

Creating *Problemata* with the Hippocratic Corpus

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This chapter discusses how the Aristotelian *Problemata* engage with the Hippocratic corpus. The existence of such engagement was the subject of a fundamental study by Poschenrieder (1887, 38-66); more recently Bertier (1989), Jouanna (1996) and Ulacco (2011, 67-77) have discussed particular examples; Flashar's commentary (esp. 338-40) and the notes to the editions of Louis and Mayhew contain numerous references.¹ My aim is not primarily to revisit arguments about whether a particular parallel implies source-use, nor to uncover new parallels. Instead I shall focus on what the parallels tell us about how the Hippocratic corpus was read and used by Aristotle and his followers. This provides evidence of both the early reception of the Hippocratic corpus, and the role of medical authority among Peripatetics. One productive approach (touched on for example by Jouanna and Ulacco) is to situate the *Problemata*'s explanations, where their *content* contrasts with Hippocratic ones, in the context of Peripatetic physiology. But here I shall focus, more basically, on the range of *forms* of engagement, from the straightforward conversion of proposition-plus-explanation into a *problema*, through cases of supplying, altering and combining explanations, more or less complex processes of extracting a proposition, and instances of reapplying some Hippocratic data to a different problem. My contention is that by delineating these various processes, and by contrasting them where possible with Galen's commentaries on the same

My thanks to the audience in Oxford who gave very helpful comments on an early version of some of the material presented here. All translations are my own.

¹ Where I cite Flashar 1975, Louis 1991-4 and Mayhew 2011 by name alone, understand 'ad loc.'

Hippocratic passages, we can better understand the enduring pedagogical value of *problemata* as a format for study.

1. Reformatting and Probing Hippocrates

Hippocrates is not cited by name in the *Problemata*, unlike various natural philosophers.² (The nearest one gets is a reference at 30.1.953a16 to ‘sacred disease’ being the terminology of οἱ ἀρχαῖοι for epilepsy, as in the Hippocratic *Morb.Sacr.*)³ However, Theophrastus is nowhere cited by name either, despite the fact that the *Problemata* (particularly in books 2, 5, 12-13, 20, 23-6 and 30.1) convert extensive passages of claim-plus-explanation from his works into the *problema*-format.⁴

No *problema* in the extant collection paraphrases Hippocratic material quite like this.⁵ However, if we look to the earlier edition of ‘Aristotle’s *Problemata*’ read by Aulus Gellius, we do find an example.⁶ Gellius (19.5) cites the question in Greek, then gives the explanation in Latin with a Greek précis. Both parts are remarkably similar to *Airs Waters Places* 8, as the comparison in table 1 shows.

² See Mayhew’s index (2011, ii.433-4) s.v. Alcmaeon, Anaxagoras, Empedocles (see also Arist. fr. 718 Gigon), Heracliteans, Plato, Pythagoreans; also the mathematician Archytas.

³ Cf. the claim of οἱ ἀρχαῖοι πάντες cited at 2.21.868a33, that sweating-treatments should be applied in summer rather than winter. I am not aware of this being Hippocratic. ἀρχαῖοι cosmologists are cited at 25.21.939b34.

⁴ See e.g. Flashar 1975, 335-8, Richter 1885, 5-30.

⁵ We will return below (n. 37) to 2.35, which appears to rewrite a passage of observation and explanation from *De Morbis* in more Aristotelian terms.

⁶ Gell. 19.5 = Arist. fr. 760 (fr. 711-69 give the testimonia to ancient collections of Aristotelian *Problemata*). Gellius mentions (19.6) that he read the *Problemata* with L. Calvenus Taurus, his teacher in Athens in c.146 (see Holford-Strevens 2003, 90-7).

Gellius (Latin)	Gellius (Greek paraphrase)	Airs Waters Places
[Question only given in Greek.] (2) <i>quoniam cum aqua frigore aeris duratur et coit, (3) necessum est fieri euaporationem et quandam quasi auram tenuissimam exprimi ex ea et emanare. (4) 'id autem' inquit 'in ea leuissimum est, quod euaporatur'; manet autem, quod est grauius et sordidius et insalubrius, (5) atque id pulsu aeris uerberatum in modum coloremque spumae candidae oritur. (6) sed aliquantum, quod est salubrius, difflari atque euaporari ex niue indicium illud est, quod minor fit illo quod ante fuerat quam concreceret.</i>	(1) διὰ τί τὰ ἀπὸ χιόνος καὶ κρυστάλλων ὕδατα φαῦλά ἐστιν; (2) ὅτι παντὸς ὕδατος πηγνυμένου (3) τὸ <u>λεπτότατον καὶ κουφότατον</u> ἐξατμίζει. (6) σημεῖον δέ, ὅτι ἔλαττον γίνεται ἢ πρότερον, ὅταν τακῆι παγέν. (4) ἀπεληλυθότος οὖν τοῦ ὑγιεινοτάτου ἀνάγκη αἰεὶ τὸ καταλειπόμενον χειρὸν εἶναι.	(1) <u>Τὰ δὲ ἀπὸ χιόνος καὶ κρυστάλλων</u> [sc. ὕδατα] πονηρὰ πάντα· (2) ὁκόταν γὰρ ἄπαξ παγῆ, (3) οὐκ ἔτι ἐς τὴν ἀρχαίην φύσιν καθίσταται, ἀλλὰ τὸ μὲν αὐτέου λαμπρὸν καὶ κοῦφον καὶ γλυκὺ ἐκκρίνεται καὶ ἀφανίζεται, (4) τὸ δὲ θολωδέστατον καὶ σταθμωδέστατον λείπεται. (6) Γνοίης δ' ἂν ᾧδε· εἰ γὰρ βούλει, ὅταν ἢ χειμῶν, ἐς ἀγγεῖον μέτρῳ ἐγγέας ὕδωρ, θεῖναι ἐς τὴν αἰθρίην, ἵνα πήξεται μάλιστα, ἔπειτα τῇ ὕστεραίῃ ἐσενεγκῶν ἐς ἀλέην, ὅκου χαλάσει μάλιστα ὁ παγετὸς, ὁκόταν δὲ λυθῆ, ἀναμετρέειν τὸ ὕδωρ, εὐρήσεις ἔλασσον συχνῶ. (3) Τοῦτο τεκμήριον, ὅτι ὑπὸ τῆς πήξιος ἀφανίζεται καὶ ἀναξηραίνεται τὸ <u>κουφότατον καὶ λεπτότατον</u> , (4) οὐ τὸ βαρύτερον καὶ παχύτερον· οὐ γὰρ ἂν δύναίτο.
[Question only given in Greek.] (2) Because	(1) Why are waters deriving	(1) Waters deriving from snow and ice are all poor. (2) For as

