LIVING IN IRON, DRESSED IN BRONZE: METAL FORMULAS AND THE CHRONOLOGY OF AGES[1]

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Abstract. Names of important metals such as gold, silver, iron, and bronze occur many times in the Homeric Epics. We intend to look at them within the framework of oral poetry, with the purpose to determine if they form a more or less coherent set of "formulas", in the sense defined by Milman Parry and the *Oral Poetry Theory*[2], and to test a possible link with the stages of the evolution of humankind. Though several specialists criticized some excess in Parry's and Lord's definitions of the formula, we deem the theory still valuable in its great lines and feel no need to discuss it for the present study[3]. The frequent use of bronze in epical formulas for arms, while the actual heroes fight their battles with iron equipment, and the emphasis of gold in the descriptions of wealth may reflect a deep-seated linguistic memory within the archaic mindset of the *Ages of Mankind.* With Homer's language as our best witness, metal formulas testify to the importance of the tradition of the *Ages of Mankind* in understanding the thought patterns and value-systems, as well as some linguistic usages of the Homeric Epics.

Keywords: oral poetry, the Myth of Ages, metals, gold, bronze, iron, metaphors, anthropology

We shall here study the possible coherence or opposition between linguistic and literary artefacts in Homer and Hesiod on one hand, and archaeological or historical data on the other. We have first to prevent a naive approach, which would consist of equating the periods named after the main metal in use with the periods mentioned in myth as if it were an objective and realistic succession. In the civilizations concerned, iron was already known in the so-

called Bronze Age and, reversely, bronze was still in use in the Iron Age, now better called the Geometric period[4].

The status of metal metaphors, along with other materials like stone or wood, is also an important feature in approaching the ancient views on the qualities of those materials used as models for analysing phenomena that cannot be directly expressed in common language. The *Oral Poetry Theory*, confronted both with the chronological order in the Hesiodic myth and the stratigraphy of metaphors, will lead to some conclusions on the relative chronology of the poetic language of Archaic Greece.

The main interest we took in this study is anthropological: the language of the Epics shows how heroes are supposed to live in a world built mainly on bronze, iron being rarely mentioned for material goods. However, some phrases and images, either in the characters' language or in that of the poet, suggest that they fought with iron, which was the material able to provide an image of heart-hardness. The poet of the *Odyssey* uses a metallurgic image of a smith working iron, not bronze, for Odysseus piercing Polyphemus' eye: language leads us then to conclude that iron was of common use in real life (of both the poet and its audience, and maybe also in the hero's life), but despised as such, probably because of prestige reasons.

1. Materials in the Homeric World: a Linguistic approach through formulas

If we trust a statistical account leaning on an inquiry based on the TLG, the main metal used by the characters of Homer is bronze, with more than 300 items attested: it is used for arms, as well as for several tools in everyday life. The Homeric language thus reflects the world of the Mycenaean warriors[5] rather than the world of the Geometric period[6]. This does not mean that iron is unknown or of no use in Homer: the word for it - *sidēros*, though much less attested,

is often of high valuation, for instance, when iron is offered as a gift, as can be seen in Book 23 of the *Iliad*. Moreover, the Greek word σίδηρος, usually translated as "iron", actually corresponds both to iron and steel, as shown by Robert Halleux (2007). Thus, the numeric pre-eminence of χαλκός in the text is more impressive.

Gold and silver are also mentioned, though less frequently than bronze, and constantly as of a great price, attached to gods or the distant past of heroes. Materials such as tin, amber, lead, copper, ivory are also known, but their marginality seems to appear from their nearly total lack in formulas, comparisons and metaphors. On the other hand, formulas show a high degree of proximity between precious materials, especially gold and silver, and gods: several formulas imply various compounds built with χρυσο- and ἀργυρο- and, as shown below, the formulaic status of metals appears in the traditional epithets for gods: compare the formula[7] at the end of the verse: χρυσόθρονος Ἥρη - in the nominative, χρυσοθρόνου Ἥρης - in the genitive[8]. In the terms defined by Milman Parry, this is a "fixed" epithet, specific of the goddesses Hera, Eos, and Artemis, since the nominative also occurs with Artemis' name, in a different metrical configuration: *Il.* 8. 533 καὶ γὰρ τοῖσι κακὸν χρυσόθρονος Ἄρτεμις ὦρσε.

See the analysis by Parry, who did not specifically study this case of epithets concerning metals:

> (…) there is only a small number of noun-epithet formulae which have the same metrical value with another noun-epithet formula used in the same grammatical case for the same character. It should follow that with a few exceptions the poet uses the same epithet every time he uses a formula of a given length. If all epithets in Homer were distinctive, an investigation into the choice of epithets would have to stop there, and we would have to declare ourselves satisfied with this first proof of the traditional character of the epithet. For most of the epithets applied to the gods, this is true. […] It is otherwise with the epithets used for the heroes. Here the distinctive epithet […] is comparatively rare, and epithets employed indifferently for two or more heroes are far more numerous and occur with far greater frequency (Parry 1971, 83-84)

We may still note that these metals mentioned in the typical epithets for gods (especially goddesses here) may refer either to the mental representation of gods themselves or their statues[9]. A rationalizing view could hold that men used precious metals for making statues of gods and, therefore, imagined them after the model of these statues. But the reverse may also be said: men made images of their gods wearing gold and silver because they imagined them in gold and silver form, especially because the formulas from the traditional poetry motivated them to do so.

Thus, the formulaic style has χρυσόθρονος Ἥρη / Ἠώς at the end of the verse and χρυσόθρονος Ἄρτεμις with a third trochaic cut. The simple adjective χρυσὴ seems, in contrast, devoted to Aphrodite in several cases of the declension (nominative excepted); acc. χρυσὴν Ἀφροδίτην, gen. χρυσέης Ἀφροδίτης, dat. χρυσείῃ Ἀφροδίτῃ. We also note that the compound epithets χρυσήλακατος and χρυσήνιος seem specific of Artemis[10], χρυσάορος of Apollon, χρυσόπτερος of Iris, and χρυσόρραπις of Hermes. The analysis could be extended to objects and animals, as χρυσάμπυκας for horses. The specificity of epithets also occurs with compounds in ἀργυρο-: compare the verse-ending ἀργυρότοξος Ἀπόλλων with different associated goddesses (*Il.* 5.760 Κύπρις τε (…); 7.58 Ἀθηναίη (…)), and the usual verse-ending Θέτις ἀργυρόπεζα (2x), with a variant in the acc. εἰς Θέτιν ἀργυρόπεζαν, and another one that seems specific of *Il.* 1, ἀργυρόπεζα Θέτις at the beginning of the verse.

All this seems to fit with the analysis of epithets by Milman Parry and the use of fixed epithets for gods. Notice that absolutely no compound is found in Homer with the name of iron, which could be interpreted as a lower integration of this metal in the traditional language of the poet than gold and silver. But we shall see later on that the metaphorical usage shows an image in strong contrast with this first provisory conclusion, and it will be necessary to think about this contrast later in more depth.

