

The *Jiha/Tropos-Mādda/Hūlē* Distinction in Arabic Logic and its Significance for Avicenna's Modals

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mīnū nā māte jēna līdhe
ā shakya banyū che

Abstract The word, *tropos*, translated in Arabic as *jiha*, is understood in the field of logic as mode. Though investigations of modals in the medieval Arabo-Islamic logical tradition trace their lineage back to Aristotle, the Greek word designating this concept was never used in this manner by the Stagirite. The closest word that the Arabic *jiha* translates from Greek is *tropos*, which was a technical term that gradually developed with Aristotle's commentators. The word came to be understood as part of a dichotomy, *tropos-hūlē*, which was inherited by the Arabs as *jiha-mādda*. This dichotomy seems to have become a determining factor for conversion rules of modal propositions and thus for modal syllogistic. After an investigation outlining the evolution of the term *tropos* and the development of the dichotomy *tropos-hūlē* in the Commentary tradition of modal logic, the article presents philological evidence for their influence on Avicenna. It then briefly discusses the ramifications of this influence for his modal conversion rules and syllogistic. In sum, the article argues that the *jiha-mādda* (*tropos-hūlē*) division was part of a larger dichotomy that allowed Avicenna to construe propositions in various ways. How he understood a given proposition determined the validity of its conversion and so of its place in his modal syllogistic.

1 Introduction

Interest in Arabic modal logic first bloomed in the second half of the twentieth century with the works of Nicholas Rescher, who offered a preliminary syntax and semantics for the statistical (and some alethic) models of a few medieval logicians

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writing in Arabic.¹ As Rescher's studies were geared mainly towards providing us with a systematic interpretation of various modal systems, they remained largely ahistorical in their approach. After Rescher – and until the turn of the century – Arabic modal logic was studied at a steady but slower pace, either in short articles devoted exclusively to the subject² or as a tangential part of some larger study.³ A good number of the scholars of this period turned to historicization and contextualization. It seems that over the past five years, studies in Arabic modal logic have come to maturity with large strides, with works that combine the systematization of Rescher with the historical bent that followed after him.⁴ Two things, however, are missing from the latest approach: a focus on the chronological development of the modal systems of individual medieval logicians, and attention to some important underlying assumptions that might explain those systems.⁵

This short article—something of a sketch extracted from the first part of a larger study I have been preparing on the chronological development of Avicenna's modal logic—is a contribution to filling these lacunae. I have divided it into three parts. In the first, (1) I present a central topic of discussion in the logical systems of Aristotle's commentators that Avicenna had to consider before setting down his own pronouncements on modalities and modal syllogistics. This was the perennially appearing distinction between *jīha* (*tropos*) and *mādda* (*hūlē*) that we find clearly articulated in *al-Shifā'* and *al-Najāt*.⁶ I present, in this first part, some of my notes on the development of these concepts and on the associated technical terminology. I begin (1a) by focusing on the term *tropos* in Aristotle and then (1b) move on to discuss it and its counterpart, *hūlē*, in pre-Avicennan philosophy—in the commentary tradition and in al-Fārābī. In the second part, (2) I offer Avicenna's appropriation of these concepts, paying close attention to his language to get a precise sense of how he inherited them. Finally, in the third part, (3) I discuss how these concepts were important for Avicenna's understanding of modalities. I do so by (3a) zeroing in on Avicenna's comments on the quantification of possible propositions. For distinctions in his quantification scheme seem to run parallel to the *jīha-mādda* one. (3b) How Avicenna understood the quantification of modalities affected his stance on the conversion of propositions. With respect to the e-conversion of the ever-ambiguous absolute propositions, (3c) his stance may have changed over time. (3d) I think that this change may again be explained with reference to the *jīha-mādda* distinction.

