιανοί [Mango / Scott 1997, p. 524: <al-Walid, that wretched man> also forbade that the registers of the public offices should be written in Greek; instead, they were to be expressed in Arabic, except for the numerals, because it is impossible in their language to write a unit or a pair or a group of three or eight and a half [...]. For this reason they have Christian notaries until this day]" (Theophanes Confessor, *Chronographia*, ed de Boor, p. 376, ll. 2-7 – textual and authorship-related issues are discussed in some detail in Jankowiak / Montinaro 2015, part I and II). In a different vein altogether but around the same time (give or take a few decades as tentatively suggested by Wheatley 1996 and Bugar 2016), Pseudo-Hyppolitus' eschatological ruminations involved numbers in the form of tattoos – ψῆφοι as it happened: "ἡ δὲ σφραγὶς αὐτοῦ ἐπὶ τοῦ μετώπου καὶ ἐπὶ τῆς δεξιᾶς χειρός ἐστι ψῆφος χξς. καὶ ὡς οἶμαι οὐδὲ ἀκριβῶς ἐπίσταμαι τοῦτο, κτλ. [the seal of the deceiver upon the forefront and the right hand is the number six hundred sixty-six. I kind of surmise that this is the case, but I do not know precisely, etc.]" (Ps. Hippolytus, *De consummatione mundi*, ed. Athanasopoulos, p. 28, ll. 16-17). On the other hand – for what it's worth – some six centuries after Boethius, Michael of Ephesus, despite being about as [arithmetically biased] as one can get, kept counters (*ψῆφοι*) and numbers (*ἀριθμοί*) within their respective semantic boundaries in his explanation of Aristotle's analogy. As a matter of fact, whilst digital dexterity and abacus expertise played no part in Michael of Ephesus' commentary either, Aristotle's mention of pebbles – as opposed to plain numbers – was, if not particularly meaningful, at least linguistically transparent: "χρᾶται δὲ τοῖς ἀριθμοῖς καὶ ταῖς ψήφοις πρὸς τὸ δεῖξαι τοὺς σοφιστὰς τῷ τὰ ὀνόματα μεταφέρειν ἐπ' αὐτὰ τὰ πράγματα παραλογιζομένους τοὺς ἀνεπιστήμονας. ὡς γὰρ ἐπὶ τῶν ψήφων οἱ μὴ δεινοὶ ἀλλ' ἐπιπόλαιοι καὶ ἰδιῶται τῷ τοὺς ἀριθμοὺς φέρειν ἐπὶ τὰ ἀριθμούμενα παρ' ἑαυτῶν καὶ παρὰ τῶν περὶ τὰς ψήφους καὶ τοὺς ἀριθμοὺς ἐπιστημόνων ἀπατῶνται καὶ διὰ τοῦτο

how that, figuratively, *ψῆφος* could possibly mean number and thought that – for some reason – *numerus* made better sense in the context of the prologue of the *Sophistici Elenchi*.

Second, one can only go so far with circumstantial evidence. What of Boethius' motives, if any? Without establishing probable cause to begin with, what's the point of discussing any further the facts of the case? What proof do we have that Boethius actually had Aristotle's analogy say what he wanted it to say, namely something along the lines of his own views on how language and computation – if they're connected at all – stand in relation to one another?

8. Pebble in the shoe

Count one is a bit of a moot point: whatever the right answer to the question turns out to be – the question itself has no direct bearing on how things went down in the Latin tradition insofar as the issue never came up for discussion. Boethius handed down his translation without much in the way of instructions for use. As a result, Latin commentators were no more privy to Boethius' mind and intention than we are and, for all practical purposes, it makes no difference whether or not he left the pebbles out of his translation by design or by accident. Moreover, it is not as if Mediaevals had any reason to suspect that something was missing in Boethius' translation, which made perfect sense as it stood. Unconcerned and, for the most part, unable to ascertain whether Boethius' Latin squared with Aristotle's Greek and to what extent, they trusted Boethius implicitly and took his translation at face value.

καὶ ὑπὸ τούτων παρακρούονται, τὸν αὐτὸν δή φησι τρόπον ἔχειν καὶ ἐπὶ τῶν λόγων τῶν ἐξ ὀνομάτων· οἱ γὰρ ἀξύνετοι καὶ ἀνεπιστήμονες τῆς τῶν ὀνομάτων δυνάμεως κακῶς διαλεγόμενοι παραλογίζονται καὶ αὐτοὶ διαλεγόμενοι καὶ ἄλλων ἀκούοντες [Aristotle introduces numbers and counters in order to explain how the sophists mystify those who lack knowledge by transposing words into the facts themselves. Just as those who are not skilled with counters, being careless and unaware of how numbers are related to the things they stand for, deceive themselves and are deceived by those who know their way around counters and numbers and, for the same reason, are misled by the latter, the same goes – Aristotle says – for arguments made out of words. In fact, the witless and those who pay no heed to the power of words make fools of themselves both when they take part into a discussion and when they listen to others]" (Ps. Alexander Aphrodisiensis (Michael Ephesius), *In Aristotelis Sophisticos Elenchos Commentarius*, ed. Wallies, p. 13, ll. 20-29). Even if Michael of Ephesus is no longer the unfathomable character he was before Browning 1962 and Ebbesen 1981, I, pp. 268-285 shed some much-needed light on his association with Princess Anna Comnena's philosophical circle and his style as an Aristotelian commentator, he still is an elusive figure – and he will be for the foreseeable future, as suggested by recent efforts to extract more information from the scanty historical data in our possession: cf. Golitsis 2018; Wilberding / Trompeter 2018; Trizio 2019 (which is both a lesson in sobriety against reading too much into known sources and a useful reminder that known manuscript material is always worth a second look).

9. Motive and opportunity

Count two is a different beast altogether. Whether or not Boethius' translation reflects first and foremost his own understanding of how calculations never fail while language seems to work only half of the time is a legitimate concern for the historian. As it happens, we might just have what we need to settle the issue: Sten Ebbesen put the pieces of this particular jigsaw together a while ago[22]. We'll have to take it from there and solve the problem accordingly. As observed time and again in Ebbesen's wake[23], Boethius' translation of the Aristotelian prologue of the *Sophistici elenchi* bears an uncanny resemblance to his celebrated account of the origin of logic – or, rather, let's put it the other way around, as we should: Boethius' celebrated account of the origin of logic bears an uncanny resemblance etc.

[Ur-Text^{B}] Arist., *De Sophisticis Elenchis Translatio Boethii*, ed. Dod., pp. 5-6, ll.14-13: "eodem autem modo et syllogismus et elenchus [15] hic quidem est, ille vero non est quidem, videtur autem **propter** [16] **imperitiam**; nam imperiti velut distantes longe speculantur. [17] Nam syllogismus quidem ex quibusdam positis est ut dicatur [18] diversum quid ex necessitate ab his quae posita sunt, elenchus [6.1] autem syllogismus cum contradictione conclusionis. Illi vero hoc [2] quidem non faciunt, videntur autem ob multas causas, quorum [3] unus locus aptissimus est et publicissimus per nomina. Nam [4] quoniam non est ipsas res ferentes disputare, sed nominibus pro [5] rebus utimur notis, **quod accidit in nominibus in rebus quoque** [6] **arbitramur accidere**, velut **in compotis ratiocinantibus**. Hoc [7] autem non est simile. Nam nomina quidem finita sunt et [8] orationum multitudo, res autem numero infinitae. Necesse est ergo [9] plura eandem orationem et nomen unum significare. Quemadmodum [10] igitur illic qui non sunt prompti **numeros ferre** a scientibus [11] expelluntur, eodem modo et in orationibus qui nominum [12] virtutis sunt ignari paralogizantur et ipsi disputantes et alios [13] audientes" (quoted – and translated – above).