<p>when water hardens and coalesces through the coldness of the air, (3) there is necessarily evaporation and a kind of very thin exhalation is squeezed out and emanates from it. (4) 'It is,' he says, 'the lightest part of it which evaporates.' The heavier, dirtier and less healthy part remains. (5) It is whipped by the air and takes on the nature and colour of white foam. (6) Evidence that some portion – the healthier part – is exhaled and evaporated from snow is that it becomes smaller than it was before solidifying.</p>	<p>from snow and ice bad? (2) Because when any water hardens the lightest and most mobile part evaporates. (6) Evidence is that it becomes smaller than before whenever it thaws after freezing. (4) Hence, when the healthiest part is gone, necessarily and in every case the remainder is worse.</p>	<p>soon as they ever harden, (3) they no longer take on their old nature. Rather, its bright and mobile and sweet part is separated out and disappears, (4) whereas the most turbid and sedimentary part remains. (6) You can see this as follows: if you like, whenever it is winter, pour water using a measure into a pail, put it in the open so that it will be sure to harden, then on the following day bring it to a warm spot where the ice will be sure to dissolve. When it has done so, measure the water, and you will find it significantly less. (4) This is a sign that the lightest and most mobile part disappears and is dried up by the freezing process – not the heaviest and thickest part, which would be unable to.</p>
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Table 1: comparison of Gell. 19.5 and *Aer.* 8.8-10. Numbers in brackets refer to key ideas.

Evidently the ideas are presented in different orders, and Gellius' Latin includes point (5) about the frothy colour of snow and ice.⁷ But still one can speak of a paraphrase of explanandum, explanation and evidence, complete with some verbal similarities where Gellius offers us the Greek.

We shall see that *Airs Waters Places* was of particular interest to the *problema*-writers, though elsewhere as something which required more probing.⁸ After all, in the surviving fragment (112) of Aristotle's essay *On Problemata*, Alexander specifies that for Aristotle natural *problemata* were 'things pertaining to nature whose causes are unknown' (ὧν γὰρ φυσικῶν ὄντων τὰ αἴτια ἀγνοεῖται, ταῦτα φυσικὰ προβλήματα). Indeed, in the majority of passages I shall be looking at, the *problema* explains a Hippocratic assertion without simple recourse to a Hippocratic explanation from the same source.⁹ This explanatory aim accords with various implications of the early philosophical uses of πρόβλημα. In Plato's *Theaetetus* (180c-d), Socrates and Theodoros characterise what they call 'Ionian' natural philosophy as being practised through obfuscation, and hence set about examining it 'like a *problema*'. Socrates expresses its position in terms of two propositions: that Okeanos and Tethys are parents of all (*Iliad* 14.201), and that everything is in motion (Heraclitus 22A6 Diels-Kranz). Each *problema* encapsulates a prior author's key position so as to make it amenable to debate. Aristotle's definition of dialectical *problemata* in *Topics* 1.11 (101b, 104b-5a) includes a particular sub-category, *theseis*, which are based on a disputable opinion of an

⁷ This perhaps derives from *GA* 735b19-21, on how air whitens froth and snow.

⁸ On the reception of *Aer.* see Diller 1932.

⁹ See Quarantotto 2011, esp. 32-4, on how the *Problemata* fit into an Aristotelian 'research programme' of establishing propositions then probing their causes.

authoritative thinker (104b29-35).¹⁰ Meanwhile, Aristotle's category of the poetic *problema* (*Poet.* 25.1460b6-1b12) is also structured around authority: a question like 'Why does Telemachus not meet his grandfather Ikarios when he visits Sparta?' is a cue to criticise or defend Homer's coherence. Hence authority was ingrained in the construction of *problemata* in various contexts, and it is unsurprising that several of the surviving medical *problemata* should probe the authority of Hippocrates. What will concern us as we proceed is how explicitly they do so.

2. Ways of Explicating Hippocrates

I shall order my discussion not by the Hippocratic source-text (for this, I append table 3), but mainly by the form of engagement with it. In fact, several of these forms can be introduced by examining the longest and best-known case where the *Problemata* offer 'commentary' on a Hippocratic text – the relationship between *Pr.* 1.8-12, 19-20 and chapter 10 or *Airs Waters Places*.¹¹ This chapter discusses five bad weather-patterns and the illnesses they produce, with varying complexity in providing aetiologies and further details, as outlined in table 2. The patterns are excerpted in much reduced form as *Aphorisms* 3.11-14, while the seven *problemata* mentioned discuss them in more detail.¹²

¹⁰ For Aristotle's sense(s) of *problema* see Lennox 1994, Slomkowski 1997, 14-19, and Mansfeld 1992 for the importance placed on tackling dialectical *problemata* through the opinions of (multiple) previous authorities. For the earlier history of *problemata* see e.g. Flashar 1975, 297-303.

¹¹ Ulacco (2011, 72-6) and Jouanna (1996) discuss characteristically Peripatetic vocabulary in these *problemata*; Poschenrieder (1887, 43-52) is still useful.

¹² That *Aph.* is using *Aer.* here is implied by the compilatory nature of *Aph.* 3 as a whole, and the fact that phrases which are not contiguous in *Aer.* 10 get joined in *Aph.* 3.11-14 but not vice versa. *Pr.* 1.8, 9, 12, 19, 20 share material with *Aer.* which *Aph.* has omitted.