Thus, in *Iliad* 5.721-731[11], the narrator follows the goddess Hera

in preparing her chariot with the help of Hebe, and numerous materials are mentioned in a luxurious exhibition:

> Ἥρη πρέσβα θεὰ θυγάτηρ μεγάλοιο Κρόνοιο·
> Ἥβη δ' ἀμφ' ὀχέεσσι θοῶς βάλε καμπύλα κύκλα
> Τῶν ἤτοι χρυσέη ἴτυς ἄφθιτος, αὐτὰρ ὕπερθε
> χάλκε᾽ ἐπίσσωτρα προσαρηρότα, θαῦμα ἰδέσθαι·
> πλῆμναι δ᾽ ἀργύρου εἰσὶ περίδρομοι ἀμφοτέρωθεν.
> Δίφρος δὲ χρυσέοισι καὶ ἀργυρέοισιν ἱμᾶσιν
> ἐντέταται, δοιαὶ δὲ περίδρομοι ἄντυγες εἰσι.
> Τοῦ δ᾽ ἐξ ἀργύρεος ῥυμὸς πέλεν· αὐτὰρ ἐπ᾽ ἄκρῳ
> δῆσε χρύσειον καλὸν ζύγον, ἐν δὲ λέπαδνα
> κάλ᾽ ἔβαλε χρύσει.᾽
>
> [Hera] the mighty, went away to harness the gold-bridled horses (χρυσάμπυκας … ἵππους),
> Then Hebe in speed set about the chariot the curved wheels eight-spoked and brazen, with an axle of iron both ways.
> Golden is the wheel's felly imperishable, and outside it is joined, a wonder to look upon, the brazen running-rim, and the silver naves revolve on either side of the chariot,
> Whereas the car itself is lashed fast with plaiting of gold and silver, with double chariot rails that circle about it, and the pole of the chariot is of silver, to whose extremity Hebe made fast the golden and splendid yoke, and fastened the harness, golden and splendid, and underneath the yoke Hera.[12]

The Homeric text seems here to keep the memory of the brilliant techniques of alloy and inlay, which we can see in some luxurious Mycenaean objects thanks to archaeology.

Some formulas combine several metals (and other possible materials, precious stones for instance): they seem to obey very strong constraints on word order and metrical forms, implying a kind of rhetoric of the materials). Thus, we meet "gold, red bronze, and fair-girdled women, and grey iron":

> *Il.* 9.365-367
> ἄλλον δ᾽ ἐνθένδε χρυσὸν καὶ χαλκὸν ἐρυθρὸν
> ἠδὲ γυναῖκας ἐϋζώνους πολιόν τε σίδηρον[13]

Gold and silver: *Il.* 10.438
ἅρμα δέ οἱ χρυσῷ τε καὶ ἀργύρῳ εὖ ἤσκηται

Gold, silver and ivory: *Od.* 23.200
δαιδάλλων χρυσῷ τε καὶ ἀργύρῳ ἠδ᾽ ἐλέφαντι.

Bronze and iron: *Il.* 7.473-4
ἄλλοι μὲν χαλκῷ, ἄλλοι δ᾽ αἴθωνι σιδήρῳ,
ἄλλοι δὲ ῥινοῖς, ἄλλοι δ᾽ αὐτῇσι βόεσσιν

Though in χαλκός τε χρυσός τε πολύκμητός τε σίδηρος, "bronze is there, and gold, and difficulty wrought iron" (*Il.* 6.48; 10.379; 11.133; *Od.* 14.324, 21.10), bronze is mentioned first, then gold and iron in the second part of the verse receives much importance with the adjective πολύκμητος. Formulas most usually ordinate metals on a clear scale going from the most precious to the most usual. Some exceptions may come from pragmatic reasons: in *Il.* 8.15 ἔνθα σιδήρειαί τε πύλαι καὶ χάλκεος οὐδός - from the usual priority of the door compared to the threshold when one enters a house. In Hephaistos' blacksmith, does the necessity of various degrees of heat explain why the god first puts into the fire bronze and tin, secondly gold and silver?

Il. 18.474-5
χαλκὸν δ᾽ ἐν πυρὶ βάλλεν ἀτειρέα κασσίτερόν τε
καὶ χρυσὸν τιμῆντα καὶ ἄργυρον· αὐτὰρ ἔπειτα
θῆκεν ἐν ἀκμοθέτῳ μέγαν ἄκμονα

He cast on the fire bronze which is weariness, and tin with it and valuable gold, and silver, and thereafter set forth upon its standard the great anvil (…)

The rhetoric mentioned above is particularly striking when the alliteration on *kh* coincides with an anaphora on compounds in πολύ, as in:

Il.10.314-5
ἦν δέ τις ἐν Τρώεσσι Δόλων Εὐμήδεος υἱὸς

> κήρυκος θείοιο πολύχρυσος πολύχαλκος (…)
> But there was one among the Trojans, Dolon, Eumedes'
> son, the sacred herald's, a man of much gold and bronze (…)

> Il. 18.289
> πάντες μυθέσκοντο πολύχρυσον πολύχαλκον·
>
> [mortal men would speak of the city of Priam] as a place with much gold and much bronze.

The particularized epithet, so frequently met for the Akhaioi, χαλκοχιτών – "bronze-armoured", could owe its frequency from this taste for sounds, as well as from its descriptive quality: second hemistich with gen. ≠ Ἀχαιῶν χαλκοχιτώνων, 25 ex./ with acc. ≠ χαλκοχίτωνας Ἀχαιούς (once: *Il.* 10.287); ≠ Ἐπειῶν χαλκοχιτώνων (once: *Il.* 4.537) / Ἐπειοὶ χαλκοχίτωνες (once: *Il.* 11.694); with Argeioi instead of the usual Akhaioi: one item only,

> *Il.* 4.285
> Αἴαντ᾽ Ἀργείων ἡγήτορε χαλκοχιτώνων, *see* also with Kreton
>
> *Il.* 13.255
> Ἰδομενεῦ, Κρητῶν βουληφόρε χαλκοχιτώνων;

whereas one item only is found for the Trojan side, *Il.* 5.180 Αἰνεία Τρώων βουληφόρε χαλκοχιτώνων, with the same pattern (addressed with a vocative and an epithet intertwined with the genitive of a people's name and its epithet), while Trojans and Achaeans usually contrast each another as "Trojans breakers of horses" vs. "Bronze-armoured Achaeans" (Τρώων θ᾽ ἱπποδάμων καὶ Ἀχαιῶν χαλκοχιτώνων).

Of course, we cannot succeed in justifying expression that we met, like *Od.* 13.136 (apart from the alliteration) χαλκόν τε χρυσόν τε ἅλις ἐσθῆτά θ᾽ ὑφαντήν.

These formulas show how important metals were in the real world to which the Epics allude: they are sometimes combined

together in inlaid or alloyed objects, or imagined as associated in the "real world" of heroes.

When several metals occur in a series, as noted above, the succession in the word-order generally corresponds to that of the *Myth of the Ages of Man* in Hesiod, except in the occurrences quoted above (for instance, when one sees "iron doors and bronze step", which could come from the priority of the door over the step). Another apparent inversion of the apparently "chronological" order, *Od.* 21.61 (…) ἔνθα σίδηρος / κεῖτο πολὺς καὶ χαλκός, seems to be motivated by the enhancing value of word-order, as the enjambment could testify.

Craftsmen specialized in working with metals appear in the Epics and, once more, the narrative language, starting from the name χαλκεὺς deriving from χαλκός, seems to reflect especially bronze, never iron:

> *Il.* 4.216 corr.
> (λῦσε) ζῶμά τε καὶ μίτρην, τὴν χαλκῆες κάμον ἄνδρες.
>
> [He slipped open the war belt and the flap beneath it] with the guard of armour that bronze smiths wrought carefully for him.

> *Od.* 3.432-4
> (…), ἦλθε δὲ χαλκεὺς
> ὅπλ᾽ ἐν χερσὶν ἔχων χαλκήϊα, πείρατα τέχνης,
> ἄκμονά τε σφῦράν τ᾽ εὐποίητόν τε πυράγρην,
> οἷσίν τε χρυσὸν εἰργάζετο[14]
>
> (…)The smith came,
> holding smith's tools in his hands, implement of his art,
> anvil, hammer, and well-made tongs,
> with which he worked gold.