[T7] Boethius, *In Isagogen Porphyrii Commentum. Editio secunda*, I, 2, ed. Brandt, p. 138-139, ll. 15-1: "ut in multis evenit Epicuro, qui atomis mundum

22. Ebbesen 1981, I, p. 253: "apparently the *Elenchi* passage, in which it is explained how the imperfect correspondence between words and things deceives people, was a famous one in late Antiquity, for Boethius, too, draws on it in his Second Commentary on the *Isagoge*. Lack of experience in the art of dialectic, he says <*In Isag.*, ed. 2a, I, 138 Brandt>, was responsible for the errors committed by Epicurus and his like who thought that facts about reality could be directly inferred from a consideration of expressions. They were wrong, Boethius continues, because the way words are related to things is not like the way numbers are. If you count correctly, using the fingers or an abacus, you can be sure that if the resulting number is one hundred the things that underlie the figure are a hundred. Not so with words: when you reason by means of words you may find something which is not matched in nature. This is clearly a paraphrase of 165a 6-17". How accurate Boethius' paraphrasis actually was is, of course, another puzzle (ours to solve, as it happens), which however cannot be unravelled unless we take our cue from Ebbesen.

23. Cf. e.g. Magee 1989, p. 122; Suto 2012, p. 47, note 22; Crialesi 2020, p. 113.

consistere putat et honestum voluptatem mentitur. Hoc autem idcirco huic <scil. Epicuro> atque aliis accidisse manifestum est, quoniam **per imperitiam** disputandi **quicquid ratiocinatione comprehenderant, hoc in res quoque ipsas evenire arbitrabantur**. Hic vero magnus est error; neque enim sese ut in numeris, ita etiam in ratiocinationibus habet. **In numeris** enim quicquid in digitis recte computantis evenerit, id sine dubio in res quoque ipsas necesse est evenire, ut si ex calculo centum esse contigerit, centum quoque res illi numero subiectas esse necesse est. Hoc vero non aeque in disputatione servatur; neque enim quicquid sermonum decursus invenerit, [139] id natura quoque fixum tenetur [<this kind of errors> occurs often in Epicurus, for he thought that atoms make up the universe and he falsely claimed that pleasure is a virtue. The reason why this happened to him as well as it happened to others is clear: because they all thought – as a result of their lack of experience in the art of argumentation – that whatever conclusion they reached by way of reasoning, the conclusion also applied to the things themselves. This is utterly mistaken. As a matter of fact, one thing is what happens when numbers are involved and another thing is what happens when arguments are. As a matter of fact, as far as numbers are concerned, whatever is the result one reaches when he reckons right on his fingers, there's no doubt that the same result must apply to the things themselves as well. For instance, if one hundred happens to be the result of one's reckoning, then the things matching those figures must also be one hundred. On the other hand, when we argue, things do not run as smoothly. As a matter of fact, it is not the case that whatever the path of an argument leads us to, it is also what we are to assume the natural order of things ends up with]".

Boethius' explanation of why we need logic in the first place ([T7]) is a remarkable piece of reverse engineering. It conveys the main idea of its Aristotelian blueprint ([Ur-Text^{A}]); moreover, it develops it according to the general pattern Aristotle laid out himself: poor dialectical skills and training lead to excessive trust in the ability of language to tell things as they are. Overconfidence in words is easily misplaced and, more often than not, it welcomes deception, error, misjudgement – you name it. That being said, even if [Ur-Text^{A}], [Ur-Text^{B}] and [T7] make the same general point (excessive reliance on words is a recipe for disaster), they marshal different facts in order to build their case. While Aristotle's argument in [Ur-Text^{A}] brings as close together as possible two distinct sets of symbols (abacus counters and words) insofar as they share the same liability (they are both prone to subtle but critical shifts in value and meaning), Boethius' translation ([Ur-Text^{B}]) and his repurposing of Aristotle's original design ([T7]) drive as far apart as possible two kinds of ratiocination (*ratiocinatio*, *ratiocinans*), namely calculation (*compotus*, *computans*) and debate (*disputare*, *disputans*), on account of the opposite ways numbers (*numeri*) and words as well as word-compounds (*nomina*, *orationes*) match the things we refer to when counting or debating. It then becomes immaterial to ask whether or not Boethi-

us' cautionary tale ([T7]) about arithmetical success[24], as opposed to discursive failure[25], sheds any light on Aristotle's analogy between computational and disputational hazards. In a nutshell, Aristotle was not so much interested in comparing why, on the one hand, everything adds up when we count right and why, on the other hand, things go awry when arguments misfire, as he was interested in comparing why (and how) both arithmetical reckoning by means of counters and verbal reckoning by means of words fail when we mishandle the symbols involved (counters and words, respectively). Which is, needless to say, a different story altogether. At any rate, it is not the story told by Boethius' translation ([Ur-Text^{B}]), together with his piece on the origin of logic ([T7]) – simple as that.

10. *Sententia latinorum* (*potius orthodoxorum*)

Again, Latin commentators had the truth of it – very early at that[26]. Two of the earliest extant witnesses provide the gist of Boethius' legacy and deliver its one-two punchline, namely "once you take the abacus counters out of the equation and make the analogy about numbers and calculations as such, it is the whole analogy that falls apart" – let's call them [ARITHMETIC BIAS] and [DISANALOGY BIAS] for short:

> [T8] *Anonymi Glosae in Aristotelis Sophisticos Elenchos*, ed. DE RIJK, p. 199, ll. 1-17: "quoniam non est ipsas res dicere ferentes, id est res non possunt significari in disputatione nisi per voces; sed utimur nominibus pro rebus notis, idest notandis, quod accidit in nominibus, id est coerentia vel discoerentia, in rebus arbitramur accidere ad similitudinem numerorum. HOC AUTEM NON EST SIMILE <165a10>, quia, ut dicit Boethius <*In Porphyri Isagogen*, II, pp. 138-139, ll. 14-1>, si ex calculo centum evenerint, centum oportet res esse subiectas et quicquid in digitos recte computantis evenerit, id procul dubio in natura rerum fixum tenetur, sed non quicquid in concursu sermonum evenerit. [...]. Demonstrata dissimilitudine inter voces et numeros statim demonstrat similitudinem inter eadem dicens <165a3-17>: QUE-

24. Inasmuch as whatever reckoning number stands in an immediate and unambiguous relation with the reckoned things whose number it is, one has to work hard to get off track when figures are involved.

25. Insofar as many a word stands in an ambiguous relation to the things it signifies, one has got to work hard to keep on track when dealing with linguistic expressions.

26. I.e. as early as the mid-twelfth century. DE RIJK 1962, I, p. 83 convincingly dated [T8], the anonymous Parisian glosses to around that time. It took Sten Ebbesen's ingenuity and erudition to bring together [Ur-Text^{B}] and [T7] in recent times. On the other hand, there's nothing out of the ordinary about a Parisian Glossator of around Peter Abelard's generation doing so and quoting Boethius commentary on Porphyry's *Eisagôgé* in connection with Aristotle's *Sophistici elenchi*: Boethius' explanation of the "ortus logicae disciplinae [origin of logic as a discipline]" was a popular topic indeed, as Hugues of Saint Victor (HUGO DE SANCTO VICTORE, *Didascalicon*, ed. BUTTIMER, pp. 19-20, ll. 4-27) and John of Salisbury (IOANNES SARISBERIENIS, *Metalogicon*, II, 2, ed. HALL / KEATS-ROHAN, p. 58, ll. 10-21) bear witness.