	Aer. 10.3-12	Aph. 3	Pr. 1
3. Pattern 1: dry winter dominated by northerlies + opposite spring:	11	8, 19	
---effects in summer: fevers, eye-disease and dysentery	11	8	
---aetiology: moisture in soil and guts suddenly heated; fevers for the phlegmatic, dysentery for the moist	-	8, with alterations	
4. ---further detail: hope if Sirius brings rainstorms	-	19, with explanation	
5. Pattern 2: wet winter dominated by southerlies + opposite spring:	12	9	
---effects on spring pregnancies: miscarried or weak babies	12	9, with explanation	
6. ---effects on others in summer, with aetiology: dysentery for phlegmatic and women, dry eye-disease for bilious, catarrhs for elderly; 7. further aetiology: brain congealed through spring and suddenly dissolves	12	9, with reordering (effects only)	
8. ---further details: which towns most effected; 9. what if summer is dry or rainy?	-	-	
10. Pattern 3: summer and autumn both wet and dominated by southerlies:	-	20	
---effects: kausoi for phlegmatic and those over forty; pleurisy for bilious	-	20, with explanation	
11. Pattern 4a: dry summer dominated by northerlies + opposite autumn:	13	10	
---effects in winter: headaches, colds etc; some consumption	13	10, with explanation	
12. Pattern 4b: dry summer dominated by northerlies + same autumn:	14	11-12	

---effects on phlegmatic and the moist: good	14	11
---effects on bilious and aetiology: bad for bilious since they dry out; causes dry eye-disease, fevers, melancholy since the bile and blood are thickened	14	12 (effects only)
---aetiology for phlegmatic: good since they dry out	-	11

Table 2: comparison of the contents of *Aer.* 10.3-12, *Aph.* 3.11-14, and *Pr.* 1.8-12, 19-20

This cursory overview indicates that, whereas the *Aphorisms* systematically remove aetiological elements, the *Problemata* supply an explanation where *Airs Waters Places* lacks one, and also modify its explanation of the first pattern. A more instructive and fine-grained contrast is between the type of ‘commentary’ offered by the *Problemata* and by Galen’s commentary on the relevant parts of *Aphorisms* 3, which he explicitly elucidates using *Aer.* 10 with the stated purpose of ‘clarifying what is unclear... and adding proof to every true statement’.¹³ Galen immediately goes on to contrast his approach with his near-contemporary Lykos, who added no interpretative argumentation for these particular aphorisms and left them as merely empirical assertions. Galen’s Hippocratic commentaries frequently attempt to recover traces of his system in the Hippocratic works, to increase his authority.¹⁴ This puts some constraint on how he can use the explanatory passages from *Airs Waters Places*. By

¹³ 17b.561 Kühn (from the preface to *In Aph.* 3), and 577-99 for the commentary. Galen subsequently wrote a commentary on *Aer.* itself, which only survives in translation. The Arabic is to be edited by Strohmaier; its importance is discussed in Jouanna 1991, Strohmaier 2004. The Hebrew précis (Wasserstein 1982) breaks off at *Aer.* 10.4.

¹⁴ See Flemming 2008, esp. 330, 334, Lloyd 1991, 398-416, and in general Manetti and Roselli 1994.

contrast, both the attitude to authority in the *Problemata* and their format allow for a freer exploration of the material.

For example the *Problemata* leave 1.8 and 1.19 containing an incompatibility. Both deal with the pattern of a cool dry winter followed by a warm wet spring, but 1.8 neglects the final (unexplained) detail of the Hippocratic passage, namely the consequences if the summer stays dry beyond the rising of Sirius. According to its explanatory model, a damp summer is more dangerous than a dry one, because it leaves the body full of fluids which can putrefy (860a8-11). But the final Hippocratic detail states that a damp summer is *less* dangerous, and *Pr.* 1.19 finds an alternative model which accords with this: the body's fluids can prevent it from overheating. Galen might say that 1.19 therefore provides the better explanation of *Aer.* 10. But when viewed from the perspective of a student studying the *Problemata* without *Airs Waters Places* to hand, such discrepancies among potential solutions were a stimulus to intellectual engagement. This emerges, in fact, from Plutarch's and Gellius' crucial testimonia about how editions of the *Problemata* could be used by educated readers. For example, in Aristotle fr. 735 (= Plutarch *Quaest.Conv.* 8.10) a copy of the *Problemata* fills Florus with many uncertainties, which he shares with his companions (αὐτόξ τε πολλῶν ἀποριῶν... ὑπεπίπλατο καὶ τοῖς ἑταίροις μετεδίδου); one is the *problema* 'Why are dreams least reliable in autumn?', for which Favorinus and Autoboulos come up with playful competing explanations to add to the Aristotelian one.

Returning to the engagement with *Aer.* 10, a second significant example is how 1.9 intelligently reads across the grain of its source. *Airs Waters Places* presents the weather-pattern and first describes its effects on spring pregnancies, then its effects on others. A first level of explanation relates the latter effects to humours (10.6 τοῖσι μὲν οὖν φλεγματίησι... τὰ δεξιὰ), before a second level relates them to the temperature and moistness of the body as it develops through summer (10.7 ὁκόταν γάρ... νοσεύματα ἐπιπίπτειν). Both *Pr.* 1.9 and

Galen notice that, unlike the other effects, the troublesome pregnancies (a) occur in spring, and (b) are not explained. Galen follows the contorted order of exposition of *Airs Waters Places* (unnecessarily: recall that his lemma is *Aph.* 3.12), whereas the *problema* disentangles it. The question becomes why, in *this* weather-pattern, both spring and summer are unhealthy. The answer traces the fundamental reasoning about fluidity and temperature through winter to spring, where it supplies an explanation for the effects on pregnancies, and thence to summer and its diseases. These too are reordered by severity, from dry eye-disease up to apoplexy. A consequence of this is that, unlike in *Airs Waters Places*, catarrhs in the phlegmatic are not treated apart from catarrhs in the elderly.¹⁵ Similar disentanglement occurs in 1.11-12, which split the processes and effects of the final weather-pattern into separate, slightly expanded discussions about its effects on the phlegmatic and the bilious.¹⁶

This cluster of *problemata* engage with an extended passage of *Airs Waters Places* very closely; while there are places where they rewrite passages of Hippocratic explanation, none is pure paraphrase. They are not afraid to suggest new or modified explanations, and when compared to Galen they show that freedom from his more restrictive form – a lemmatic commentary with vested interests in the source’s correctness – could be pedagogically useful, both in disentangling the source and in promoting debates about it.

Adding and supplanting explanations are processes which can be seen on a smaller scale in various other *problemata*. Those where the *problema* takes a ready-made Hippocratic proposition include 1.50a (~ 4.16), which suggests an explanation for the assertion in

¹⁵ Galen also treats the two types separately, but justifiably given his argument that ‘catarrh’ is being used in two slightly different senses (17b.589). Ulacco (2011, 74) discusses how *Pr.* 1.9 imports at the end an Aristotelian idea about the innate heat of the elderly.