2 *Jīha* (Tropos)

2.1 *Technical Terminology in Aristotle*

In the field of Arabic logic, *jīha* is a technical term understood as mode. Goichon tells us that it was the translation of the Greek *tropos*, as it occurs in Aristotle.⁷ She explains the term further as “mode”. Now I am uncertain whether, by this term (usually given as mood in English), Goichon means the modes Barbara, Celarent, etc., or modality. In the case of the only logical work she cites, namely,

Topics 106a3, *tropos* is used in neither way: *to de posachōs pragmateuteon mē monon hosa legetai kath' heteron tropon...*(regarding how many ways it is employed, not only those many which are said in a different way...). The same general sense of manner/way goes for her citations of *Metaphysics*, 1052a17 and *De Generatione*, 318b8. Goichon also cites the *Prior Analytics*, 43a10, for an occurrence of *tropos* as “mode (du syllogisme)”.⁸ The Greek reads: *kai gar en pleiosi schēmasi kai dia pleionōn tropōn* (<they can be proved> with more figures and moods). This is certainly not a reference to modalities. Goichon gives the Arabic equivalent of *ḍarb* for this use of *tropos*. *Ḍarb* is the standard word used in Arabic to convey moods; and *tropos* as mood appears fairly frequently in Aristotle and should be considered a technical term.⁹ Be that as it may, the word *tropos* was often translated in Arabic as *jiha*, even if it did not mean mode.¹⁰

The fact of the matter is that there is no technical term in Aristotle that means mode. *Tropos* (way/manner), like *jiha*, is a vague enough term to have a wide semantic range. In my own survey of the works of Aristotle, I have been able to find the following types of uses:¹¹ (1) general type/way/manner/means: (1a) *Prior Analytics*, 32b5: *duo legetai tropous* (it is said in two ways); (1b) Id., 45a4: *eis tous tropous* (<it will reduce> to the types); (1c) Id., 45a7: *ek...tropou* (from the type); (1d) Id., 25b15: *kath' hon tropon diorizomen to endechomenon* (according to which manner we define the possible); (1e) *Posterior Analytics*, 74a29: *ton sophistikon tropon* (in a sophistical sense); (1f) *oute gar ho rētorikos ek pantos tropou peisei* (for the rhetorician will not persuade with every means); (2) Aristotle often uses the following or similar phrases to avoid repetition: (2a) Id., 24a30: *ton eirēmenon tropon* (in the aforementioned way); Id., 25a27: *ton auton tropon* (the same way); (3) in the technical sense of mood, mentioned above and at *Prior Analytics*, 43a10, 52a38; *Posterior Analytics*, 85a11, etc.;¹² (4) in order not to be redundant, Aristotle often uses the expression *ho autos tropos ho tēs deixēōs* (the same method of proof), which reduces elliptically at *Prior Analytics*, 65a18, *to ouch ho tropos* (not this method <of proof>); this may be related to an expression like *ho sophistikos tropos* (the sophistical method <of proof>) at *Topics*, 111b32; again, at *Topics*, 128a37: *ton auton de tropon kai epi tōn allōn tōn toioutōn* (<you must use> the same method <of proof> in other cases of this kind);¹³ (5) Genus at *Metaphysics*, 996b5 (equivalent of *eidē*); (6) figures (of syllogisms) at *Prior Analytics*, 45a4-7: *tropoi syllogismōn* (types, i.e. figures, of syllogisms).¹⁴

Now as for (7) the use of *tropos* in the sense of modality, we have some indications of the seeds of this technical use already in Aristotle: at *Prior Analytics*, 41b35, we read, “*kai hoti sullogismou ontos anagkaion echein tous horous kata tina tōn eirēmenon tropōn* (and that when we have a syllogism, it is necessary for the terms to be according to one of the aforementioned ways/relations).” The reference of course has to do with the universal or particular relation of the terms of the premises, not with their modal relation. What I wish to point out here is that the loose semantic range of *tropos* has allowed Aristotle to use it to indicate *some kind of relation between terms*. A less stretched indication of a quasi-modal use of *tropos* in Aristotle is found at *Topics*, 135a7. Aristotle begins the discussion by pointing out that errors regarding properties occur because there is often no indication given as to how and to what things these properties belong. Thus