MADMODUM IGITUR ILLIC id est in numeris, illi homines qui non sunt prompti ferre numeros, id est qui nesciunt numerare, expelluntur a scientibus, scilicet a ratione numerorum, eodem modo et in orationibus, id est quod sophistae expelluntur a sapientibus. Vel sic: quemadmodum illi numeri qui non sunt prompti ferre, idest qui non possunt ferre numeros, id est proprietatem propositi numeri, ut quinarius non potest ferre proprietatem binarii, expelluntur, idest reiciuntur a scientibus, eodem modo in orationibus expelluntur a sapientibus illi termini et orationes quae non possunt ferre proprietatem syllogismorum [since it is not possible to discuss things by carrying them around, that is to say since things cannot be argued about unless we use words in their stead, we avail ourselves of names as symbols in order to refer to the things we want to refer to. Therefore, what words bring about, namely whether what we speak about results in a correlation or lack thereof, we assume that the same follows concerning the things themselves as well, just like we do when numbers are involved. 'Still it is not the same', for – as Boethius explains – if one hundred happen to be the result of one's reckoning, then the things matching that figure must also be one hundred and, accordingly, whatever is the result one reaches when he reckons right on his fingers, there's no doubt that we are to assume that the same also follows in the natural order of things. Now, this is not what happens when we lay down the path of an argument. [...]. Once Aristotle has established the difference between numbers and words, he turns to their similarity and establishes it without delay: just as with numbers, those who are good at working out figures show those who are not, namely those who do not know how to reckon, that they are out of their depth when they handle figures, likewise those who know how to argue show that the sophists are out of their depth when they discuss. Or else: just as some numbers are unfit and cannot uphold other numbers, that is they do not display the property of a given number – for instance, five does not have the properties of an even number – and are cast aside, that is are rejected by those who are knowledgeable in these matters, in the same way some words and sentences cannot display the properties nor meet the requirements of a proper deduction and are cast aside by those who know how syllogisms work]".

[T9] *Anonymi Aurelianensis I Commentarium in Sophisticos Elenchos*, ed. EBBESEN, pp. 27-28, ll.14-13 and p. 29, ll. 1-12: "NAM QUONIAM EST <165a6>, id est contingit, disputare non ferentes, id est non proponentes ipsas res de quibus disputatur, sed utimur nominibus disputando pro rebus; [114b] cetera praedicto modo legantur. Nota ideo Aristotelem se communicasse ita male arbitrantibus ut arrogantiam vitet et se hac arte indigere ut alios notet. Quoniam, ut Boethius dicit in secundo commento super Porphyrium <*in Porphyrii Isagogen* II, I, 2, p. 138>, antequam ars ista esset tradita et remedium ad ipsam, singuli arbitrabantur in rebus accidere idem quod in nominibus, et ideo fere omnes fallebantur putantes quod dicitur de nomine dicendum esse de re, et ut nomen dicitur de nomine, sic res dicatur de re. VELUT IN COMPOTIS <165a9>, vel 'IN NUMERIS' secundum aliam translationem, quasi diceret: quoniam nominibus utimur gratia rerum, videtur [28] nobis accidere in rebus quicquid in nominibus, decepti similitudine numerorum, quibus similiter gratia rerum utimur, nam et in rebus quidem accidit fere quicquid in numeris, ut si numerus binarius et res duae, si numeri pares vel impares et res si-

militer, et tot res quot numeri, quod non accidit in orationibus; et hoc est 'VELUT', id est: sic arbitramur accidere in rebus ut in nominibus velut accidit ratiocinantibus in compotis id est in rationibus numerandi, ut scilicet illi inveniant fere eodem modo accidere in numeris et rebus. Compotus est numerandi ratio. HOC AUTEM NON EST SIMILE <165a10>, quod scilicet se **habeat in orationibus et rebus quemadmodum in numeris et in rebus**, etc. [...]. QUEMADMODUM <165a13>. Inconvenienter videtur inferre, cum dixerit non similiter esse in numeris et orationibus, id est **non similiter habere se numeros et orationes ad res**. Sed si quis bene inspiciat poterit hic notare locum a maiori hoc modo: **dixerat enim hoc non esse simile eo quod difficillimum sit falli in numeris**, cum in rebus eodem accidat modo, facillimum autem in orationibus, quare non est mirum si accidat falli in orationibus, cum etiam et in numeris accidat, et hoc est QUEMADMODUM IGITUR ILLI QUI NON SUNT PROMPTI FERRE NUMEROS, id est qui non sunt expediti in arte numerandi et in computatione numerorum, ut si quaeratur ab eis quanta sit summa istorum numerorum, scilicet XX.L.D.III.V, et nesciant reddere summam nisi detur tempus meditandi ['in fact, since it is', that is to say since we happen to argue without carrying around or putting on display the very things we talk about, but we use words instead of things in our discussions, the rest is to be understood in the aforementioned way. Now, do notice that Aristotle expressed himself thus lest those who are quick to misjudge accuse him of arrogance; take also notice that Aristotle wrote as if he lacked such an art himself, just like the others. Since, as Boethius explains in his second commentary on Porphyry, before the technique sophists resort to was handed down along with its antidote, people deemed that what happens with words also is the case for the things the words stand for. As a result, almost everyone was mistaken because they thought that whatever words allow to say of one another, the same applies to the things themselves and that, for the same reason, just as a given word is said of another, the things themselves are also said of one another. 'Just as with calculations' or, according to another translation, 'with numbers' as if Aristotle was saying: since we use words as substitutes for things, we are under the impression that things behave in the same way words do and we are deceived because of what happens with numbers, which we also use in a similar way as substitutes for things. As a matter of fact, things and numbers behave in almost exactly the same way. For instance, when a number is two or a multiple of two, then the things are two as well. Again, when numbers are either even or odd, then the things they stand for are too. Whilst there are exactly as many things as their number says there are, this is not what happens when we speak about things. And this is what 'just as' means here, namely we think that what happens with words also happens with things as this is the case for those who calculate with their reckoning, that is with numerical ratios, insofar as those who calculate find out that what happens with numbers is exactly identical to what happens with things. Reckoning here means numerical ratio. 'Still it is not the same', that is to say **linguistic expressions and things are not in the same relation as numbers and things**, etc. [...]. 'Just as', that is we are mistaken when we infer from words how things are in the same way we do it with numbers, for Aristotle has just said that the same does not apply to numbers and linguistic expressions alike, that is to say numbers and linguistic expressions do not stand in the same relation to things. If we read carefully, we'll dis-

> cern here an argument *a fortiori* as follows: Aristotle maintains that words and numbers are not alike insofar as it is **extremely hard to be wrong when numbers are concerned**, the reason being that what happens with numbers is identical to what happens with things; whereas it is very easy to be wrong when linguistic expressions are involved. Accordingly, there is nothing surprising when one makes a mistake involving linguistic expressions, for this can also happen when numbers are involved. And this is what Aristotle refers to when he says: 'just as in the case of those who aren't any good with figures', namely those who are not deft at counting numbers and reckoning figures, as when they are asked to say how much is twenty plus fifty plus five hundred plus three plus five and are unable to answer unless they are given some time to work the sum out]".

As [T8] and [T9] show, Boethius' translation ([UR-TEXT^{B}]) and Boethius' cue ([T7]), when taken together, are a mixed bag at best. In the former ([UR-TEXT^{B}]) there is no mention of computational symbols (pebbles) as analogical counterparts to linguistic ones (words both taken by themselves and compounded together) – most certainly, calculations (*compoti*), let alone numbers (*numeri*), are not symbols or, at any rate, they are not symbols in the sense stone counters and words are. In the latter ([T7]) the results we end up with when we reckon and the conclusions we reach when we argue are pitted against each other. Latin commentators followed Boethius on both counts: that is, they usually went along with the [ARITHMETIC BIAS] Boethius hardwired into them, namely that computations and numbers – Boethius' substitutes for Aristotle's counters – are what the Aristotelian analogy is all about, it being understood that therefore it is not an analogy at all ([DISANALOGY BIAS]). As a matter of fact, on Boethius – and the Boethian tradition's – terms, Aristotle's simile explains, to an extent, why we cannot expect linguistic expressions to behave in the same way numbers do, insofar as – precisely – the calculations involved are plain arithmetic ones, which can't go wrong as such. However, this does not help us much understand why both arguments and calculations rely on symbols and, more to the point, why – under certain conditions, similar conditions to be sure – linguistic and computational symbols do more harm than good (this is the way an analogy is supposed to work, isn't it?).