¹⁶ Galen rejigs the order of *Aer.* 10 in the same way in commenting on *Aph.* 3.14.

Epidemics 6.5.15 that libido assists in phlegmatic diseases, using similar Greek phrasing.¹⁷ The nearby passage *Epid.* 6.5.1, a list of auto-regulating and unlearned bodily functions, perhaps inspired *Pr.* 34.12, which tries to explain the regulation of breathing and blinking, rather than leaving them as wonders of nature as Hippocrates and even Galen in his fascinating commentary do.¹⁸

By contrast, *Pr.* 11.3 is an instance of attempting to elucidate an opaque explanation in *Epidemics* 6, namely from 6.4.19 ‘Those who contain the greatest warmth have the loudest voices, since the cold air is also greatest, and the products [ἔκγονα, lit. ‘children’] of two large things are large.’¹⁹ The last phrase seems to offer a partial explanation: the two large things which have been mentioned are the abundant warmth and the volume of air, but how do they generate the voice? The *problema* rewrites the question as ‘Why are all those with a

¹⁷ λαγνείη τῶν ἀπὸ φλέγματος νούσων ὠφέλιμον becomes διὰ τί συμφέρει πρὸς τὰ ἀπὸ φλέγματος νοσήματα λαγνεία. The topic of *Pr.* 1.50 changes abruptly at 865a35 πότερον. The textual evidence then favours no particle (the *lectio difficilior* of Y^aC^a; and in *PPA* 2.23 a new *problema* starts here). Once this *problema*-division went unmarked, the other manuscripts naturally added a particle to avoid asyndeton. At the start of *Pr.* 1.50b, it is not difficult to understand ‘a disease’ as the object of ἀρχομένῳ.

¹⁸ In the Hippocratic passage (cf. Manetti and Roselli 1982, Gal. *CMG* V 10.2.2 p. 259.9) I suggest οἷον τὸ σκαρδαμύσσειν καὶ <ῆι> ἢ γλῶσσα ὑπουργέει, ‘such as blinking, and <how> the tongue does service’. As Bertier (1989, 266-8) observes, several other processes in the *Epidemics* passage are explored elsewhere in the *Problemata*, especially sweating in bk. 2 and sneezing in bk. But it would be rash to suppose that all these *problemata* are a *systematic* attempt to explain a single Hippocratic passage.

¹⁹ Cf. *Pr.Ined.* 2.95, very similar in phrasing to *Pr.* 11.3. Bertier (1989, 262) comments that this is the only case of *Pr.* trying to *clarify* an explanation from the *Epidemics*.

hot nature loud-voiced?', and suggests that the large quantity of heat draws in a large quantity of cold air. Then, following Aristotle's view (*GA* 787a2-22), the volume of sound is correlated to the volume of air expelled, while pitch is correlated to speed. This is not fully convincing as an explication of the Hippocratic metaphor, in that the two 'parents' (the great warmth and the large quantity of air) are unequal: the former causes the latter. Again, we can contrast Galen's struggles with the same passage (*In Epid.* 6.4.25) to show the *Problemata*'s different attitude to Hippocratic authority. Galen's view, contradicting Aristotle's, is that a loud voice is caused by lots of air made to move quickly by a strong throat, and he relates this to inner heat via sophisticated evidence from the dissection of animal hearts. However, his reverence forces him to take seriously the task of explicating Hippocrates' view, and so to admit that it fell short of Galen's own, since Hippocrates mentioned neither strength nor speed. The *problema*, however, picks out the interesting observation, does not preserve an attribution, and unapologetically suggests a possible Aristotelian direction for a reader to explore.²⁰

3. Ways of Mining Hippocrates

²⁰ More dubious cases of supplanting explanation include fr. 736 and *Pr.* 6.3. If fr. 736 is indeed to be ascribed to an edition of *Problemata*, it may take the claim that a post-prandial walk is beneficial from *Hp. Vict.* 2.62, and slightly alter the explanation (... because it fans the food's warmth, rather than because it warms the food). 6.3 discusses why it is best (and recommended by most doctors – a nod to source-texts) to lie slightly curled in bed. Commentators have compared *Hp. Prog.* 3, where it is a good sign for a *patient* to be lying like this, since it is a normal posture for healthy people, but also Diocles of Carystos fr. 182.8 van der Eijk, which also recommends lying on one's side slightly curled, and not just for the sick. The three texts give different rationales.

The Hippocratic texts did not always provide ready-made propositions for the *problema*-writers to tackle. In this section a range of relationships between the source and explanatory material will continue to be on display, but my focus will shift to the extraction of a question for the *problema*.

One basic procedure is to draw together non-contiguous clauses in the source, omitting other parts. A simple example is 11.38, ‘Why are stammerers melancholic?’ This takes its cue from the assertion at *Epid.* 2.5.1 ‘The lisping or bald or stammering or hairy have strongly melancholic illnesses.’ The *problema* deals with stammerers and – in the explanation – lispers, but omits the bald and hirsute. By ditching some phenomena, the *problema* may seem to expose itself to easily falsifiable explanations, but possibly the extra focus arose when our collection was rearranged, for ‘archival’ convenience, by topic (in book 11, the voice).

Several cases involve abridgement of a wider span of the source. *Pr.* 35.9 (‘Why do we often shiver after food?’) perhaps arose as an encapsulation of the end of *De Flatibus* 7, which traces a detailed causal chain from fullness to shivering. If so, the *problema*’s compendious treatment omitted a detailed physiological explanation from the source, and left us with the much feebler suggestion that (all!) food itself is cold. But abridgement need not entail simplification. *Pr.* 5.6 asks ‘Why is a massage with a mixture of water and oil better at stopping fatigue-pains?’ (881a4-5 διὰ τί οἱ κόποιοι μᾶλλον παύονται ὅταν τις τῷ ἐλαίῳ ὕδωρ συμμίξας ἀνατρίψῃται;). It argues that the mixture sinks into the flesh better than oil alone, and thus can soften it (881a8 μαλάττεται) rather than drying it out. This seems to borrow from the comment at the end of *De Victu* 2.65 that ‘a massage of oil with water softens’ (τρίψις ἐλαίου σὺν ὕδατι μαλάσσει), combined with the gist of the lengthy chapter 66, that