The traditional language may clearly correspond to a different reality, where the same craftsman may work in iron as well as in bronze - and rather rarely gold - as Mycenaean and Geometric archaeology show and as occurs in modern languages (*see* the vocabulary of *orfèvrerie* in French, coming from *or* - "gold" and lat.

faber – "metal-worker"). It appears then that technology progressed or evolved while language remained the same, archaic words corresponding to the old and recent material at the same time. As S. West remarked, the tools brought by the workman are more appropriate to iron than bronze, though the poet explicitly says he worked in gold, in verse 435. In *Iliad* 18.410-3 and 476-7, Hephaistos uses the same equipment (410 ἀπ᾽ ἀκμοθέτοιο "from the block of the anvil", 412 φύσας "bellows", 476 ἀκμοθέτῳ, ἄκμονα "anvil", 477 ῥαιστῆρα κρατερὴν "the ponderous hammer" and πυράγρην "the pincers"). Though no note comments this point in Edwards' commentary, the tools are the same (the hammer and pincers).

Moreover, the context of *Od.* 9.391-4 in the *Kyklopeia* explicitly shows Odysseus practising a very accurate surgery on Polyphemus' eye, as a χαλκεὺc working iron, in one of the most interesting similes of the *Odyssey*:

> ὡς δ᾽ὅτ᾽ ἀνὴρ χαλκεὺς πέλεκυν μέγαν ἠὲ σκέπαρνον
> εἰν ὕδατι ψυχρῷ βάπτῃ μεγάλα ἰάχοντα
> φαρμάσσων· τὸ γὰρ αὖτε σιδήρου γε κράτος ἐστίν·
> ὣς τοῦ σίζ' ὀφθαλμὸς ἐλαϊνέῳ περὶ μοχλῷ.
>
> As when a smith man plunges a big axe
> or adze in cold water to temper it, and it hisses
> greatly for it is how it has again the strength of iron,
> so his eye sizzled around the olive-wood stake.

The comparison reveals here the practice of common life, as if the poet forgot for once the convention of bronze-armoured men, because he is speaking of Polyphemus' eye pierced by an arm made from an olive-tree and not of forging noble arms for warriors. Alfred Heubeck saw the importance of this passage for pondering the relation between language and *realia*, as well materials as technical knowledge and practise:

> The eye hisses (σίζ' 394) like a hatchet or σκέπαρνον (v. 237) plunged by a χαλκεὺς (Myc. ka-ke-u/khalkeus) into cold water to harden. Φαρμάσσω

> (hapax) is a technical term ('treat with a φάρμακον (here, liquid to temper the metal); harden'). Τὸ γὰρ (…) ἐστιν (*cf. Il.* IX 706): 'for the strength of iron depends on this hardening process'. While the poet elsewhere consistently archaizes (he equips his heroes exclusively with bronze weapons and tools) he includes in the similes pictures of the contemporary world. The technique here described was introduced in Greece around the ninth century BC. (R. Forbes, *Archaeologia*, K, 26, 32) (Heubeck 1989, 34)

The Epics also refer to the ancient craft of working gold: a *chrusochoos* is even mentioned by his proper name, *Laerkes*, in Nestor's realm (*Od.* 3.425). He is in charge of pouring gold on the horns of oxen for a sacrificial ceremony. Archaeology shows that this practice had a close correspondence in the Mycenaean world.

The skill to lay various precious materials into a work of art is well-known, as shows the scene of manufacturing the shield of Achilles by Hephaistos (18.474-8) - bronze, tin, gold and silver, and though the craftsman is a god, we see there the very tools a real workman needs for such a work, already mentioned above with the passage of *Od.* 3: *akmôn*, *rhaister*, *puragre*.

A simile met in *Od.* 6.232-4 attests the same craft consisting in pouring gold on silver, and also refers to this craft as a divine power of gods, either Hephaistos or Athena, or here both gods[15]:

> ὡς δ' ὅτε τις χρυσὸν περιχεύεται ἀργύρῳ ἀνὴρ
> ἴδρις, ὃν Ἥφαιστος δέδαεν καὶ Παλλὰς Ἀθήνη
> τέχνην παντοίην, χαρίεντα δὲ ἔργα τελείει,
>
> As when someone pours gold around silver, a skilful man
> whom Hephaestus and Pallas Athena have taught
> every kind of art, and fashions pleasing works,
> [so she poured grace upon his head and shoulders.]

It may appear interesting that we thus come to a conclusion similar to that reached by Glenn Most in a paper published in 1997, whose point of departure was different from ours[16].

2. COMPARISON WITH *THE MYTH OF AGES* IN HESIOD

As well-known, in his famous mythical narrative from the *Works and Days*, Hesiod mentions five successive races: gold, silver, bronze, heroes, and, finally, iron, in his terms our pitiable age. Well-known is also the fact that the mention of the Age of Heroes may be intrusive, relevant for a period later than the other ages, as a personal invention of the individual author[17], a remodelling of an old mythic tradition that probably came from Eastern sources, if we believe the parallels given by Martin L. West (1978, 172-175)[18], who concluded that there was a probable common origin of the myth in Mesopotamia (West 1978, 177):

WD 109-10
Χρύσεον μὲν πρώτιστα γένος μερόπων ἀνθρώπων
ἀθάνατοι ποίησαν Ὀλύμπια δώματ᾽ ἔχοντες.

128-30
Δεύτερον αὖτε γένος πολὺ χειρότερον μετόπισθεν
ἀργύρεον ποίησαν Ὀλύμπια δώματ᾽ ἔχοντες,
χρυσέῳ οὔτε φυὴν ἐναλίγκιον οὔτε νόημα·

143-146
Ζεὺς δὲ πατὴρ τρίτον ἄλλο γένος μερόπων ἀνθρώπων
χάλκειον ποίησ᾽, οὐκ ἀργυρέῳ οὐδὲν ὁμοῖον,
ἐκ μελιᾶν, δεινόν τε καὶ ὄβριμον· οἷσιν Ἄρηος
ἔργ᾽ ἔμελε στονόεντα καὶ ὕβριες, οὐδέ τι σῖτον

150-1
τῶν δ᾽ ἦν χάλκεα μὲν τεύχεα, χάλκεοι δέ τε οἶκοι,
χαλκῷ δ᾽ εἰργάζοντο· μέλας δ᾽ οὐκ ἔσκε σίδηρος.
[race of heroes]

174-178
Μηκέτ᾽ἔπειτ᾽ὤφελλον ἐγὼ πέμπτοισι μετεῖναι
ἀνδράσιν, ἀλλ᾽ ἢ πρόσθε θανεῖν ἢ ἔπειτα γενέσθαι.
νῦν γὰρ δὴ γένος ἐστὶ σιδήρεον· οὐδέ ποτ᾽ ἦμαρ
παύσονται καμάτου καὶ ὀιζύος οὐδέ τι νύκτωρ
φθειρόμενοι· χαλεπὰς δὲ θεοὶ δώσουσι μερίμνας.

Some of West's expressions ("entirely alien to the general Greek view of the past", for instance) seem absolute. But we might now more frankly disagree with him about the origins of the Myth: "The use of metal symbolism is most likely to have originated in the Near-East, where the technologies of metal-working were most highly developed" (West 1997, 312)[19].