Later commentators built on both Boethian foundations with their usual ingenuity and exegetical finesse[27]. Two more highlights will provide a sense of how [ARITHMETIC BIAS] and [DISANALOGY BIAS] bolstered each other and became the standard story:

27. EBBESEN 1993 supplies extensive information about available editions and extant manuscripts of Latin commentaries. An updated list will include (detailed references are provided in the first section of the bibliography below): *Anonymi Cantabrigiensis Commentarium in Aristotelis Sophisticos Elenchos*; *Anonymi Marciani Commentarium in Sophisticos Elenchos Aristotelis*; *Anonymi Pragensis Quaestiones super* ARIST., *De Sophisticis Elenchis*; *Anonymi Mazarinei Quaestiones Super Librum Elenchorum*; IOANNES DUNS SCOTUS, *Quaestiones super Librum Elenchorum Aristotelis*; GUALTERUS BURLAEUS, *Quaestiones super Sophisticos Elenchos*.

[T10] *Anonymi Cantabrigiensis Commentarium in Aristotelis Sophisticos Elenchos*, ed. Ebbesen, pp. 68-70: "NAM QUONIAM NON EST <165a6> i.e. non contingit semper 'NOS FERENTES IPSAS RES DISPUTARE', i.e. nos in disputatione ipsas res deferre posse. Ferre dicitur rem in disputationem qui rem illam de qua fit sermo potest demonstrare ad oculum. Hoc autem non possumus semper facere, quoniam quandoque res absens est, quandoque incorporea, quandoque de aliquo indeterminato fit sermo; 'SED TUNC UTIMUR PRO REBUS NOMINIBUS NOTIS' <165a7>, i.e. significativis rerum. Vel notis i.e. cognitis et usitatis. Et quoniam, inquam, oportet [69] nos uti nominibus pro rebus, quando hoc fit, 'ARBITRAMUR QUOD ACCIDIT IN NOMINIBUS ACCIDERE IN REBUS' <165a9>, unitatem scilicet in significato secundum nominis unitatem attendendo et semper diversitatem significationum ex varietate nominum considerando. Unde decipimur putantes vere esse syllogizatum in aequivoco. Arbitramur, inquam, similiter esse in rebus et in nominibus, 'VELUT RATIOCINANTIBUS IN COMPOTIS' <165a9>, i.e. in computationibus – in illis, inquam, videtur **similiter esse in numeris et numeratis, et merito**, nam progressionem rerum numeratarum sequitur progressio numeri et econverso; paritatem numeri comitatur paritas rerum numeratarum, et si numerus finitus est, res numeratae finitae sunt. Omnis equidem proportio in numeris considerata in numeratis rebus sibi similiter respondet. Arbitrantur, inquam, quidam sic esse in significantibus et significatis ut computantibus in numeris et numeratis; 'HOC AUTEM NON EST SIMILE' <165a10>, nam cum numeri certam comprehensionem certarum <rerum> comitetur comprehensio, nec sic est in nominibus et rebus, 'NAM NOMINA QUIDEM <FINITA> SUNT ET ORATIONUM MULTITUDO FINITA EST, RES AUTEM INFINITAE SUNT NUMERO' <165a10>. [...] [70] [...] QUEMADMODUM <165a13>. Ex praedictis patet **aliter esse in numeris quam in sig<nifi>cantibus, unde horum ad invicem manifestatur differentia**. Ne ergo nullo modo convenientia videantur, ostendi<t> in quo simile accidat in his et illis. Dicit ergo quod sicut in numeris qui nesciunt multiplicationes et divisiones numerorum expelluntur a peritis, sic et qui significationes vocabulorum nesciunt a scientibus abiciuntur. Et hoc est: in praedictis differunt nomina a numeris, ERGO i.e. sed QUEMADMODUM ILLIC i.e. in numeris QUI NON SUNT PROMPTI FERRE NUMEROS i.e. qui non sunt periti circa numerorum proprietates (ferre dicitur ille numeros qui novit scientiam multiplicandi <et> partiendi) EXPELLUNTUR A SCIENTIBUS et pro imperitis reputantur, sic et in orationibus se habet quod illi sc. QUI SUNT IGNARI VIRTUTIS NOMINUM i.e. significationis nominum paralogizantur ['for since it is not etc.', namely insofar as it is not always the case that we discuss things by bringing them into our conversations, that is insofar as it is not always the case that we can bring the things themselves into our discussions. By bringing something itself into a conversation Aristotle refers to what happens when we can put under someone else's eyes the very thing the discussion is about. We can't do that every time, because sometimes we talk about missing things, sometimes about immaterial things and sometimes about things in general. 'We then use words as symbols instead of things', that is words which refer to things or, if we understand the word 'notis' otherwise, words which we know and use every day. And because, as I say, we need to use words instead of things, when this occurs 'we deem that what happens in the case of words, happens in the case of things as well', namely we expect that one and the same word always has the same

meaning, whilst different words have different meanings. As a result, we deceive ourselves when we think that a proper deduction has occurred while in reality equivocity has prevented it from happening. We assume, I say, that the same goes for words and for the things words stand for, just as those who reckon think when they go about their computations, that is when they do their calculations. In computations, I say, **the same goes for numbers and the things numbers stand for – and rightly so**: as a matter of fact, incremental series of numbered things follow the series of numbers and the other way around. Equal amounts of things match their number, and if the number is a finite one, then the things the number stands for are finite too. Indeed, the same relation that obtains between numbers is also to be found amongst the things numbers stand for. According to some, the words we use in order to say the things we say stand in the same relation as the numbers we come up with when we reckon stand in relation to the things whose numbers they are. But 'this is not the same' – as a matter of fact, getting a number right goes hand in hand with sorting out how many things exactly the number stands for, whereas this is not the case when words are involved: 'in fact, words as well as sentences are finite in number, whereas things are infinite in number'. [...]. 'Just as' – from what we have just said, it is clear that **numbers and words are at variance so that their difference stands out**. In order to rule out that they are related in any way, Aristotle shows what it is that happens in similar fashion when we work out numbers and when we resort to words. To that effect, Aristotle says that just as those who, working out numbers, do not know how to multiply and how to divide are outsmarted by those who are good at it, the same happens to those who know little about the power of words and are no match for those who are knowledgeable in this regard. And this is: words and numbers differ the way we said, that is 'then just as in the case of numbers', namely 'in the case of those who are not proficient at crunching numbers', that is those who are not familiar with the properties of numbers (handling numbers means here knowing how to do multiplications and how to perform divisions) are overmatched by those who have such knowledge and are looked down upon as ignorant, the same goes for those who are engaged in a conversation: they are deceived insofar as they have little knowledge of the power of words, namely what it is that words stand for]".