one often fails to mention that *x* belongs to *y* naturally, actually, specifically, etc. At the end of this discussion, we read, “*allou men oun houtōs apodidontos to idion epicheirēteon autōi d’ou doteon esti tautēn tēn enstasin all’ euthus tithe-menōi to idion dioristeon hon tropon tithēsi to idion* (if someone else gives the property thus one must stand against it, but for oneself this attack should not be given; rather, immediately upon setting it down, one must define in what way one is setting down the property).” Again, *tropos* is certainly not used as a technical term, but it loosely refers to the manner in which a property holds of a subject. In other words, Aristotle does not say that one should indicate the *tropos* of a proposition (that would be a technical use), but the *tropos* in which a predicate holds of a subject. I imagine that it is only a small step that would get us to the technical sense from this usage in Aristotle.¹⁵

2.2 The Peripatetic Tradition: *Eidos-hūlē* and *Tropos-hūlē*

quanti apud Syros Arabesque Alexandri scripta aestimata fuerint

(Wenrich, quoted in Steinschneider, *Die arabischen Übersetzungen*, 1960, p. 94)

I have found no clear signs of the development of *tropos* as a technical modal term within the surviving logical writings of Alexander of Aphrodisias.¹⁶ Rather, the term appears there in its fully matured technical sense; this suggests that it was used to indicate modalities well before his time.¹⁷

In the post-Aristotelian logical tradition, *tropos* as mode comes to oppose *hūlē*. In my view, this distinction became central to Avicenna’s understanding of modified propositions. But before I turn to a discussion of this dichotomy, I think it would be useful to say something about the other related *eidos-hūlē* one. In his commentary on the *Topics*, Alexander writes at 2, 1 that one kind of syllogism does not differ from another *qua* syllogism, but “*kata ta eidē tōn protaseōn, tēn de kata tous tropous kai ta schēmata tēn de kata tēn hūlēn peri hēn eisin* (according to the form of the premises—according to the moods and the figures—and according to the matter about which they are).” Thus we have a difference, on the one hand, between the form of a syllogism, consisting of its mood and figure, and its matter, on the other. Alexander says something similar in his commentary to the *Prior Analytics* at 6, 16: the figures <of the syllogisms> are like a sort of common matrix. You may fit matter (*hūlēn*) into them and mold the same form (*eidos*) for different matters. Just as, in the case of matrixes, the matters fitted into them differ not in respect of form or figure, but in respect of matter, so too is it with the syllogistic figures.¹⁸ Further clarification of what is meant by matter is found in Ammonius’ commentary on the *Prior Analytics*, 4, 9–11, where he says that the matter is analogous to objects (*pragma*), whereas the form is analogous to the figures of syllogisms.¹⁹ It is then clear that at least in one sense matter is to be taken as the objects for which the figures serve as a common logical matrix.²⁰

Let me now turn to another dichotomy. Commenting on *Prior Analytics*, 25a2-3 (on which see note 16), Alexander writes that by the expression *kath’ hekastēn*

prosrēsin Aristotle intends “*kath’ hekastēn katēgorias diaphoran kai kath’ hekastēn tropou prosthēkēn* (with respect to each difference of predication, i.e. with respect to each attachment of mode).” The word *prosrēsis* of course carries the sense of adding a designation to something. Thus, for Alexander, the mode of a proposition is something that is added to it. For he writes that the modality of a proposition does not depend on what is set down,²¹ but on that which is joined to it. Here then we have the emergence of a dichotomy between Aristotle’s system for classifying modalized premises on the one hand, which operates on the explicit presence of a modal copula-modifier (*prosrēsis/tropos*), and the modal facts on the other hand, e.g. necessary truths, that inhere in the objects that form the subject-matter of the premise (*apo tōn hupokeimenōn*).²²

The distinction between the *tropos* (attached mode) and *hūlē* (subject matter) of a proposition is now at hand; but Alexander has so far drawn up this dichotomy only conceptually, without recourse to a clear distinction in his technical apparatus. But this is not far off. Following his comments on *Prior Analytics* 25a3-5, Alexander says the following:

axion de edoxen episkepseōs einai moi ti de pote peri sullogismōn kai schēmātōn ton logon en toutois tois bibliois poioumenos paralambanei kai tas tōn protaseōn kata tēn hūlēn diaphoras hūlikai gar diaphorai to houtōs ē houtōs huparchein (it appeared to me to be worthy of investigation why, when speaking in these books about syllogisms and figures, he also sets out the distinctions of premises according to the matter; for to hold thus or thus is a material difference).²³