Most's paper helps much in being more cautious about this question. Though Hesiod may have borrowed a great deal from the West, Most shows that the tradition of the *Myth of Ages* can be traced back to traditions that may be found in Homer if we accept his anteriority:

> Evidently, he not only had some contact with oriental myths —they seem to have made an important contribution to the succession myths of the Theogony—but was also intimately familiar with the Greek epic traditions. […] How much of the whole myth of the races in the Works and Days could have been derived from a thorough familiarity with the traditions of Greek epic? The answer is: a surprisingly large amount.
> The Homeric epics often suggest a three-part view of the course of human history. On the one hand, they look back upon the heroes as a race of men stronger than those alive now. […] On the other hand, the Homeric heroes themselves look back to a wild race of even greater and stronger men with whom most of them would not dare to contend. (Most 1997, 121)

Apart from the *Myth of Ages*, we find in Homer and Hesiod several allusions to the first human beings' birth from wood (oaks or ashes, when a specific species is named) and stone. They occur in proverbial sentences, most often spoken by the characters as if the form used was near the common language of their time.

> *Il.* 22.126-8
> οὐ μέν πως νῦν ἔστιν ἀπὸ δρυὸς οὐδ᾽ ἀπὸ πέτρης
> τῷ ὀαριζέμεναι, ἅ τε παρθένος ἠΐθεός τε
> παρθένος ἠΐθεός τ᾽ ὀαρίζετον ἀλλήλοιιν.[20]
>
> There is no way any more from a tree or a rock to talk to him gently
> whispering like a young man and a young girl, in the way
> a young man and a young maiden whisper together.

Od. 19.163-4
ἀλλὰ καὶ ὣς μοι εἰπὲ τεὸν γένος, ὁππόθεν ἐσσί·
οὐ γὰρ ἀπὸ δρυός ἐσσι παλαιφάτου οὐδ᾽ ἀπὸ πέτρης.

[But even so, tell me of your race, where you're from]
for you're not from a rock or from an oak of ancient story.

In his note *ad loc.*, Joseph Russo (1992) speaks of a "proverbial expression", referring to "the myths of human origins from trees or stones".

An address of Patroklos to Achilles might also enter this group. *Il.* 16. 33-36: he accuses Achilles of being born from the sea and stones, instead of from Thetis and Peleus. If entering our series, "you're the son of the stones" might have been an idiom:

νηλεές, οὐκ ἄρα σοί γε πατὴρ ἦν ἱππότα Πηλεύς,
οὐδὲ Θέτις μήτηρ· γλαυκὴ δέ σε τίκτε θάλασσα
πέτραι τ᾽ ἠλίβατοι, ὅτι τοι νόος ἐστὶν ἀπηνής.
εἰ δέ τινα φρεσὶ σῇσι θεοπροπίην ἀλεείνεις

Pitiless: the rider Peleus was never your father
nor Thetis was your mother, but it was the grey sea that bore you
and the towering rocks, so sheer the heart in you is turned from us.

In his note to this passage, Richard Janko mentions a fragment of Alcaeus that shows how this passage of the *Iliad* impressed the Greek poetic tradition[21]:

πέτρας καὶ πολίας θαλάσσας τέκνον (Alcaeus fr.. 359)

And he speaks of a riddle about a limpet!

If these facts are put together, adding the various mentions of the birth of humanity in both Hesiod's *Theogony* and the Epics, what picture may arise? Hesiod tells, in an explicit way, that the Iron race came from the Nymphs of the ashes (*WD* 145 above: ἐκ μελιᾶν[22]). The succession of ages in the myth might thus somehow delete the origin of mankind from wood (and stone?), to mention only the current material used for earning their livelihood. Otherwise,

mankind in the Iron Age would be born from stone and wood, as the above-mentioned proverbs attest.

3. CONFRONTATION WITH THE ARCHAEOLOGICAL DATA

If we trust the data coming from excavations, it appears that bronze and gold for precious objects are mostly found in graves of Mycenaean times, corresponding roughly to the time of the Trojan war and, thus, of Homer's heroes, whereas iron becomes the predominant material in the Geometric period, corresponding to the formation of the main body of the Epics, the time Hesiod recognizes it explicitly as *ours*.

The list of objects occurring in the Homeric epics may be compared to the list of objects found by the archaeologists: since Gilbert Murray, in 1905, Miss Lorimer, in 1950, Miss Gray, in 1954, among others[23], several specialists made this study. They first concluded that Homer describes the world of his heroes; later on, with Moses Finley[24], that he rather alludes to his own world. In the recent interpretations, the Homeric world is actually neither the Bronze nor the Iron Age, but a mixture of both, just as its language combines very archaic features and even linguistic forms with a number of Aeolian forms and a mostly Ionian dialect.

Anthony Snodgrass's *The Dark Age of Greece* addresses the question about the relation between Hesiod, the memory of the past, and the historical modern terms, thus opening the way to a wider study.

Both the *Myth* and archaeological terminology actually rely on a coherent succession of the main metals in use: bronze/iron. The Hesiodic *Myth of Ages*, on one hand, adds the precious silver and, above all, gold to refer to an age of wealth and happiness, and the Age of Heroes Hesiod may have invented whereas he found the other Ages in the Eastern tradition. Archaeology, on the other hand, adds technical terms, but in the current tradition, the public still

retains the mention of the Stone Age. We shall see that the metaphorical uses of metal names may also refer to a parallel tradition, thus confirming the opinion that scientific terminology emerged from a common knowledge that might trace back to the popular language and thought coming from Homer through Vergil to the Middle Ages and modern times. Metals are a keystone for this study because they well survive the injury of time, whereas other materials like wood or linen have disappeared. We may note, in passing, that Homer does not allude to vase-paintings. He apparently kept the memory of Mycenaean jewellery and sculpture, not of the magnificent paintings that were seen on vases and walls. Though Homer may allude to the skill of pottery in a comparison (*Il.* 18.600-1), he does not refer to those kinds of Geometric paintings that were probably contemporary to the Epics and which gave the scientific name to this period in the historical terminology.

Although *ekphrasis* is a very well-established tradition, tracing back to ancient rhetoric[25], Homer does not really "describe" objects but often narrates their history. By tracing back to the first craftsman who made a shield or cut off an ash in a forest for making a spear (I'm thinking of Hephaistos and Cheiron) or to the first owner of a sceptre, a cuirass (chest armour) or a helmet, and citing the names of their successive owners down to the current one in the Trojan War, the poet enhances those objects with an aura and splendour that come from the very far past[26]. See Agamemnon's sceptre or Odysseus' bow, mentioned in an oral communication by Øivind Andersen, as well as Achilles' spear or the *panoplia* offered to Peleus as a marriage-gift by Cheiron. Book 18 of the *Iliad* shows a different case: we follow Thetis in Hephaistos' forge and look at the shield in the process of construction during the night, in a marvellous and exciting *chiaroscuro*[27].

Several uses, in Homer, of τάλαντα + χρυσοῖο and the more frequently formula χρυσοῖο τάλαντα as a verse-ending raise the important question of the pre-monetary status of the Geometric period. Some objects are actually considered as values recognized by

everybody. The gold-talent (actually a certain amount of metal) is one of them. As it refers to a significant weight of a valuable metal, it is a kind of a standard reference to the world of the heroes, and to a wealth which seems largely exaggerated for the *basileis* in the Homeric world, as we may better appreciate now.

> *Il.* 9.120-4 (122-264)[28]
> ἄψ ἐθέλω ἀρέσαι δόμεναί τ᾽ ἀπερείσι᾽ ἄποινα.
> ὑμῖν δ᾽ ἐν πάντεσσι περικλυτὰ δῶρ᾽ ὀνομήνω
> ἕπτ᾽ ἀπύρους τρίποδας, δέκα δὲ χρυσοῖο τάλαντα,
> αἴθωνας δὲ λέβητας ἐείκοσι, δώδεκα δ᾽ ἵππους
> πηγοὺς ἀθλοφόρους, οἳ ἀέθλια ποσσὶν ἄροντο.
>
> I am willing to make all good, and give back gifts in abundance.
> Before you all I will count off my gifts in their splendour:
> seven unfired tripods; ten talents' weight of gold; twenty shining cauldrons
> and twelve horses, strong race competitors.