soreness can arise in various ways from the flesh drying out.²¹ Thirdly, the question of 14.1 is ‘Why are those who live in extremes of either cold or scorching heat [καύματος] more beast-like [θηριώδεις] in both their characters and looks?’ This appears to arise by a compression of the start and end of *Aer.* 24, namely 24.2 ‘All those [Europeans] who live in a mountainous, rough, elevated and watery country, where the changes of season are very different, are likely to be tall of appearance, and naturally disposed to hard work and bravery; and such natures have not the least portion of the wild and beast-like [θηριώδεις]’ and 24.10, where those in a bare, rough country, ‘weighed down by winter and scorched [κεκαυμένη] by the sun’ are described first in terms of their appearance (sinewy, hairy), then their character (‘containing a greater share of the wild than the tame’). *Airs Waters Places* and *Pr.* 14.1 distinguish themselves from similar sources by discussing the climate’s influence on ‘beast-like’ humans, using the adjective θηριώδης.²² The explanation supplied in the *problema*, that climate can distort both body and mind, appears to be its own. Even more broadly than that example, the general tenor of question and answer in 1.3 draws on the prefatory survey of factors of

²¹ Poschenrieder 1887, 58. Flashar thinks that Diocles could be a more immediate source, but his phrasing (fr. 182.4) is not so close.

²² Contrast, for example, Arist. *HA* 8.29.607a9-13, where both characteristics and looks of animals in rough mountainous places are contrasted with those of fertile plains. This may be influenced by *Aer.* 24, but in *HA* the focus is switched from humans to animals. *Pol.* 7.7.1327b23-36 (cited by Louis) contrasts cold (and not hot) parts of Europe with Greeks and Asians in their characteristics (and not looks); *EN* 1145a29-31 and 1148b15-9a20 (cited by Flashar) discuss being θηριώδης but without climatic causes.

disease in *Airs Waters Places* 1, as well as on chapter 11 for details about changes of seasons and significant stars.²³

More complicated, both in the extraction of questions and the treatment of explanations, is the relationship of 21.2 and 21.8 to book 2 of the Hippocratic *De Victu*. The latter discusses the digestive properties of barley and different types of barley-breads (ch. 40), barley-gruels (ch. 41), wheat, different types of wheat-breads and -gruels (ch. 42).²⁴ Chapter 42 begins with the assertion that ‘Wheat-grains are more powerful and nourishing than barley-grains, but they and their liquid pass less easily’, which resembles the problem of *Pr.* 21.2, ‘Why does food made of wheat fasten most onto bodies, and why is it more nourishing than food made from barley?’. The *De Victu* does not here detail the mechanism of nutrition, but does repeatedly allude to moisture making loaves nutritious.²⁵ This perhaps inspires the *problema*’s explanation that wheat is stickier than barley, so that its particles stick to the body during digestion. The *problema* adds that crumbly barley-grains can have their nutritional value improved by kneading. This point may have been extracted from *Vict.* 2.40, where the catalogue of barley-breads specifies that ‘dry-kneaded’ dough is more nutritious than moistened kneaded and moistened unkneaded dough. The Hippocratic text here also implies

²³ 1.1-3 form a kind of introduction to disease (Ulacco 2011, 67-70), and indeed were bundled as such by Hunain in *PPA* 1.1. It is apt that the general approach of the most significant Hippocratic source (*Aer.*) should feature here.

²⁴ The vaguer similarity of 21.11 (about barley) to *Vict.* 2.41 (about wheat) could be significant given its proximity to the use of *Vict.* 2.40-2 in *Pr.* 21.2 and 21.8.

²⁵ E.g. κοῦφος μὲν ἐστὶν ὅτι ἀπὸ τῆς ζύμης τοῦ ὀξέος τὸ ὑγρὸν προανάλωται, ὅπερ ἐστὶν ἡ τροφή, or later τῶν ἄρτων οἱ μέγιστοι τροφιμώτατοι, διότι ἥκιστα ἐκκαίονται ὑπὸ τοῦ πυρὸς τὸ ὑγρὸν. The work’s general claim is that nutritional health derives from a suitable balance of moisture and fire: e.g. *Vict.* 1.3, 7.

that the faster these breads pass through one's system, the less nutriment is adsorbed. *Pr.* 21.8 picks up on this, but adds a further complication: why does kneading wheat-doughs, by contrast, make them pass less easily? This is not something addressed in the list of wheat-breads in *Vict.* 2.42. This time the *problema* gives an explanation for why kneading contributes to stickiness (which went unexplained in 21.2), which supplants the point in *Vict.* 2.40 that denser particles are less prone to clog up one's passageways before being adsorbed to the flesh. In sum, if – as the multiple correspondences tend to suggest – these two *problemata* were indeed inspired by the passage of *De Victu* rather than other ideas about the nutritional value of staples, they tackle an extended passage, draw together separate claims mined from it, supply explanation (that wheat is stickier), supplant explanation (why kneading barley is good), and add new material to it (kneading wheat).²⁶

Two *problemata* from book 2 demonstrate a different sort of complexity in creating questions, in that they combine a Hippocratic passage with a mediating passage of the dominant source, Theophrastus's *De Sudore*.²⁷ 2.9 combines *Sud.* 27 with – again – *Airs Waters Places* 8.²⁸ The question ('Why, though the sun warms the naked more than the clothed, do the clothed sweat more?') is more closely related to the Hippocratic (alleged) observation that a person sitting or walking in the sun sweats under their clothes but not where the skin is exposed (8.3). By contrast, Theophrastus' focus is on a different point in *Aer.* 8.3, that people after exercise (Theophrastus specifies running rather than walking) sweat more *in the shade* than in the sunshine. All three texts explain that the sun boils off

²⁶ Another possible source here is Mnesitheos' discussion of grains. In fr. 28 Bertier he states that wheat is easier to digest than barley; however he goes on to say that unkneaded breads (no matter what the grain) cause flatulence and headaches.

²⁷ Fragment 9 on TLG; Fortenbaugh, Sharples and Sollenberger 2003.