In the proposition, “x is y”, how y is predicated of x is determined by the natures of x and y themselves. This is something *hūlikē* or material. The fact of pointing out truly or falsely in speech that it holds in such and such a manner means adding a mode to this proposition.²⁴ The truth-value of the articulated mode will be judged against the material relation.²⁵

By the time we get to Ammonius, *hūlē* becomes a technical shorthand for material relation.²⁶ For he writes in his commentary on the *De Interpretatione*, 88, 17, “*tautas de tas scheseis kalousin...tōn protaseōn hūlās, kai einai autōn phasi tēn men anagkaian tēn de adunaton tēn de endechomenēn* (these relations <between subject and predicate> they call the matter of propositions and they say that they are necessary, impossible, or possible).” He then explains that they are called matters because they depend on the objects posited in the propositions and – this is important to note – they are not so due to our opinions or predication, but due to the very nature of the objects (*ouk apo tēs hēmeteras oiēseōs ē katēgorias all’ ap’ autēs tēs tōn pragmatōn lambanontai phuseōs*). That which is due to our opinion or predication is the modal expression; that which is due to the nature of the things is the matter.²⁷

This second dichotomy is of course related to the first. In the first, the form of a syllogism comprised its figure and mood. Its matter was that from which it was constructed, namely, the proposition.²⁸ The form of the proposition was a contrast to its matter, which was its subject and predicate. Everything else, including the modal expression, was its form. Thus *tropos* was a part of *eidōs* and conceptually stood apart from the *hūlē*. *Hūlē*, in the sense of material relation, was derived from

hūlē in the sense of matter. It stands to reason, then, that the *eidōs/hūlē* dichotomy should incorporate the *tropos/hūlē* one.

Both pairs of distinctions were known to al-Fārābī and both have been preserved in the Arabic translation of Alexander's treatise on conversions. For al-Fārābī, both uses of matter (i.e. as material modality and as things about which statements are made) are found in one passage, which has an echo of Ammonius' explanation of the emergence of *hūlē* as a technical term (i.e. meaning material modality). Zimmermann translates al-Fārābī's *Commentary on the De Interpretatione*, 164, 11, as follows:

Modes are not the same as matter²⁹. Modes signify how the predicate holds of the subject, while the matters³⁰ are the things connected when brought together in an informative way by a statement: their connexion produces the qualities (signified by modes). This is why modes belong to the part of logic which examines the composition of statements – for they are modes and qualities of composition –, and not the part which examines the subject-matters. Accordingly, these modes can occur in statements whose material (modalities)³¹ are contrary to those signified by their modes, which signify the mode and quality of the connexion alone.³²

Modes are connected with the composition of propositions; they are formal. Matters constitute what the propositions are about; the former are both the content and the quality of the latter.

Before I move on to discuss the significance of the *jiha/tropos-mādda/hūlē* distinction for Avicenna's modal logic, I would like to point out briefly that it must have been available to him also in the Arabic translations of the commentators.³³ In his *Fī in 'ikās al-muqaddamāt*,³⁴ Alexander points out that particular negative propositions do not convert because the conversion is sometimes true and sometimes false, depending on the matter:

fa-ammā al-muqaddamātu allatī lā yūjadu fihā 'ṣ-ṣidqu 'inda inqilābi al-ḥudūdi fa-laysa tan'akisu ra'san lākinna rubbamā ṣadaqat wa-rubbamā kadhabat min qibali khāṣiyati al-māddati wa-kayfiyyatihā wa-hādhihi hiyā al-muqaddamātu's-sālibatu al-juz'iyatu al-mawjūdātu minhā wa-ḍarūriyyatu wa-dhālika fi al-muqaddamāti allatī tan'akisu hiyā' llatī taṣdiqu min qibali annahā bi-hādhihi al-hāli mina al-kayfiyyati wa-sh-shakli lā min qibali annahā fī hādhihi al-māddati wa-fī hādhihi li-annā al-muqaddamāti allatī tantaqilu bi-intiqāli al-māddati laysat tan'akisu wa-in ṣadaqat mirāran kathīratan fī ba'ḍi al-mawāddi wa-dhālika anna al-in'ikāsa li al-muqaddamāti innamā huwa min qibali 'sh-shakli wa-ṣ-ṣūrati ka-l-hāli fī tantjī al-qiyaṣāti lā min qibali al-māddati wa-li-dhālika wajaba an takūna ḥāluhu fī jamī'i al-mawāddi ḥālan wāḥidatan (as for those propositions in which there is no truth when the terms are transferred, they do not convert absolutely (*ra'san?*); rather, they are sometimes true and sometimes false on account of the special property of the matter and its quality. These are the hyparctic and necessary negative particular propositions. Regarding propositions that convert, they are true on account of the fact that they have this quality and form, not on account of the fact that they are with respect to this and that matter. For propositions which transfer <their truth-value> with the transference of the matter do not convert, even if they are true many times with respect to some matters. This is because conversion of propositions is only with respect to the form (*ash-shakl wa-ṣ-ṣūra*), like the condition with respect to extracting conclusions in syllogisms, not with respect to the matter. For this reason, it is necessary that its condition with respect to all the matters be one)."

Conversions of propositions, then, should be judged in accordance with their forms, not in accordance with their matters or the qualities of the matters. Better put, they should be judged with respect to abstracted forms that can support all matters, not just some. And we already know that *tropos* is a formal aspect of a proposition.³⁵

3 Avicenna: *Jiha/Mādda*

The ground for studying Avicenna's position on these matters has now been prepared, so that it should be fairly simple to see what he is up to. To the best of my knowledge, Avicenna does not speak much about the general *eidos-hülē* type of distinction in his logical works. However, he writes the following in the *Kitāb al-'Ibāra* of *al-Shifā'*:³⁶

<Mode>

The least of the conditions (*aḥwāl*) of propositions is that they are two-fold. Then the <copula is> made explicit (*yuṣarraḥu bi'r-rābiṭa*) so that they become three-fold. Then a mode (*al-jiha*) may attach to them so that they <i.e. the propositions> become four-fold. The mode is an (A) utterance (*lafza*) which indicates the relation (*al-nisba*) which the predicate has with respect to the subject. It specifies (*tu'ayyinu*) that it is a relation of necessity or non-necessity; thus it indicates a firmness (*ta'akkud*) or a <mere> allowance (*jawāz*) <of their relation>. The mode may <also> be called a kind (*naw'*) <of relationship?>.37 There are three modes: (1) one which indicates the suitability (*istiḥqāq*) of the perpetuity of existence, i.e. the necessary; (2) another which indicates the suitability of the perpetuity of non-existence, i.e. the impossible; and (3) another which indicates that there is no suitability of the perpetuity of existence and non-existence, i.e. the possible mode.

<Difference between Mode and Matter>

The difference between mode and matter (*al-mādda*) is that the mode is an (A) utterance — added (*lafza zā'ida*) to the subject, predicate, and the copula — which is made explicit and which indicates the strength or weakness of the copular connection. <It indicates this> (B) sometimes falsely by means of an utterance. As for the matter — and it may be called an element (*'unṣuran*) — it is the (C) condition of the predicate (*ḥāl al-maḥmūl*) in itself (*fī nafsihī*) in an affirmative relation to the subject (*bi al-qiyās al-ijābī ilā al-mawḍū'*) regarding the (D) nature of its existence (*fī kayfiyyati wujūdihi*) <for that subject>. If an utterance were to indicate <this nature>, it would do so by means of a mode. It may be that a proposition with a <certain> mode differs from its matter. For, if you say, “It is necessary that every man be a writer,” the mode would be necessary and the matter would be possible.