On Achilles' shield, Hephaistos places a scene of trial, where two talents put "in the middle" show the value at stake between the litigants:

> *Il.* 18.507[29]
> κεῖτο δ᾽ ἄρ᾽ ἐν μέσσοισι δύω χρυσοῖο τάλαντα,
>
> and between them lay on the ground the talents of gold, to be given [to that judge who in this case spoke the straightest opinion].

> 19.247-8
> χρυσοῦ δὲ στήσας Ὀδυσεὺς δέκα πάντα τάλαντα
> ἦρχ᾽, ἅμα δ᾽ ἄλλοι δῶρα φέρον κούρητες Ἀχαιῶν.
> Odysseus weighed out ten full talents of gold and led them
> back, and the young men of the Achaians carried the other gifts.

> *Cf. Il.* 9.125-6
> οὔ κεν ἀλήϊος εἴη ἀνὴρ ᾧ τόσσα γένοιτο,
> οὐδέ κεν ἀκτήμων ἐριτίμοιο χρυσοῖο,
>
> That man would not be poor in possession, to whom were given all these have won me
> nor be unpossessed of dearly honoured gold, were he given [all the prizes]

The *katalogos* of wealth pieces met in *Il.* 23.549-50 seems to value metals more than cattle, and female servants among cattle:

> ἔστί τοι ἐν κλισίῃ χρυσὸς πολύς, ἔστι δὲ χαλκὸς
> καὶ πρόβατ᾽, εἰσὶ δέ τοι δμῳαὶ καὶ μώνυχες ἵπποι·
>
> there is abundant gold in your shelter, and there
> is bronze there and animals, and there are handmaidens and single-foot horses.

Let us think of the "standard" consisting of oxen, in *Il.* 6.137 and further on. The Homeric society appears, thus, as a pre-monetary one, up from the *Iliad* where characters constantly value the war or contest-prizes, as well as the ransom for a prisoner or a corpse in terms of metal, objects, slaves or animals.

4. THE MYSTERY OF METAPHORS

In a study published in 2004 (Létoublon-Montanari), an intriguing formal fact appears: in the discourse of characters, the metals are constantly used with a proverbial connotation to underline a "hard heart"[30]. But in strong contrast with the above analysed, the frequency of realistic uses of the words for gold, silver, bronze, and iron is statistically dominant in the metaphoric language, with an interesting "grammar of formulas" or variational paradigm[31].

The main facts are the followings: σιδήρεος/ σιδήρειον appears in the second hemistich in a series of examples, plus two times in the *Odyssey* with a rhythmic variant in the first hemistich:

> *Il.* 22.357
> πείσειν· ἦ γὰρ σοί γε σιδήρεος ἐν φρεσὶ θυμός
>
> [I could not] persuade you, since indeed in your breast is a heart of iron.

> *Il.* 24.203-5
> πῶς ἐθέλεις ἐπὶ νῆας Ἀχαιῶν ἐλθέμεν οἶος
> ἀνδρὸς ἐς ὀφθαλμοὺς ὅς τοι πολέας τε καὶ ἐσθλοὺς

ὑιέας ἐξενάριξε· σιδήρειόν νύ τοι ἦτορ.

How can you wish to go alone to the ships of the Achaians
before the eyes of a man who has slaughtered in such numbers
such brave sons of yours? The heart in you is iron.

Il. 24.519-21 5
πῶς ἔτλης ἐπὶ νῆας Ἀχαιῶν ἐλθέμεν οἶος
ἀνδρὸς ἐς ὀφθαλμοὺς ὅς τοι πολέας τε καὶ ἐσθλοὺς
ὑιέας ἐξενάριξα· σιδήρειόν νύ τοι ἦτορ.

How could you dare to come alone to the ships of the Achaians
and before my eyes, when I am one who have killed in such numbers
such brave sons of yours? The heart in you is iron.

Od 23.171-2
ἀλλ᾽ ἄγε μοι, μαῖα, στόρεσον λέχος, ὄφρα καὶ αὐτὸς
λέξομαι· ἦ γὰρ τῇ γε σιδήρεον ἐν φρεσὶν ἦτορ.

But come, nurse, spread a bed for me, so I can lie down by
myself. For, yes, the heart in this one's chest is iron.

Od. 4.292-3
οὐ γὰρ τό γ᾽ ἤρκεσε λυγρὸν ὄλεθρον
οὐδ᾽ εἴ οἱ κραδίη γε σιδηρέη ἔνδοθεν ἦεν.

It's worse, for this in no way kept sad destruction from
him, nor would it, even if he had a heart of iron inside him.

Od. 5.190-1
καὶ γὰρ ἐμοὶ νόος ἐστὶν ἐναίσιμος, οὐδέ μοι αὐτῇ
θυμὸς ἐνὶ στήθεσσι σιδήρεος, ἀλλ᾽ ἐλεήμων.

For my mind is righteous, and I myself
don't have a heart of iron in my chest, but one of compassion.

Thus, a formulaic analysis in one and the same model is possible:

σιδήρε(ι)ον/ς ἐν φρεσὶ(ν)˽ νύ τοι ἦτορ/˽ θυμός

See also *Od.* 12.279-81:
σχέτλιός εἰς, Ὀδυσεῦ, περί τοι μένος, οὐδέ τι γυῖα
κάμνεις· ἦ ῥά νύ σοί γε σιδήρεα πάντα τέτυκται

> You're a reckless one, Odysseus, with surpassing strength
> and limbs that never tire. Indeed, you're completely made of iron,

where the whole person of Odysseus is meant (Eurylochus addresses Odysseus), not his heart only, whatever translation is chosen for the initial adjective.

Gold and silver do not occur in this kind of formulas[32], probably because they do not fit the image of hardness as a mental process describing both a quality and a dark side (in the *Iliad*, it concerns mainly Achilles in Hector's words, and Priam in Hecabe's and Achilles' words). It might thus correspond with the generally positive meaning of gold, silver and bronze in the Hesiodic myth. But bronze occurs in such a metaphoric use at least once, in the poet's famous address to the Muse, asking for help with the memory of the list of names before the Catalogue of ships:

> *Il.* 2.489-90
> οὐδ᾽εἴ μοι δέκα μὲν γλῶσσαι, δέκα δὲ στόματ᾽ εἶεν,
> φωνὴ δ΄ ἄρρηκτος, χάλκεον δέ μοι ἦτορ ἐνείη.
>
> Not if I had ten tongues and ten mouths, not if I had
> A voice never to be broken and a heart of bronze within me.

Aristarchus judged the hyperbole in verse 489-90 as "typically Homeric"[33], as said in the note of the *Cambridge Commentary to the Iliad:* but nothing is said about the very specific χάλκεον (…) ἦτορ. However, Virgil and Ovid, with other less known Latin poets, show us that one isolated phrase in Homer may well have generated a whole tradition[34]. An accurate look at the scholia may be worth. We actually read in the scholia edited by H. Erbse:

> Ariston. οὐδ᾽ εἴ μοι δέκα μὲν γλῶσσαι<-ἦτορ ἐνείη>: ὅτι ἡ ἰδιότης τῆς ὑπερβολῆς Ὁμηρική. καὶ ἐν Ὀδυσσείᾳ "οὐδ᾽ εἴ οἱ χεῖρές τε ἐείκοσι καὶ πόδες εἶεν" (μ 78). ἡ δὲ ἀναφορὰ πρὸς τοὺς περιγράφοντας τούτους τοὺς στίχους. A 2.490.1 D <φωνὴ δ᾽ ἄρρηκτος:> διὰ {δὲ} τοῦ εἰπεῖν φωνὴ δ᾽ ἄρρηκτος δηλοῖ ὅτι σῶμα ἡ φωνή. ATil

Aristonicus tells us that his master, Aristarchus, saw here the rhetorical process of *hyperbole*, and defends the authenticity of the text against *chorizontes*. Importantly for us is that the scholiast comments the value of numbers, classifying the figure as an exaggeration, whereas the second part of line 490, with the metaphor of bronze heart, remains without a word of commentary[35].