²⁸ Flashar has a useful brief discussion.

sweat from exposed flesh, but in both Theophrastus and *Pr.* 2.9 a further explanation is given: the sun closes up the pores.²⁹ Later in the book, *Pr.* 2.30 combines some dietetic advice from *De Victu* 2.63 with a Theophrastean passage (*Sud.* 39) which also seems to have drawn on the same Hippocratic source.³⁰ The *De Victu* mentions that running while clothed produces more heat and sweat, but also pallor from unventilated flesh. Theophrastus notes that running while clothed (and, he adds, oiling one's cloak) produces pallor from unventilated warm flesh, and adds that naked running actively brings about a good complexion. The *problema* combines these to pose a more general question 'Why is the sweat on a naked runner, even when it arises in less quantity, better than the sweat (on a runner) in a cloak?' Like the Hippocratic text, it begins with the fact that running in a cloak is hotter and sweatier work, and ignores Theophrastus' point about oil; like Theophrastus, it includes the benefits of naked running. In treating the shared point that lack of ventilation causes pallor, the *problema* uses the more up-to-date vocabulary of εὔπνοια (good ventilation) and κατάπνιξις (stifling) from Theophrastus, before ending with a further point about oversleepers. Hence the same *problema* intelligently combines sources, selects explanatory terminology, and marshals further evidence.

The last two examples are unusual in that we can trace additions to Hippocratic material to the influence of Theophrastus. More often, elements from unidentifiable sources are added to produce a more precise question. The procedure can be traced in the edition of *Problemata*

²⁹ The *problema* uses συμμύω, which Theophrastus applies to the closing of pores in *Sud.* 22, 25, whereas it is generally used in gynaecological treatises in the Hippocratic Corpus. The *problema* characteristically presents the two explanations – drying and pore-closing – as possible alternatives (πότερον ὅτι... ἢ διότι...: 'Is it firstly because... or because...?') whereas Theophrastus has the two working in tandem (διὰ τὸ τὸν ἥλιον ἀναξηραίνειν καὶ πυκνοῦν τοὺς πόρους, 'through the sun drying up and contracting the pores').

³⁰ Contrast *Pr.* 38.3, which is a close expansion on the Theophrastean passage alone.

read (avidly) by Apollonius the Paradoxographer. Aristotle (fr. 750) explained in it why earwax, which is generally bitter, becomes sweet in those who are about to die of a chronic illness.³¹ This *problema* was surely inspired by *Epid.* 6.5.12 ‘In humans sweet earwax, unlike bitter, signals death.’ But by adding the more specific observation that the sweetness arises over the course of a chronic illness, it narrows down the scope for possible explanations. The significance of this can be seen from Galen’s brief commentary (*In Epid.* 6.5.19), where after expressing disgust at the idea of tasting a patient’s earwax he refers the sweetness to *syntexis* of the brain, without explicit reference to whether the illness is chronic as the *problema* would demand.

One sees this process of narrowing the question in 33.1, 33.5 and 33.17, behind which lies *Aphorisms* 6.13 ‘Someone gripped by hiccups is released from the hiccups by the supervention of sneezes.’ This becomes the question of 33.17 straightforwardly, but the explanation invokes further details: hiccups start in the lung, unlike burps (963a39); holding the breath and taking vinegar also stop hiccups (963b4-5). These two further comments are incorporated into more specific questions in 33.1 (‘Why does sneezing stop hiccups but not stop burps?’) and 33.5 (‘Why do sneezing, holding the breath, and vinegar stop hiccups?’). Again, Galen’s explication – that hiccups are a type of spasm caused by fullness and that sneezing helps evacuate some excess fluid (18a.23 Kühn) – would need some tweaking to

³¹ ὁ ῥύπος... ἐν τοῖς ὠταρίοις γιγνόμενος, πικρὸς ὄν, ὅταν τελευτᾶν μέλλωσιν ἐν ταῖς μακροῖς νόσοις γλυκὺς γίγνεται, where Hercher’s dubious bracketing of ὅταν τελευτᾶν μέλλωσιν (1876, 359) is accepted without comment by Gigon and by Giannini 1965, 132. Apollonius does not tell us Aristotle’s reasoning.

satisfy the fuller set of observations probed by *Pr.* 33.1. There is a fleeting sense here that the *Problemata* were a tool for ongoing research which did achieve real refinements.³²

Similarly 14.7 compresses the discussion of people in marshlands at *Airs Waters Places* 7.2-6, by picking out for analysis the final assertion that they grow old before their time and cannot be long-lived because of their water-sources. However, the *problema* adds to the question a contrast with those living in well-ventilated places, which is not explicit in the source. The explanation then justifies this addition: whereas *Airs Waters Places* suggests that stagnant water causes ageing, the *problema* has a deeper theory that poor ventilation causes both stagnant water and ageing. *Pr.* 34.4 also combines delicate mining of a Hippocratic source with the further specification of material from elsewhere. It asks why tongues are used as medical signs, citing three cases – during fevers, when there are pustules, and when its colour is variegated.³³ The explanation on the last point speaks of the tongue being coloured as it filters multi-coloured liquids. This appears to be inspired by two nearby comments in

³² See also the relationship between 10.48 (‘Why are those humans with spaced-out teeth generally short-lived?’) and 34.1, Arist. fr. 273(15) *uitae brevis signa ponit raros dentes*, *HA* 2.3.501b20 (animals – not just humans – with more teeth live longer), and *Epid.* 2.6.1 (‘The long-lived have more teeth’). This complex of sources is noted at Poschenrieder 1887, 17; Quarantotto (2011, 45-6) notes that the closing remark in *Pr.* 10.48, ‘One must also consider the case of other animals’, situates the *problema* within a broader research project.

³³ The text is corrupt: διὰ τί αἱ γλῶσσαι σημαντικὸν πολλῶν; καὶ γὰρ τῶν πυρετῶν καὶ γὰρ [ἐν *pro* καὶ γὰρ edd.] τοῖς ὀξέσι νοσήμασι, καὶ ἐὰν χάλαζαι ἐνῶσιν, καὶ τῶν ποικίλων προβάτων ποικίλαι (963b34-5). The explanation more clearly discusses the three cases mentioned above, which suggests one should emend προβάτων. Given βάπτεται in 963b38, προβα<ψάν>των may deserve consideration. For the relationship of *Pr.* 34.4 and *Epid.* 6.5.8-10 see also Bertier 1989, 269.

Epidemics 6. *Epid.* 6.5.8 states without explanation that the tongue's colour is a sign of the prevailing humour; then 6.5.10 explains that the tongue-colour is diagnostic because it matches the προστάσεις, the material which collects on the tongue's surface. The *problema* extracts from *Epidemics* 6 a part of its question and the corresponding part of its explanation, but it also supplements this with further instances where the tongue is a sign, and thence constructs a more general claim that it is the tongue's moistness which gives it signifying power.