Almost all the important elements of the commentary tradition discussed above are found in this passage: (A) Avicenna states that modes are added expressions that indicate the nature of the relationship between the subject and the predicate (*lafza zā'ida = prosrēsis*). (B) What is indicated by the modal expression may sometimes be false. This implies that these expressions are subject to our *taṣdīq*, and may at times fail to get it. And this means that they are in the category of judgments that we pass regarding things (*apo tēs hēmeteras oiēseōs ē katēgorias*).

In other words, they function on the level of signs, not on the level of things of which they are signs. Things themselves cannot be false, but signs as part of complex statements, which indicate thoughts about things, may be. (C) As opposed to this, the matter of a proposition is *ḥāl al-maḥmūl fī nafsihī* in its relation to the subject. This rings of *ap' autēs tēs tōn pragmatōn lambanontai phuseōs* above. (D) The expression *fī kayfiyyati wujūdihi* also reminds us of the Arabic translation of Alexander's *On Conversion*, which I quoted above: *min qibali khāsiyyati al-māddati wa-kayfiyyatihā*. There are thus two kinds of modalities: those which are due to us and our attachment of an expression to a proposition (which may be false); and those which are the nature of the things themselves (which are always true).

4 Avicenna's Modals: An Excursus

So what significance does this distinction have for Avicenna's modal logic? I think that it is at the base of the *dhātī-waṣfī* dichotomy of assertoric propositions. A *dhātī* assertoric of the *khāṣṣī* type conveys with "All A is B" that "All As pick out that which Bs pick out at some time and fail to pick it out at some other time." The *'āmmī* assertoric conveys only the first half of this conjunction. A *waṣfī* proposition, for example, states that "All As, for as long as they are As, are Bs."³⁸ A *dhātī* proposition then speaks about things, a *waṣfī* about things insofar as they are defined in this or that manner; the latter, therefore, is conditioned. This dichotomy is easily extended to the modified propositions in general: with regard to this distinction, we can speak, for example, about Avicenna's various types of necessities;³⁹ or we can speak about possibilities (a) insofar as they express the nature of the relationship between two things or (b) insofar as they have something to say about what obtains in this world (i.e. for those things that come under a certain description).⁴⁰ The former has to do with things themselves, the latter with how they are in relation to us. That which is in relation to us is susceptible to our judgment and may have any modality attached to it.⁴¹ At the base of these dichotomous manners in which one can look at a proposition lies the *jīha-mādda* distinction. It explains how the various propositions should be read. How propositions are read, in turn, determines how they convert. And since conversion is the *sine qua non* of Avicenna's syllogistics, we can say that *jīha-mādda* lies at the very core of his logic. My cryptic and summary comments here will become clear below by way of a case study in what Avicenna has to say about the quantification of problematic premises. I will then move on to consider some conversion rules in the light of what he says about these quantifications and what we have so far learned about *jīha-mādda*.

In the *Kitāb al-'Ibāra* of *al-Shifā'*,⁴² Avicenna points out that, as the complexity of a proposition increases, each new added element comes to modify that which preceded it. Thus, when a copula is added to a binary proposition, it comes to modify the predicate. When a mode is attached to a ternary proposition, it modifies the copula. It seems then that each new building block of a proposition applies

to the most recent one that was added before it. However, quantifiers are much like particles of negation. Although they modify a proposition, they do not contribute to its ordered complexity. Thus, just as particles of negation attach to the copula in a ternary proposition, so a quantifier attaches to the subject; however, neither makes the proposition five- or six-fold. But what happens when a modified proposition is quantified? Does the mode apply to the quantifier or to the copula?