This sole example of a "bronze heart" might show that to the value of hardness brought by the usual iron, the nobler bronze adds a more positive quality of nobleness, a kind of poetic chivalry attached to this metal and its weight of "nostalgia of the past", to refer to Boardman's title (Boardman 2002).

We also meet the metaphor of stony-heartedness in two passages of the *Odyssey*, thus appearing an idiom in Greek as it is in English, though stone occurs in apparently more isolated passages than iron. In *Od.* 19.494, Eurykleia addresses Odysseus just after the recognition:

> ἔξω δ᾽ ὡς ὅτε τις στερεὴ λίθος ἠὲ σίδηρος
> and I'll hold as solid as any stone or iron

(in the wake of 493 οἶσθα μὲν ἐμὸν μένος ἔμπεδον οὐδ᾽ ἐπίεικτόν, "You know how my spirit is steady an unyielding"), whereas in *Od.* 23.103 Telemachos addresses his mother[36]:

> σοὶ δ᾽αἰεὶ κραδίη στερεωτέρη ἐστὶ λίθοιο
> "[…] But your heart is always more solid than stone".

This probably implies an idiomatic status of κραδίη στερέη ὡς λίθος. Another phrase in a war context, in *Il.* 4.510, implies that one could speak of a "stone or iron skin" (at least a possible metaphor):

> ἐπεὶ οὔ σφι λίθος χρὼς οὐδὲ σίδηρος.
> "surely their skin is not stone, nor iron".

What conclusion can we draw from such facts? Iron seems to come more easily to the mind of the poet as a metaphor of a mental reality, whereas he preferably mentions bronze as the actual material in the world he describes. This may have been an idiomatic metaphor in the time of the fixation of the text, the period of the dominance of the Ionian dialect, if we leave aside the discussion on diffusion/phases stratification of the text as well as that of its mode of fixation[37].

Stone and bronze occur rather seldom in these metaphors[38]. Nevertheless, these occurrences might be archaic and testify to the very old habits of language, somehow old-fashioned and reduced by the more recent formulas to a marginal status, as do often proverbial phrases in modern languages.

Thus, the Epics may show in those metaphors a kind of memory of the Ages of Mankind, less conscious than the Hesiodic wisdom literature but perhaps quite a good testimony to the representations of chronology in archaic minds. Everyday language shows how deep the presence of iron was in the time of the poet, whereas he gives an image of his heroic world dominated by gold for wealth and bronze for arms. As Stephanie West orally remarked, the episode called the *Removal of arms* in the *Odyssey* also shows the importance of iron arms in the *World of Odysseus*, to use Finley's title[39]. As the commentary by Joseph Russo quoted above shows, the narration usually sticks to the convention of bronze weapons corresponding to the Mycenaean or heroic world. But the poet seems sometimes to forget it uses the iron-language of his own time.

The famous passage about the exchange of arms between Diomedes and Glaukos, in *Iliad* 6, might give the last word: verses 235-7 tell that Glaukos "lost his mind" (Γλαύκῳ φρένας ἐξέλετο Ζεύς) since he gave Diomedes gold for bronze (τεύχε᾽ ἄμειβε / χρύσεα χαλκείων). Kirk's commentary insists on the fact that nobody - be it in Antiquity or in the modern period - understood the meaning of this strange passage:

> The valuing of golden armour at a hundred oxen's worth, bronze armour at nine, makes a neat and epigrammatic conclusion but throws little light on the main problem. The ox as a standard of value is familiar throughout the epic: each golden tassel of Athene's aegis is worth 100 oxen at 2.249, Lukaon was sold in captivity for the same sum and ransomed for three times as much at 21.79f […] One suspects an arbitrary element in these equivalents, as well as some influence by metre. […] Such considerations preclude any literal and realistic understanding of the exchange.

Of course, no gold armour could ever be used for fighting except in myths, whereas bronze arms did exist in the Mycenaean period, and traditional poetry kept the memory of this fact. In Homeric times, warriors were wearing iron arms anyway, see the compound verb σιδηροφορεῖν used by Thucydides in the passage mentioned by Snodgrass[40], and the kind of *lapsus* that the narrator had in *Odyssey* 19 about the *Removal of weapons* mentioned above. The mention of an exchange of iron against bronze in Temessa (*Od.* 1.183-4)[41] may thus correspond to a reality of the Homeric context much more than the bond between Diomedes and Glaukos, which partakes of a fantasy, as Kirk noted, of a norm of hospitality that is no longer understood in the poet's time and thus deemed foolish. One might consider the meaning of a fundamental inequality of value in the ritual exchange between hosts, such as Benveniste mentioned[42]. Andersen takes into account the poet's interpretation and judgment[43], whereas Benveniste thought of an archaic tradition of exchange (*mei–* in ἄμειβε as well as in Skr. *mitra*, as a common or proper name), no more understood by the poet. As far as chronology is concerned, we can now more surely say that Greeks had in the Geometric period of our texts a good sense of the past ages, associating different metals to each one, and placing them in a chronology that starts from the most precious gold (which fits well enough with a later representation of Mycenaean wealth) and goes to the most common iron in their own time. This notion of a succession in time appears directly in the *Myth of Ages* told by Hesiod, who probably forged the Age of Heroes, which fits his

peculiar vision of the time just preceding iron; but it also appears indirectly in the idiomatic uses of materials in metaphors for psychology. The most common use is then the name for iron, whereas bronze is currently mentioned as the material used for objects in everyday life. This proves that Homer was more impressed by the image or memory of Mycenaean times than Finley thought. Iron is used in the common language of the characters as a metaphor, proving thus that it was the material they commonly used or rather the material best known by both the poet and the audience of the Epics. The poet seems to value bronze and undervalue iron when he deals with material goods, whereas the real dominance of iron in his actual world appears as soon as metals enter an imaginary world, where they provide images and proverbial idioms. We might perhaps say that Finley was right about the world of reference for the poet, not for heroes like Odysseus: they were actually immersed in the Iron Age reality and thought themselves magnetically drawn by iron, which is expressed in a significant amount of idioms, proverbs and metaphors, and in an important simile. However, when the poet controls the image of the world of his heroes, he almost systematically undervalues iron and shows people living with bronze, in a kind of "nostalgia for the past"[44] much more close to the Mycenaean world than the Geometric one. Thus, as far as Homer's language is our best witness, Achilles, as well as Odysseus, felt themselves living in a world of iron, though the poet dressed them in bronze.

Notes

1. The first version of this paper was orally presented at the conference of Oslo on Relative Chronology in Greek Epic Poetry, held in June 2006. My colleague Isabelle Ratinaud made many remarks. Barbara Graziosi also read a version of it and gave me precious advice. An enriched version was presented at the University of Prag, in March 2016. I feel very grateful to Professor Dagmar Muchnova and the audience for their remarks. Steven Rojcewicz read the last version, corrected my English, and occasioned

several endeavours. To all of them, I express my gratitude. I remain responsible for any error that could still meet there.