[T11] Robertus Grosseteste, *Commentarium in Sophisticos Elenchos*, ms. Oxford, Merton College, 280, f. 4rb: "quod autem decipi possumus per nomen ostendit 'QUOD ACCIDIT IN NOMINIBUS IN REBUS ETIAM ARBITRAMUR ACCIDERE etc.' <165a8-9> et causam quare sic arbitramur dicit eo quod non afferimus res in disputatione, sed pro rebus utimur nominibus notis. Illud idem confirmat per simile quoddam ut quod videtur esse simile quod accidit computantibus: apud eos numerus significatorum respondet semper numero significantium et ideo non decipiuntur. Sed apud disputantes non est ita, quod innuit cum dicit 'HOC AUTEM NON SIMILE' <165a10> et causam quare non est simile subiungit et est ratio talis: tam nomina quam orationes sunt FINITA, res vero numero infinitae, plures igitur sunt res quam nomina. Si ergo significantur omnes res per nomina necesse est idem nomen et eandem orationem plura significare. Quoad hoc <non> advertentes, sed unam rem per unum significari credentes decipiuntur. Et ponit iterum similitudi-

> nem inter disputantes et computantes. Nam sicut computantes vituperant et expellunt computare nescientes, sic disputantes vituperant et confundunt virtutem nominum ignorantes [Aristotle shows that words can be deceiving by saying 'we assume that what happens with words also is the case for the things the words stand for'. Aristotle also says that the reason why we believe so is that we do not bring the things themselves we discuss into our conversations; rather, we use words as symbols instead. Aristotle drives the point home by way of an analogy, for this is somewhat similar to what happens to those who work out figures. As far as those who reckon are concerned, the number of signified things always matches the number of signifiers – this is why those who deal with numbers are not deceived. This does not apply to those who deal with arguments, as Aristotle suggests by saying: 'but this is not the same'; and Aristotle adduces as proof the fact that words as well as sentences are finite in number, whereas things are infinite. Accordingly, there are more things than there are words. As a result, if we are to refer to all things by way of names, then the same name and the same sentence must refer to more than one thing. But those who are not alert to such fact and believe that one name stands for one thing will be deceived. Aristotle resorts again to the analogy between those who reckon and those who argue: just as those who can work figures out disparage and humiliate those who can't, those who can argue disparage and humiliate those who do not understand the power of words]".

If we leave aside peculiar or idiosyncratic features – such as [T8]'s optimism about sorting out syllogistic compatibility and incompatibility at the sophists' expense – the general picture is clear enough: numbers and words have precious little in common. What ultimately sets them apart is that we can confidently take the former at face value, but not the latter. Numbers stand in a direct, straightforward and perfectly univocal relationship with the things whose number they are: when figures add up and calculations come together, reckoning numbers and reckoned things stand in a perfectly one-to-one relation with one another. As Boethius and Latin commentators in his wake put it, if – by our reckoning – there are one hundred what's-their-names out there, we won't find out, later, that there were in fact ninety-nine of them or one-hundred-one for that matter (if we got the maths right to begin with, that is). Words and word-compounds are nothing like that: they fail to achieve the same kind of transparency insofar as their relationship to the things they refer to is neither direct nor straightforward, let alone univocal. As a result, while numbers are relatively foolproof and we can put as much trust in them as we can possibly muster, words are likely to cause all sorts of trouble and we are well advised to proceed with utmost caution when matching them with the things they refer to.

11. *Sententia modernorum* (*potius orthodoxorum*)

Little, if anything, has changed to this day. [ARITHMETIC BIAS] still provides the foundation of contemporary understandings of Aristotle's computational analogy as an analogy in name only [DISANALOGY BIAS]. A few distinguished examples – one from each group of scholars worth mentioning in this connection – will show how the standard story has built momentum (or, rather, never lost it) and has become very popular with historians of Ancient and Mediaeval Philosophy alike as well as with bona fide philosophers who have joined the consensus over the years:

> [T12] DORION 1995, p. 206: "(*ad* 165a3) the case of the names we use instead of things is not exactly similar or even analogous to the case of the pebbles we use when we reckon. Because, for a reason Aristotle will introduce immediately afterwards, between words and things there is not the one-to-one relationship obtaining between counters and the unities constitutive of numbers".

> [T13] KRETZMANN 1967, pp. 362-363: "ambiguity, Aristotle maintained, is theoretically unavoidable, [363] for since 'names and the sum-total of formulas [*λόγοι*] are finite while things are infinite in number... the same formula and a single name must necessarily signify a number of things'. This will, however, give us no trouble unless 'we think that what happens in the case of the names also happens in the case of the things, as people who are counting think of their counters', which are in a one-to-one correspondence with the things counted (*Sophistical Refutations*, 165a5)".

> [T14] FOUCAULT 1971, pp. 43-44: "let us leave to one side the extension that must be given to this text. One thing that is clear here is the location of the sophistical effect. It is made possible by the fact that it is not things themselves which are manipulated in the discourse, but their verbal symbols. Precisely, their name. But if this symbolization makes the sophism possible, it does not explain it. The sophism does not take place in the dimension in which words are signs. It takes place in a certain difference between names and things, between the symbolic elements and the elements symbolized. In what does this difference consist? It does not consist in that by which words produce an effect of meaning, whereas things do not. No more does it consist in the difference between *phusis* and *nomos*, between the natural character of things and the conventional character of words. It consists in the fact that there is a finite number of names and an infinite number of things, that there is a relative scarcity of words; that we cannot establish a bi-univocal relation between words and things. In short, the relation between words and what they designate is not isomorphic to the relation that enables one to count".

12. *Italiani brava gente*

If there's such a thing as an intellectual geography of Aristotelian scholarship, Italian staunch support of the majority view ([ARITHMETIC BIAS] + [DISANALOGY BIAS]) would certainly make for an interesting case in point. Exceptions are exceedingly few and far between (two overall that I know of, namely FAIT 1996 and – as a distant second – GAZZIERO 2021b). Moreover, they are unlikely to turn the tide any time soon – there's strength in numbers and Italian numbers are solid and overwhelmingly against a change away from the mainstream interpretation:

> [T15] PAGLIARO 1962, pp. 45-46 (= DI CESARE 1981a, pp. 22-24 and DI CESARE 1981b, pp. 16-20 – down to the word): "Aristotle introduces a sharp distinction between the language of numbers, on the one hand, and the language of spoken words, on the other hand. [...]. Plainly, what sets apart those who speak and those who reckon with pebbles (it being understood that their kinship is limited to the fact that neither deal directly with the things themselves) is the fact that, when we count, symbols' extensional relationship to things is straightforward – in fact, univocal insofar as one pebble refers, say, to one book, two pebbles refer to two books and so on and so forth. On the other hand, language operates with signs whose reference has a wider scope. As a matter of fact, their reference to concrete objects results in a joint determination, both connotative and extensional: for instance, the word 'book' refers to a variety of books which differ not only in shape and content, but also in number, be it one book, two, three or all of them for that matter (we say, for instance, 'the book contributes to the dissemination of culture'). Fallacies arise from within the scope of meaning so understood as a concept".

> [T16] BELARDI 1975, pp. 141-142 (= BELARDI 1976, p. 83): "*psêphoi* and *pragmata* stand in a one-to-one (1:1) relationship on account of there being so many pebbles, the *calculi*, as there are things to refer to – their relationship is therefore a numerical representation, namely a reckoning. *Onomata* and *pragmata*, on the other hand, stand in a different relationship altogether, that is a one-to-many relationship (1:n, where 'n' is a placeholder for a whole number whatsoever). As a matter of fact, even if linguistic signs count as one, for instance the word 'man' is one sign, they each stand for an unlimited number of things, men-things in this particular instance – their relationship is therefore a symbolic representation, namely a word. Accordingly, the relationship between *psêphoi* and *pragmata* rests on a numerical identity between pebbles and things. On the contrary, the relationship between *onomata* and *pragmata* can be hardly quantified – it is indeterminate or, rather, indeterminable on account of the infinite scope of things names apply to. As a matter of fact, each name can refer to whichever actual or possible individual out of the infinite number of individuals of the same kind the name stands for by virtue of an abstract generic notion which applies to them all".