Finally, *Pr.* 13.6 even raises an explicit objection to the more superficial passing comment on which it builds, *De Morbis* 4.56 'Whenever we eat garlic or some other smelly food, our urine smells of the food' (given as evidence that drink goes to the stomach rather than the lungs). The *problema* first corrects the over-generalisation: 'Why does the urine smell if someone eats garlic, but not smell when other strong-scented things are eaten?' Then it supplies possible explanations, the first of which draws on a 'Heraclitean' theory, which is found wanting precisely for failing to distinguish garlic from other strongly scented foodstuffs.³⁴

³⁴ These examples are more successful than *Pr.* 3.1, on why the drunk are prone to chills and pleurisy 'though wine is warm'. These last words appear to be added to the likely source (Flashar), *De Affectionibus* 7, in order to point the paradox – which, however, the *problema*'s explanation does nothing to address. Nor does it relate drunkenness to pleurisy. Others (e.g. Poschenrieder 1887, 61, Louis, Mayhew) cite only *Morb.* 1.26 as the source, and I shall mention in the next section a possible use of *Morb.* 1.25. If this is right, the *problema*'s explanation is even more simplistic, since *Morb.* gives a detailed explanation of how drinking causes chills and pleurisy in terms of the movements of bile and phlegm around the ribcage. Perhaps the different explanations given in *PPA* 4.1, 4.6 are attempted improvements by Hunain, rather than reflecting an earlier state of the text.

4. Reapplying Hippocrates

I end with a few cases where Hippocratic passages seem to have been reapplied to explain issues not presupposed in the original context. *Pr.* 10.50, for example, asks why having a squint is largely peculiar to humans. The suggested solution is that strabismus is caused by epilepsy during youth, and the latter is itself an almost exclusively human trait. The connection between epilepsy and strabismus was perhaps inspired by the Hippocratic *Epidemics* 2.5.11, where it is stated without explanation that when the ‘Great Disease’ becomes habitual, various symptoms including ‘skewing of the eyes’ occur.³⁵ The question of the *problema*, however, is unrelated to the Hippocratic text.³⁶ Similarly, *Pr.* 31.23, about the temperature of tears, supports its explanatory model with a notion drawn from *De Morbis* 1.25, that cold sweats arise from the slight warming of a large amount of residue while warm sweats can only arise from a small amount of residue; this explains why cold sweats betoken a lengthy illness.³⁷ And *Pr.* 25.15 brings to bear the observation that ‘the South is hottest through being closest to the sun’ (939b7, ἔστι δὲ ἡ μεσημβρία θερμότερον διὰ τὸ εἶναι

³⁵ Cf. the almost identical 31.26, and 31.27 which suggests other explanations but includes at 960a19 the assertion ἡ δ’ ἐπίληψις διαστροφὴν ποιεῖ ὅταν γένηται, ‘epilepsy causes skewing [sc. of the eyes] whenever it occurs’.

³⁶ Cf. the mention of marjoram (ὀρίγανος) as being bad for eyes at *Pr.* 31.9.958b8 – a property mentioned at *Hp. Epid.* 5.54. Admittedly, this piece of plant-lore need not be tied down to a specific Hippocratic source.

³⁷ This material is repackaged more straightforwardly in *Pr.* 2.35, without the application to the temperature of tears. The connection to *Morb.* 1.25 is made at Poschenrieder 1887, 60, and is more convincing than the connection to *Prog.* 6, which states that cold sweats signal a long illness, without giving any rationale. I suspect that Mayhew’s comparison of *Pr.* 2.35 to *Epid.* 7.25 (where cold sweat immediately precedes death) should read ‘*Morb.* 1.25’.

ἐγγύτατον ἡλίου). This is very similar to one of the first comments in *De Victu* 2 – whose use we have seen repeatedly – that ‘A [country] situated towards the South is hotter... because it is very near the sun’ (*Vict.* 2.37 ἡ πρὸς μεσημβρίαν κειμένη θερμότερη... διότι ἐγγυτάτω τοῦ ἡλίου ἐστίν).³⁸

Finally, so that we may end where we began with the *Problemata* using *Airs Waters Places*, the question in *Pr.* 23.30, why the surface of the sea is saltier (and warmer) than its depths, is not raised in *Aer.* 8. However, the suggested explanation of the *problema* is closely related verbally: ἢ διότι ὁ ἥλιος καὶ ὁ ἀήρ ἀνάγει ἀεὶ τὸ ἐλαφρότατον ἀπὸ τῶν ὑγρῶν, τὸ δὲ ποτιμώτερον ἀεὶ κουφότερον; ‘Is it because the sun and air constantly draw up the most mobile part from liquids, and what is more potable is always lighter?’ The Hippocratic text, while explaining the quality of rain via the physics of evaporation, asserts that ὁ ἥλιος ἀνάγει καὶ ἀναρπάζει τοῦ ὕδατος τὸ τε λεπτότατον καὶ κουφότατον· δῆλον δὲ οἱ ἄλλες ποιέουσιν, ‘The sun draws and snatches up the finest and lightest part of water; salt-pans make this clear’ (8.2). This describes evaporation in similar language to the *problema*, and also connects it immediately to its effect of making the saltiness of the sea more noticeable.³⁹

5. Conclusion

Throughout this essay we have witnessed a range of ways in which the *Problemata* draw on the Hippocratic corpus. Clearly, given the fact that this engagement cannot be reduced to a

³⁸ Poschenrieder (1887, 57) tentatively drew the parallel and noted the prominent position of this comment in *Vict.* 2. Flashar (1975, 340) suggests a nebulous, widespread use of *Vict.* 2 as well.

³⁹ Flashar casts doubt on this connection by citing alternative sources for the theory of evaporation in *Pr.* 23.30. However, the only parallel with similar phrasing and an explicit link to the saltiness of the sea comes from a keen reader of Aristotle’s *Problemata*: Plutarch (*Quaest.Nat.* 9.914b-c).

simple pattern, and given the loss of other medical texts which the *Problemata* may have used, not every interaction proposed here will seem equally cogent. However, there is no room for doubt that 1.9 reordered *Aer.* 10 to clarify its structure, and I feel confident that the other instances of sophisticated interaction are not all merely the mirages of positivist source-chasing. Such interactions include refinements of the observation to be explained, which in some cases refute Galen's commentaries on the same passage. I mention that not as a cheap matter of points-scoring, but as indicating that *problemata* could contribute in real terms to the development of scientific models.