2. *See* Parry 1971, Lord, 1991, 1995, 2000, and the works of J. M. Foley, G. Nagy and J. Russo in the bibliography.
3. See also Létoublon 1989, 1997, 2001, 2014, and Létoublon – Montanari 2004.
4. A useful general account on metals in the Bronze Age is found in Harding 2000. Blakely 2006 is interesting for the comparison between the *daimones* of metallurgy in Greece (Daktyloi, Telchines and Kabeiroi) and in Africa.
5. See an account on the Mycenaean world in Castleden 2005, an archaeological account on Bronze Age in Dickinson 1994 (including the Mycenaean world into the Aegean one), and Harding 2000 mentioned above.
6. The famous analysis by Moses Finley proves thus exaggeratedly schematic and even "false", as far as arms are particularly concerned.
7. Definition of the formula by Milman Parry (1971, 13): "In the diction of bardic poetry, the formula can be defined as an expression regularly used, under the same metrical conditions, to express an essential idea".
8. (…) χρυσόθρονος Ἥρη (verse ending) - Il.1.611; (…) παρὰ χρυσοθρόνου Ἥρης - 15.5. Other schemes: Ἥρη (…) χρυσόθρονος (…) - 14.153; χρυσόθρονος (…) Ἠώς - *Od.* 10.541, 15.56, 250, 20.91; (…) χρυσόθρονος Ἠώς - *Od.* 14.502; χρυσόθρονον Ἠῶ (…) - *Od.* 19.319; χρυσόθρονος Ἄρτεμις ἁγνὴ - *Od.* 5.123, and one isolated example of (…) χρυσόθρονον ἠριγένειαν - *Od.* 23.347 without a proper name (Ἠῶ was awaited for and would fit metrical conditions).
9. As suggested by Lorimer 1936.
10. This epithet seems rather strange for Artemis, if it corresponds to the name ἠλακάτη with the usual meaning of "distaff", since this goddess is not usually linked to weaving, like Athena. In the *Odyssey*, when Helen appears to Telemachus, she is equipped with a golden basket containing a golden distaff, and in the context, she is compared to χρυσήλακατος Artemis, which shows that the link between the tool and the goddess is active to the poet's mind. Of course, the poet of the *Odyssey* may have forgotten that ἠλακάτη has in the compound another meaning, as "stick" or "arrow", as suggested in S. West's note to *Od.* 4.122. As far the golden distaff is concerned, I do not agree with her interpretation of 4.125: "Like Arete (vi 305 ff.), Helen does not intend to sit idle when she joins her husband to entertain his guests" - a golden distaff does not seem to fit with an actual work, it may be rather a luxury article intended, as several details in the description of the palace show, to flaunt one's wealth.

11. G. S. Kirk thinks that the whole typical scene "seem[s] to have been adapted and elaborated from the bk 8 scene – either that or some closely similar archetype" (1990, n. at 5.719-21). It does not matter so much for our purpose than the remarks on technology in the following notes - 5.722-3: "Chariots were stored indoors with covers over them […], often with wheels removed" as 8.441 also implies. The Linear B chariot tablets show this to have been regular Mycenaean practice (Ventris and Chadwick, *Documents*, 361-9). "[…] The eight-spoked wheels are a great rarity" (Lorimer, HM 319), probably a pious exaggeration likewise, since nearly all Bronze Age and Early Iron Age depiction of wheels show four spokes, a few six. 5.724-6: "The tires were of bronze, the felloes (i.e. the rims inside them) of gold. Real felloes were of wood" - *see* the simile at 4.485-6 with n.; the formula θαῦμα ἰδέσθαι refers primarily to gold rather than bronze. For a parallel in the Rigveda *cf.* M. L. West, JHS 108 (1988), 155. The silver πλῆμναι of 726 - the hubs or naves; they are περίδρομοι, that is, they revolve, *see* also next n. fin. 724-6 on δίφρος: "Here it is 'stretched with gold and silver straps'; the materials replace mundane leather –but does this mean that the floor is made out of straps under tension, or that the front and the sides are so constituted? Critics differ: artistic depictions, rough and ready for the most part (*cf.* Lorimer, HM 310ff.), show various types including the latter. The former is surely impracticable since the leather would stretch and a foot finds its way through somehow. As for the two rails, ἄντυγες, running around (περίδρομος has three different applications in its three *Iliadic* occurrences, *cf.* 726 and 2.812), that may again be a divine doubling of the usual single rail; or it may count each terminal (often looped) as a separable unit, which is not implausible if the derivation of δίφρος is right". This derivation implied δίς+φέρειν.
12. We constantly use the English translation by Lattimore for the *Iliad*, Huddleston for the *Odyssey*, offered by the *Chicago Homer* website.
13. Note that the names of gold and bronze allow a high number of alliterations with a *khi* in these examples. *See* similar remarks on Hesiodic use in Most (1997, 110). He also compares Homeric and Hesiodic formulas (1997, 121-4).
14. *See* the note by Stephanie West *ad loc.*: "the terms are used, as elsewhere, to cover metalworking in general; *cf.* ix 391 ff., where the χαλκεὺς works with iron. Here the tools which the smith brings (434) are more appropriate to iron-working, which alone requires the heavy hammering of red-hot metal; gold is hammered cold, with a light hammer. The poet was evidently impressed by the spectacular and mysterious processes of the blacksmith's forge and imported the equipment into a context where it has no place. The

only way in which the horns of a living ox could be gilded is by affixing gold foil. […]" - with a reference to D. H. Gray 1954.

15. Heubeck 1988. 308: "χεύειν expresses the act of pouring a material out of a vessel and its consequence: here 'pile up' a heap or 'spread' one material over another. The word gives no clue to the technology - of which the poet was ill-informed if he supposed that anvils, hammers, and tongs were required" (see iii 433-5): on the techniques (probably involving the use of gold leaf) *see* D. H. F. Gray, JHS lxxiv, 1954, 4). *See* particularly Gray's n.23: "Both gilding nor plating, however, involves the pouring of gold in liquid form, and the aptness of the simile depends on the result, not on the process".

16. G. W. Most respectfully quotes M. L. West's commentaries on Hesiod, though he does not adopt his chronology.

17. We roughly follow the analysis of J.-P. Vernant, including his detailed discussion of Defradas, Goldschmidt, and Walcot: the four first races, gold, silver, bronze, heroes, are based on the alternance of dyke/hubris and a violent cut shares them from the iron race, in Hesiod's own time (Vernant 1990).

18. The parallels mentioned in West 1978 are: 1) the vision seen in the lost books of the *Avesta* by Zoroaster: a tree with four branches, one of gold, one of silver, one of steel; p.e. of iron alloy; 2) Nebuchadnezzar's dream, in the *Book of Daniel*, of a large statue with a head of gold, breast and arms of silver, belly and thighs of brass, legs of iron, feet of iron mixed with clay; 3) the *Yugas* mentioned in Indian literature, i.e. the world four ages (without metal symbolism). A common element to Sumerians and Babylonians is "the progressive shortening of man's life". *See* the discussion of these parallels in Most 1997.

19. There are many studies on Hesiod and this peculiar question. Among them, *see* the commentary of Tandy & Neale 1996 and Lamberton 1988. People interested in the history of the question of this passage may refer to Heitsch 1966, who republished the papers on Weltaltermythos: Bamberger (1842), Roth (1860), Meyer (1910), Reitzenstein (1924), Heubeck (1955), Lesky (1955) and Rosenmeyer (1957), and also "Pandora, Prometheus und der Mythos von den Weltaltern" by K. von Fritz (1947).