> [T17] COSERIU 1979, p. 436 (= COSERIU 1981, pp. 10-11): "Aristotle compares names and counters precisely to show that they do not work in the same way and

that the relationship between name and thing is sui generis. Obviously, Aristotle's point here is not so much that things and names are not the same, as it is that the relationship between them bears no analogy to the relationship between counters and things. Counters stand in a one-to-one relationship to the things they refer to [...]. Their relationship is direct: counters simply stand for things. Counters have no 'meaning'. Their only function is to represent things or to refer to them, directly. Names are different. A name does not refer directly to any given thing. What it stands for is one single meaning through which it refers to a multitude of things (essentially, it refers to whatever falls under its meaning, namely everything that is what the name means or displays the features the name refers to). This is precisely why 'those who are not cognizant of the power of words' (*οἱ τῶν ὀνομάτων τῆς δυνάμεως ἄπειροι*) run into all sorts of trouble".

[T18] Gusmani 2004, p. 155 (≈ Gusmani 1986, p. 538 and Gusmani 1993, p. 111): "Aristotle means to contrast, on the one hand, the way abacus counters work (these are symbols just as words are, but they stand in a 1:1 relationship to the things whose numbers they are) and, on the other hand, the way linguistic items work (with the possible exception of proper names, which are not relevant here, these are supposed to refer to n things of the same kind)".

[T19] Chiesa 1991, pp. 227-229 – *reportatio*: Aristotle's 'arithmetic comparison' sets out to restore the truth about language by debunking the alleged term-to-term correlation between words and things – a fallacious, self-serving assumption which is tantamount to treating language as a vote count of sorts where the number of ballots (*ψῆφοι*) actually stands in a one-to-one relationship with the number of votes cast in the booth.

[T20] Lo Piparo 2003, pp. 184-186: "what Aristotle tells us is, precisely, that words, and not pebbles, are symbols. [...]. As Aristotle observes, the way words-which-are-symbols and the way pebbles-which-are-not-symbols refer [185] to facts differ from one another. To keep track of – say – the sheep one buys or sells, one simply has to match a pebble to each sheep. On the other hand, in order to convey one's intent to buy sheep rather than cows, one needs both words – in this particular instance, 'sheep' and 'cow' – which allows him to assign, individually and separately, all possible sheep and all possible cows. That is to say, words like 'sheep' and 'cow' function as operators by means of which each element of a virtually infinite set of sheep is identified as such (that is, as a sheep) and each elements of a virtually infinite set of cows is also identified as such (that is, as a cow). The correlation in this case is no longer a 'one-to-one' relationship (a pebble ⇔ a sheep) but a 'one-to-many' (the word 'sheep' → many sheep). [...] [186] If words referred to things the way pebbles, counters or tokens do, then rhetoric, literary works, false syllogisms, reductions to the absurd, metaphors would simply be impossible. But words are nothing like pebbles".

[T21] Sorio 2009, p. 301: "by comparing names (*ὀνόματα*) and pebbles (*ψῆφοι*), Aristotle highlights an important difference between the two: for we cannot bring

the things themselves (*πράγματα*) into our debates – in fact, in our discussions at large (of course, Aristotle's remarks apply first and foremost to dialectic, but are not restricted to the dialectical sphere alone) – but we use names as symbols (*σύμβολα*), that is as substitutes for things, one can be mislead, as Aristotle suggests in the same breath, into thinking that names and counters stand in the same relationship to things. As a matter of fact, when we work numbers out, the relationship is a one-to-one straightforward numerical correlation: five pebbles, for instance, stand exactly for five coins. It therefore seems that, according to Aristotle, pebbles are not *σύμβολα* or, at any rate, they are not symbols in the same way names are. It also appears that the relationship between counters and *πράγματα* involved in the *λογίζεσθαι* cannot be analogous to the relationship between names and things involved in the σημαίνειν".

[T22] Gusmani / Quadrio 2018, p. 58: "in *Soph. el.* 165a16, Aristotle provides a tentative theory of the symbolic character of linguistic signs. Here *δύναμις* refers to the *ὀνόματα*'s 'capacity' to refer to several *πράγματα* of the same class, as opposed to the 'capacity' of the pebbles of the abacus which are also symbols, but stand in a one-to-one relationship with the numbered objects. As a matter of fact, as far as their reference goes, linguistic expressions are inherently polyvalent, which allows them to express, by means of a limited number of signs, an unlimited number of aspects of the extralinguistic reality".

[T23] Crialesi 2020, p. 112: "according to Boethius, the cardinality of the set of reckoned numbers will always be identical to that of the set of real things. That is to say, natural or cardinal numbers are in a bijective function with things. It is not inappropriate to identify this conception as Aristotelian, if only we consider that Boethius derives the idea of the correctness of arithmetical reckoning, and thus of the capacity of numbers to signify the reality, from an Aristotelian text" – what text? Crialesi 2020, p. 113: "the roots of this conception of numerical calculation displayed in the Second Commentary on the *Isagoge* are detectable in Aristotle's *Sophistical Refutations*, which Boethius himself translated into Latin".

Granted that naming and reckoning are nothing alike (all things considered, we no more add, subtract, divide or multiply words than we speak in numbers), one might then start to wonder whether Aristotle's analogy is not 'mistaken' after all (Schreiber 2003, p. 12 made the ludicrous claim, in so many words) – or is a different understanding of Aristotle's analogy possible? By now, it should be clear that our answer is 'yes' – provided, of course, we give up either [arithmetic bias] or [disanalogy bias]. Better still we might bring the whole house of cards down and drop both assumptions. Latin commentators were not ones for half-measures and, in this respect, we can definitely take a page or two from their book[28].

28. This is, of course, a half-truth at best. That being said, there's complicated and too complicated. So we'll keep it relatively simple for the sake of the current argument, which purports to show how

13. *Sententia latinorum* (*minus orthodoxorum*)

In this connection, two Latin commentators definitely stand out, in a good way: Anonymus Bavaricus and William of Ockham. While neither seemed to push a particular agenda of their own (on the face of it, they were simply more right than they thought) both circumvented the two biases that are the hallmarks of the standard story. As a matter of fact, not only did they get past the idea that there's nothing more at stake in [Ur-Text] than smooth arithmetic routines and the arithmetic skills involved in adding, subtracting, etc. ([arithmetic bias]), but they also broke free from the concomitant notion that, for this reason, the way we usually steer clear of problems when we work out numbers provides a foil for highlighting the predicaments we get ourselves into when we misapply words, as opposed to shedding any significant light on why language fails us in the first place ([disanalogy bias])[29]:

good mediaeval commentators were at their best. As befits an homage to Jean Celeyrette, Gazziero forthcoming will deal with the whole array of alternative solutions within the arithmetical framework: non-standard or subtractive notations of Roman numerals (Nicholaus Parisiensis, *Notulae super Librum Elenchorum*, ms. Praha, Knihovna Metropolitni Kapituli, L.76, f. 56rb), algorisms (Aegidius Romanus, *Expositio super Libros Elenchorum*, ed. Venetiis 1496, f. 6ra), rhythms and metres (Aegidius Romanus, *Expositio super Libros Elenchorum*, ed. Venetiis 1496, f. 6ra), rithmomachy (*Anonymi Aurelianensis I Commentarium in Sophisticos Elenchos*, ed. Ebbesen, p. 29; and Albertus Magnus, *Expositio Sophisticorum Elenchorum*, ed. Borgnet, p. 529b) – you name it. Here's one highlight out of several the subject has to offer: whilst mainstream and essentially in line with their arithmetical background, Nicholas of Paris' and Giles of Rome's suggestion that the positional character of numerical notation is to be blamed was a huge step in the right direction. Even if their observations can hardly apply to Aristotle, they both got that much right: the whole point of Aristotle's analogy is that those who count can get it wrong too. In so many words: "sicut ille qui nescit computare propter hoc quod figura una in numeris secundum diversos situs non unum sed multa significat, 'expelluntur', id est decipitur 'a scientibus', sic ille qui non cognoscit virtutes vocabulorum a scientibus decipitur [just as someone who does not know much about working figures out, insofar as <e.g. he overlooks the fact that> one and the same digit has not the same but different values when its position changes, is entrapped, namely is deceived by those who have such knowledge, in the same way he who ignores the power of words is deceived by those who have such knowledge]" (Nicholaus Parisiensis, *Notulae super Librum Elenchorum*, ms. Praha, Knihovna Metropolitni Kapituli, L.76, f. 56rb); "sicut apparet in algorismos, ubi una figura aliter et aliter situata alium et alium numerum importat, quia si primo loco ponitur repraesentat se ipsam et secundo loco decies se ipsam, sicut ergo in talibus posset esse deceptio accipiendo unum numerum pro alio, sic et in orationibus, propter nominum multiplicitatem, accidit esse deceptio [as algorisms make it plain insofar as the same digit is worth a different number as soon as it changes its place – for instance, in one place it is worth its numerical value, whereas in another place it is ten times worth what it was. Accordingly, therefore, just as one can get a number wrong and confuse it with another number, in the same way one can be deceived in a conversation insofar as words may refer to more than one thing]" (Aegidius Romanus, *Expositio super Libros Elenchorum*, ed. Venetiis 1496, f. 6ra). Truth be told, Robert Kilwardby made a similar claim but did not provide much in the way of explaining why numeral symbolism can be misleading too (cf. Robertus Kilwardby (?), *Commentarium in Aristotelis Sophisticos Elenchos*, in **C**, f. 278rb; **P**, f. 2vb).

29. The truth, nothing but the truth and yet not the whole truth (again). One might be tempted to mention Anonymus monacensis as a third unsung hero of the abacus saga and to reconstruct along the same lines his understanding of Aristotle's analogy, but we won't – here. Sure enough, the

[T24] *Anonymi Bavarici Commentarium in Aristotelis Sophisticos Elenchos*, ms. München, Bayerische Staatsbibliothek, Clm. 8002, f. 2rb-2va: "tunc cum dicit VELUT etc. <1, 165a9> declarat illud per simile et dicit [2va] quod simile huic sit in compotis ratiocinantibus. Illi enim aliquando loco unius librae ponunt unum lapillum et pro alia illum et pro alia alium et sic cum tres sunt lapilli credunt tres esse denarios vel tres esse solidos. Et similiter si in loco viginti librarum ponatur unus lapis pro tanto alius et tunc ad numerum lapidum sumatur numerus librarum non esset bonum; eodem modo ex ista parte quia nominibus notis pro rebus utimur ideo quod accidit in nominibus accidere arbitramur in rebus. Deinde cum dicit HOC AUTEM NON EST SIMILE <1, 165a10> ponit causam defectus aequivocationis et dicit quod defectus est multitudo significatorum. Istam sententiam ponit sic HOC AUTEM NON EST SIMILE <1, 165a10> et istud debet retorquere ad illud quod primo fuit dictum de causa apparentiae, quod scilicet causa est in ista fallacia quando nos ita credimus accidere in rebus et in nominibus quod sicut vox est una et res sit una. Hoc autem non est simile quoniam aliquando vox est una et tamen sunt multa eius significata, quae multitudo significatorum decipit nos [by saying 'just like, etc.' Aristotle introduces an analogy and states that what happens to those who count when they go about their calculations is alike to what happens here. Indeed, those who reckon sometimes assume that one pebble is worth one pound, another pebble is worth another pound and a third pebble is worth one more pound. Accordingly, since there are three pebbles, they therefore infer that there are as many schillings or pence. On the other hand, if we are to assume that one pebble is worth twenty pounds and another pebble is worth as much, then figures will not add up if we keep comparing the number of pebbles, on the one hand, and the number of pounds, on the other hand. The same goes for the other half of the analogy, for we

anonymous commentator must have thought that those who reckon do not fare much better and may turn out to be every bit as mistaken as those who put their trust in words. More to the point, he nailed it when he surmised that Aristotle's analogy has to do with the way we handle stone counters, wood sticks or whatever else we use to count, reckon or calculate with (*Anonymi Monacensis Commentarium in Sophisticos Elenchos*, **M**, f. 4ra; **A**, f. 7ra: "lapilli, ligna, vel aliquid alterum mediante quo computant vel numerantes in compotis vel computantes"). That being said, he was not so eager to make the point that computational symbols are as shifting and ambiguous as linguistic ones – which is the main reason Aristotle brought them together in the first place. Accordingly, maybe one should not read too much into his most intriguing suggestion – namely: "ERGO QUEMADMODUM ILLI etc. <165a13> qui non sunt prompti, id est docti FERRE NUMEROS, id est qui nesciunt computare prompte expelluntur a scientibus computare **prompte et velociter**. EODEM MODO ET IN ORATIONIBUS <165a15>, id est a parte orationum, illi QUI SUNT IGNARI VIRTUTIS NOMINUM id est ignorantes significationes nominum et quicquid possit apprehendi et intelligi per illa PARALOGIZANTUR id est decipiuntur ['just as in the case of those who' are not proficient, i.e. are not expert at processing numbers or do not know how to reckon promptly, are no match for those who know how to reckon swiftly and quickly; 'the same applies to discussions', i.e. on the side of discussion. 'Those who are not familiar with the power of words', i.e. those who are not cognizant of the meanings of words and everything one can learn from the power of words are misled by fallacious reasonings, that is are deceived]". Anonymus monacensis' legitimate concern with the swiftness and promptness in calculations (*computare prompte et velociter*) might, after all, have less to do with the manual dexterity some display in moving the counters around, which is as close as one can possibly get to the truth of Aristotle's analogy, and more to do with how quick one is able to go through numbers, which is pretty standard lore (cf. e.g. Anonymus Aurelianensis' [T9], most notably p. 29, ll. 11-12).

use words as substitutes for things and we therefore believe that what is the case for words is also the case for the things words stand for. Next, by saying 'still it is not the same', Aristotle dwells on the cause which brings about the fallacy of equivocation and he states that its flaw consists in the multiplicity of things an ambiguous term refers to. Aristotle makes this point by saying 'still it is not the same' and one has to understand the claim by referring it back to what Aristotle has previously said about what grants the fallacy of equivocation its deceptive allure, that is to say the fact that we believe that the same goes for both the words and the things they stand for, so that we are led to believe that one and the same word refers to one and the same thing. But this is not the case insofar as sometimes the same word refers to more than one thing and its polysemy deceives us]".

[T25] Guilelmus de Ockham, *Expositio super Libros Elenchorum*, I, 3, ed. del Punta, p. 11, ll. 86-89: "ponit exemplum de ratiocinantibus in computis, quia in illis apparet aequivocatio; nam in illis aliquando unus lapillus significat unum denarium aliquando duodecim, aliquando unam libram aliquando sexdecim [Aristotle resorts to the example of accountants performing calculations, for ambiguity <also> occurs in calculations. As a matter of fact, while reckoning, one and the same pebble sometimes means one penny sometimes means twelve pence, sometimes one pound sometimes sixteen pounds]".

[T24] and [T25] are a testament to Latin commentators' matter-of-fact ingenuity and no-nonsense, down-to-earth approach[30]. Indeed, there's much we can learn from both Anonymus Bavaricus and William of Ockham's unorthodox views on what is going on in [Ur-Text].