Of the Hippocratic texts, *Airs Waters Places*, *De Victu* 2 and the *Epidemics* (esp. 6) seem to have been particularly influential; *De Morbo Sacro*, *De Flatibus*, *De Morbis*, *Aphorisms* 6 and *De Affectionibus* have all made passing appearances, and doubtless research will continue to trace new parallels. Unlike their use of Theophrastus, the *Problemata* tend not just to 'repackage' Hippocratic material in the *problema*-format. Often, it must have been precisely the unexplained assertion which attracted attention (e.g. in the *Epidemics*), and elsewhere Hippocratic explanations were felt to need more or less updating of terminology and physiological model – more, of course, than Theophrastus' texts required. The *Problemata* therefore stick, as far as Hippocratic material goes, largely to Aristotle's project for them, to explain natural phenomena whose causes are unclear (fr. 112, cited above).⁴⁰

Use of the Hippocratic Corpus characteristically does not come with any explicit ascription. While, as we saw, Aristotle sets up various kinds of *problemata* as being related to the opinions of prior thinkers, the physical *problemata* generally – and always in the

⁴⁰ Cf., correct but unsurprising, Flashar 1975, 340: 'der Stoff aus dem Corp. Hipp. vornehmlich für die Spitze der einzelnen Probleme gestellten Fragen verwendet wird, während die Antworten überwiegend von arist.-peripatetischen Erklärungsprinzipien bestimmt wird.'

Hippocratic cases – pose a question and suggest an answer without directing the reader to matters of authority. We saw from the contrast to Galen’s commentaries that instead of a faithful explanation of the merits and (sometimes) demerits of lemmata from the Hippocratic texts, the *problemata* put the student into immediate contact with a curious phenomenon, and suggest tentative, often multiple, explanations without being restricted by what ‘Hippocrates’ had declared. The openness of the text, ever able to be expanded with the reader’s own explanations, offers a vehicle for teaching which is remarkable for actively engaging the student and for its freedom of authoritarian principles. And we know that this format was appreciated: the various ancient editions which we can distinguish prove that ancient reading imposed revisions in the text, as well as implying a continuing readership whose enthusiasm is glimpsed so vividly in the representations of *problema*-reading in Plutarch and Gellius.

Hippocratic source	<i>Pr.</i>	Notes
<i>Aer.</i> 1, 11	1.3	Uses 1 vaguely and 11 in detail to form both question and explanation.
<i>Aer.</i> 7.2-6	14.7	Abbreviates to form question and construct a deeper explanation.
<i>Aer.</i> 8.2	23.30	Reapplies explanation (with phrasing preserved) to new question.
<i>Aer.</i> 8.3	2.9	Uses for question, combines with <i>Thphr. Sud. 27</i> for explanation.
<i>Aer.</i> 8.8-10	fr. 760	Reformats proposition, explanation and evidence, with slight addition.
<i>Aer.</i> 10.3-12	1.8-12, 19-20	Adopts propositions nearly verbatim; explanations added, altered or reordered.
<i>Aer.</i> 24.2, 10	14.1	Extracts question from two separate sentences; supplies explanation.

<i>Aff.</i> 7	3.1	Adds to proposition, but supplies feeble explanation. (Possibly to be related instead to <i>Morb.</i> 1.26.)
<i>Aph.</i> 6.13	33.1, 5, 17	Uses for question of 33.17, to which refinements are made in explanation and in 33.1, 5.
<i>Epid.</i> 2.5.1	11.38	Uses in part to form more focussed question; adds explanation.
<i>Epid.</i> 2.5.11	10.50, 31.26-7	Reapplies proposition to new question.
<i>Epid.</i> 2.6.1	10.48, 34.1	Constructs slightly altered question, but unclear derivation because mediated by Arist. fr. 273, <i>HA</i> 2.3.
<i>Epid.</i> 5.54	31.9	Possibly incorporates observation as a corollary of a separate piece of explanation.
<i>Epid.</i> 6.4.19	11.3	Adopts proposition; attempts to clarify Hippocratic explanation.
<i>Epid.</i> 6.5.1	34.12	Possibly uses in part to form more focussed question; adds explanation.
<i>Epid.</i> 6.5.8, 10	34.4	Adds further phenomena to construct more general question and explanation.
<i>Epid.</i> 6.5.12	fr. 750	Adds to proposition; supplied explanation (lost).
<i>Epid.</i> 6.5.15	1.50a, 4.16	Uses proposition with similar phrasing; adds explanation.
<i>Flat.</i> 7	35.9	Possibly abbreviates to form question, then adds weaker explanation.
<i>Morb.</i> 1.25	2.35, 31.23	Reformats proposition and explanation (2.35). Reapplies proposition and explanation to separate phenomenon (31.23). More likely source than <i>Prog.</i> 6.
<i>Morb.</i> 1.26	3.1	See on <i>Aff.</i> 7.

<i>Morb.</i> 4.56	13.6	Probably corrects proposition and supplies more suitable explanation.
<i>Morb.Sacr.</i>	30.1	Reference to use of ‘sacred disease’ by ἀρχαῖοι.
<i>Prog.</i> 3	6.3	Dubious use of proposition (Diocles more likely).
<i>Prog.</i> 6	2.35, 31.23	Dubious: see on <i>Morb.</i> 1.25.
<i>Vict.</i> 2.37	25.15	Reapplies explanation to new question.
<i>Vict.</i> 2.40, 42	21.2, 8	Probably extracts questions in complex way, supplying and altering explanations, with further additions.
<i>Vict.</i> 2.41	21.11	Dubious use for question.
<i>Vict.</i> 2.62	fr. 736	Possibly uses for question; modifies explanation.
<i>Vict.</i> 2.63	2.30	Combines with Thphr. <i>Sud.</i> 39 to produce broader question and for explanation.
<i>Vict.</i> 2.65-6	5.6	Uses phrasing 2.65 for question, and also of gist of 2.66 in explanation.

Table 3: Summary of (only) the passages mentioned, ordered by Hippocratic source.

Abbreviations

PPA: Filius, L. S. 1999. *The Problemata physica Attributed to Aristotle: The Arabic Version of Hunain ibn Ishaq and the Hebrew Version of Moses ibn Tibbon*. Leiden : Brill.

TLG: <http://stephanus.tlg.uci.edu>

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