20. *See* the note by N. Richardson *ad loc.*: "[…] the general point is presumably that any attempt at exchanging words of friendship with Akhilleus is a waste of time. […] It may be relevant that the Hesiodic context [Th. 35] has some resemblance to ours. […] In Hektor's case his earlier thoughts of a treaty with his enemy now suggest to his mind the conversation of two lovers

'from oak or from rock': this too may be irrelevant, trivial, fanciful, or perhaps simply long and rambling".

21. "The sea and cliffs evoke the habitats of Akhilleus' parents, in a 'reversal of personification'" (Edwards, HPI 257).

22. West 1978 notes (lines 145-6, 187): "he is thinking of the Meliai nymphs. […] They are mentioned in *Th.* 187 as born with the warlike Gigantes and Hesiod may have considered them the mothers of men. He thinks the lineage of men with that of the Gigantes in *Th.* 50. There are other traces of a myth that men were born from ash-trees (*Th.* 187 n.) and which is essentially the same as being born from tree-nymphs. *Od.* 19.162 f. […] may allude to a similar account. *See* also [Hes.] fr. 266 (a) 9 (the Pelasgian's mother is the oak), Zonaras epigr. 7.6 (A.P. 9.32); Virg. A. 8.315, Stat. *Th.* 4.276-81, Juv. 6.12; Roscher's Lexikon d. gr. *u. rom. Mythologie* V. 500.1. Thus, the Bronze race's origin from trees or tree-nymphs identifies them with the first men known to ordinary Greek tradition. […] But Hesiod does not go as far in systematizing mythology in the framework of the Ages as sch. Vet., who equate this third race with the Gigantes and the fourth with the descendants of Deucalion and Pyrrha, the two ages being divided by the Flood. Similarly Apollod. I.7.2. Hesiod's third age ends differently".

23. Lorimer 1950, ch. 3, 2 Iron, 111-121; P. 1959, ch.. 6 "Mycenaean Relics in Homer", 218-296; Stubbings 1962. Gray 1954 offered a good account of metals in Homer, with many fine detailed analyses and excellent tables showing the numerical differences between them, their uses, the objects they are used for etc. She was not interested in the formulaic aspect of the problem we are dealing with.

24. Not much later than Lorimer, since *The World of Odysseus* was first published in 1954, the same year than Gray's paper in *JHS*. Of course, the authors of the *Companion to Homer* published in 1962 ignored Finley's book. But Finley does not take into account either arms or tools and the language of metals: he mainly dwells on social relations, wealth and work, domain, family, and community. Though Stubbings 1962 appears nowadays a strong separatist, the three chapters of the *Companion* mentioned in the bibliography yield a good amount of data on the question of metals in Homer.

25. See *φράζει* in the scholiast's comment of *Il.* 18.610, and the modern tradition based on Lessing's Laokoon originally published in 1766 (*see* Létoublon 1999).

26. Page DuBois 1982; Létoublon 1998; Von Reden 2003; Crielaard 2003; Bassi 2005.

27. Létoublon 1999, with references.

28. *Cf.* the note by J. B. Hainsworth to *Il.* 9.122: "the weight of the Homeric talent (mentioned only as a measure of gold) is unknown but hardly comparable to the classical standards (25.86 kg for the Euboeic, 37.8 for the Aeginetan talent). Two talents of gold were the fourth prize in the chariot race (23.269), less than a λέβης in mint condition. W. Ridgeway, JHS 8 (1878) 133, argued that the Homeric talent was equivalent in value to one ox".
29. *See* M. E. Edwards' note *ad loc.*: "δύω χρυσοῖο τάλαντα are the fourth prize in the chariot-race (23.269, 23.614), ranking after an unused cauldron and before a two-handled jar: *see* 23.269n. The talents are usually taken to be contributed (one each) by the parties in the suit, as an award for the one who 'speaks a judgment more straightly' (δίκη as at 16.542 and *Od.* 11.570, ἴθύς as at 23.580, *HyDem* 152, Hesiod, *Erga* 36). […]The equivalence in value to the chariot-race prize is reasonable enough [ref. to A. L. Macrakis] but, of course, by standards of the classical period, this is an enormous weight of gold, even if it were the recompense which the defendant pointed to in 550. The matter has not yet been explained".
30. It will be seen later that the parallel English idiom "stone heart" (stony) corresponds to two occurrences of gr. λίθος.
31. In his already mentioned article (Most 1997, 124-5), G. Most mentions these metaphorical uses of metals and sees the link with the Ages of Mankind. But he does not see that iron is the metaphorical idiom, whereas it is not so frequent in the "real life" of the Homeric heroes.
32. It may nevertheless be idiomatic in other languages, *see* French "un cœur d'Or". It may be noted that the high value of gold seems, then, more important than hardness, which might be crucial for the Homeric occurrence of a bronze heart.
33. See Kirk's note *ad loc.*: Aristarchus (Arn/A) judged the hyperbole to be typically Homeric and compared *Od.* 12.78, where Scylla's cliff is unclimbable "even if a man had twenty hands and feet". Kirk analyses the reasoning in his following note, which is too long to be quoted here.
34. *See* Hinds (1998) on this topos in Latin poetry. As shown in Létoublon 2003, a formulaic tradition of the hero's monologic deliberation could give place to an exceptional phrasing, such as *Od.* 20.18 "τέτλαθι δὴ, κραδίη".
35. I thank Franco Montanari for his comment on this point.
36. Heubeck 1992, *ad loc.* comments as if the expression was common in Homeric phraseology: "Telemachus concludes by repeating, in the form of an unfair generalization (αἰεί) his initial reproach (*cf.* 72); this is the climax and summary of his reproof". *See* also Heubeck's commentary to 105-7: "Her θυμός is neither ἀπηνής (t97) nor 'constantly hard' (αἰεὶ στερεωτέρη,

103): but for the moment it is stunned by surprise (τέθηπεν: *cf.* τάφος 93 and 91-3n.). Thus, she is unable to react in the way that is expected of her".

37. For this problem, which we cannot develop here, refer to Haug 2003.
38. No mention of such metaphoric use of the references to metals in Kurke 1999, though a chapter called *The Language of Metals*, with a first part on the archaic period called *Forging the Language of Metals* might have led to a mention: the author focusses on *nomisma* and *basanos*, with a good analysis of the first metaphors of pure vs. impure precious metal and touchstone.
39. *Od.* 19.3-40. *See* particularly line 13 αὐτὸς γὰρ ἐφέλκεται ἄνδρα σίδηρος, with the note *ad loc.* by Russo: "'iron of itself draws a man to it', apparently a proverb, used here to add persuasiveness by an appeal to traditional wisdom […]. Although meant as a warning against the temptation to resort to weapons in a drunken quarrel […], this proverb may have older origins in an awareness of the magnetic, and hence magical, properties of iron. […] The use of iron as the word for an unspecified weapon, instead of the more normal 'bronze' (*cf.* xi 120, xix 522, xx 315, and throughout the fight in xxii), is criticized by Lorimer, Monuments, 510, as an 'unexampled breach of epic convention' (but *see* 119-20 for what she admits as 'partial exceptions'), but this is hardly an adequate reason for doubting the line's authenticity".
40. *Thc.* 1.6 Πᾶσα γὰρ ἡ Ελλὰς ἐσιδηροφόρει, *see* Snodgrass 1971, 7-8.
41. *See* the note by Heubeck about this trading.
42. In his chapter on hospitality, Benveniste 1969, I, 99, quoted by Andersen 1978, 110, n. 21. *See* also Craig 1967, and Calder 1984 for a survey of publications on the problem before Kirk's commentary.
43. *See* the reference in the former note above: "Dass 'l'inégalité de valeur entre les dons est voulue […] entspricht nicht der Auffassung des Dichters".
44. Boardman 2002.

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