14. Lesson n° 1: "what is a pebble analogy about, if not pebbles?"

The first lesson we can draw is the most obvious – and yet it has proved elusive time and again. [T24] and [T25] make it plain that, contrary to what [arithmetic biased] commentators would have us believe, there is more to Aristotle's pebble analogy than plain numbers and smooth arithmetical calculations. In fact,

30. How Anonymus Bavaricus and William of Ockham managed to get all the abacus facts straight (despite being at a considerable disadvantage, that is) is, of course, a bit of a mystery and a story worth telling in its own right. As Gazziero forthcoming will show, it involves industrious minds who designed, built and modified counting boards (abacus inventors and abacus experts) as well as unscrupulous end-users who took advantage of some of their features (merchants, accountants, book-keepers and the like). For the time being, we'll have to rely on the fact that mediaeval commentators actually put two and two together and made the connection between Aristotle's analogy and the abacus. We will also have to rely on the scanty but rock solid evidence we already provided. In this particular instance, William of Conches tells us pretty much everything we need to know for the sake of our argument – most notably, [T4] confirms that the mediaeval abacus was a positional device where one and the same counter could be moved around and change its value accordingly.

by discarding or belittling the pebbles in the pebble analogy one is most likely to miss Aristotle's point altogether. In [Ur-Text] pebbles are of interest by themselves and their function is certainly neither to remind us that counter-assisted calculations follow the exact same rules as purely arithmetic ones nor to remind us that some of the people that toss the tokens around are more proficient than others when it comes to processing numbers as such or performing calculations at large. Rather, pebbles are there to warn us that those who rely on counters in their computational transactions and those who rely on words in their verbal interactions share the same predicament, namely: words, in the course of the same argument, and counters, in the course of the same calculation, do not always have the same value and – as if that wasn't bad enough – this is not something people with bad intentions advertise up front. As a result, neither words nor counters are entirely safe to play with, precisely because neither counters nor words – as opposed to plain numbers, say – operate at a level of transparency that would make them virtually indistinguishable from the things they stand for.

15. Lesson n° 2: "pounds, shillings and pence"

The second lesson we can learn from [T24] and [T25] is also of the obvious kind and yet, like the previous one, it has also been largely overlooked. Unlike most commentators, Anonymus Bavaricus and William of Ockham made ample allowance for computational concerns other than the purely arithmetical. More to the point (and more importantly) they both referred to specialized reckoning involving coins and monetary non-decimal conventions as opposed to focusing on numbers and arithmetical operations as such[31]. Understanding Aristotle's abacus analogy along the lines of practical computational routines – such as public accounting, private bookkeeping, business transactions and the like – might well be the best way of making sense of [Ur-Text]. On the one hand, it squares nicely with a vast array of ancient literary and epigraphic sources where the abacus is most commonly – in fact, almost exclusively – associated with counting money[32],

31. Without reading too much into it and without going into too much detail, Ockham's shift between one penny and twelve pence is telling. Whether consciously or unconsciously, it reflects the 1:12 standard conversion rate (12 pence = 1 shilling) between denominations (*denarii* and *solidi*) Mediaevals were familiar with (the same ratio is mentioned in e.g. *Anonymi Fallaciae Londinenses*, ed. de Rijk, p. 662, ll. 22-29). On Ockham's monetary environment, cf. the recent survey (1150-1350) in Kelleher 2018 (together with the extensive bibliography it provides).

32. Gazziero 2021b presents evidence from fifteen epigraphic collections and discusses some twelve staple texts which strongly support the conclusion that all known features of the ancient abacus had one thing in common: they were all meant to accommodate the needs and comfort of traders, auditors, bankers and other money peddlers whose interest in numbers did not go beyond counting coins, exchanging currencies, charging interest rates and, of course, preying on each other when selling and buying goods.

and, on the other hand, it is remarkably consistent with Aristotle's language and expression, right down to [Ur-Text]'s vocabulary itself[33].

16. Lesson n° 3: "failure means failure"

A third lesson we can take from [T24] and [T25] is that [Ur-Text] is a cautionary tale without bright side or silver lining: everybody and everything fails – those who reckon and what they reckon with no less than those who argue and what they argue with. Simply put, failure is the whole point here, failure to spot subtle and yet momentous changes in the worth of counters and in the meaning of words which plague discussions and calculations alike.

17. Epilegomena

Once we give up the idea that numbers as such took centre stage in Aristotle's counter analogy, we can set it back upon its feet by shifting its focus from trying to showcase why dealing with numbers is so successful whereas dealing with words is so troublesome to trying to explain why pebble reckoning and verbal sparring are both accident-prone – prone to the same accidents, that is. For this is, arguably, the main reason why Aristotle brought pebbles and words together to start with: being symbols whose value can change with us having a hard time keeping track or even noticing, pebbles and words are every bit as tricky. More to the point, they both require that we pay constant attention to what is (worth) what and that we watch out for those who will take advantage if we don't keep up. And this is, arguably, the most valuable lesson which [Ur-Text] – understood along the same lines Anonymus Bavaricus and Ockham did – can teach us about Aristotle's views on language, its involvement in arguments and how they play out: when it comes to squaring accounts – be it by means of arithmetical or verbal reckoning – there are those who play by the rules and those who don't. As it happens, just being good at numbers or being arithmetically proficient is not enough to keep con men and traffickers at bay. Knowing one's way around counting boards and digital dexterity at pushing the pebbles around or at least the ability to understand and follow their movements on the abacus is just as important. Likewise,

33. Ancient sources (as gathered and commented upon in Gazziero 2021b) also strongly support the conclusion that when *λογίζομαι* (as well as related words: *λογισμοί*, *λογιζόμενοι*, etc.) and *ψῆφοι* showed up in the same sentence as in [Ur-Text] 165a9-10, people were counting money on their own (Theophrastus, *Characteres*, XXIV, 12, ed. Diggle, p. 134, ll. 15-17) or someone else was counting money for them (Athenaeus Naucratita, *Deipnosophistae*, III, 117e3-118a13). Even *παραχρούω* in [Ur-Text] 165a15 had a nice, cheating-money-out-of-people ring to it (Arist. (quod fertur), *Mechanica*, 849b34-38).

going about one's conversational business with a decent grasp of the general principles of verbal communication and basic argumentation is not enough to stop fallacy-mongers in their tracks. Knowing one's way around linguistic pitfalls and tricks with words is at least as important. Admittedly, there's nothing particularly profound nor particularly exciting about all that; but, as a wise man once said: "better to be bored and safe than outgunned and outmanoeuvred at every turn" (or words to that effect).

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Abstract: The prologue of the *Sophistici elenchi* is as close an Aristotelian text gets to dealing with language as a subject matter in its own right, only in reverse. Language and its features bear consideration to the extent that they account for some major predicaments discursive reasoning is prone to, both as a separate and as a common endeavour. That being said, the linguistic pitfalls that trick us into thinking that whatever is the case for words and word-compounds is also the case for the things and facts linguistic items stand for reveal as much about good linguistic habits and sound argumentation as they themselves are revealed by the principles and rules our argumentation goes by. In this connection, Aristotle resorted to a curious (or not so curious) analogy between words and counters which played a major role in explaining why language is such a powerful source of illusion and deception. As it happens, Aristotle accounting analogy is a case in point for showcasing the level of sophistication mediaeval Latin literature on fallacies achieved as early as the first half of the twelfth century. As a matter of fact, Western commentators managed to build compelling cases both in favour of and against the understanding that was to become and still is the standard story – which, of course, speaks volumes about their exegetical proficiency and technical expertise. On the one hand, trusting implicitly Boethius' translation and well aware of his views on disputational hazards as opposed to computational reliability, they usually understood Aristotle's comparison as if it was an analogy in name only. On the other hand, despite Boethius' translation put them at a considerable disadvantage, Latin commentators were able to construe Aristotle's analogy as bringing together two sets of symbolic variables (words and counters) that are neither entirely free nor entirely bound – which expose them to subtle but critical shifts in value and meaning.

Keywords: Aristotle; Boethius; William of Ockham; Language; Arithmetic; Logic; Argumentation; Fallacies; Translation.

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