Avicenna says that both the quantifier and the copula can be modified. He does not disqualify one position in favor of the other,⁴³ but he does realize that two different kinds of propositions will result with the two different modifications. When the mode is applied to the quantifier, we get the statement, “*Yumkinu an yakūna kullu wāḥidin mina an-nāsi kātiban* (it is possible for each one of men to be a writer).” When it is applied to the copula, we get, “*Kullu insanin yumkinu an yakūna kātiban* (every man, it is possible <for him> to be a writer).” Likewise, with the particulars, we get, “*Yumkinu an yakūna ba’du an-nāsi kātiban* (it is possible for some of men be writers)” as a modified quantifier. And for the modified copula, we get, “*Ba’du an-nāsi yumkinu an yakūna kātiban* (some men, it is possible <for them> to be writers)”. Avicenna states that there is nothing in the Arabic language that can express universal negative propositions with possibility modified copulae.⁴⁴ The idea of a thing possibly not being a thing can be expressed, but the statements produced “resemble” affirmatives. The particular negatives pose no problems.⁴⁵

The difference between the two kinds of propositions is that universal modified quantifiers pick out every single member of a given class and state that a predicate holds or fails to hold of each one of them. The universal modified copula, on the other hand, is about the relationship that holds between a predicate and all members of a class. It is obvious that modified quantifiers carry existential import, whereas modified copulae indicate the nature of class relations.⁴⁶

It is in drawing these distinctions that Avicenna’s language becomes very interesting: for he says that modifications of the copula suggest the *kayfiyya* of the copular connection; that the copular reading is *ṭabī’ī*; and that the copula is the *mawḍi’ ṭabī’ī* of the mode. Likewise, modification of the copula would tell us about the *ṭabī’a* of the subject. On the other hand, modification of the quantifier would suggest the fact of something obtaining or not obtaining. Statements about such facts, unlike true statements about the nature of things, can be challenged. For example, the idea that it is possible for each and every man to be a writer is something about which we may raise doubts;⁴⁷ but the idea that writing applies in a possible fashion to all men cannot be questioned. In other words, true statements of the first type may be false at some (indeed most) times; but true statements of the second type, once true, will always be true.

In this same section, Avicenna speaks about the distinction between the modes *mumkin* and *muḥtamal*. He says that the former is that which is with reference to the thing itself (*mā huwa fī nafṣ al-amr kadhālika*) and the latter is that which is with reference to us (*mā huwa ’indanā kadhālika*). According to an alternative interpretation, the *mumkin* is also that which has no perpetuity of existence or non-existence, without any view to whether it does or does not now obtain. Thus there is neither any necessity nor impossibility that is attached to this reading of the

possible. This is the classic statistical reading of the possible, called *al-mumkin al-khāṣṣī* elsewhere by Avicenna.⁴⁸ The *muḥtamal* is that which does not exist now, but will exist in the future. In other words, it has existential import with reference to the present time of the speaker. It is worth noting that Avicenna informs us that the appellations of these two types of possibilities are reversed for some people. But he also adds that they are not consistent in their technical conventions.

At this point, one cannot help but notice the emergence of a larger dichotomy within the fold of the *jiha-mādda* one. *Jiha*, *al-muḥtamal*, and the possibility modifications of quantifiers in quantified propositions are all things that happen with reference to us. As such they also carry an existential import. On the other hand, *mādda*, *al-mumkin al-khāṣṣī*, and possibility modifications of copulae in quantified propositions happen with reference to the thing itself (i.e. with reference to its nature).

Let us now see if any of this has explanatory value for Avicenna's system of conversions. A proposition like "It is possible for all A to be B" can be read in two senses. First, it can be saying that B holds of all A in a possible manner. This would be a statement about the nature of the things involved; the possibility would apply to the nature of the copula that brings them together. The *jiha* "possible" here stands as a sign for the *mādda* and the possibility expressed is of the *khāṣṣī* type. For it implies that B may or may not hold of A non-perpetually (in a statistical reading). Now the fact that B holds of all A in a possible manner does not mean that A holds in the same manner of B. For writer holds in a possible manner of all man, but man holds in a necessary manner of writer. It is perhaps for this reason that a universal affirmative *mumkin khāṣṣī* proposition converts to a particular affirmative *mumkin 'ammī* one, and not to a *mumkin khāṣṣī* one.⁴⁹ In terms of its *mādda*, in terms of the *mumkin khāṣṣī*, and the modification of copulae—all parts of one side of the dichotomy—this proposition does not convert with its original mode.

Second, the proposition converts insofar as the quantifier is modified—i.e. insofar as we are speaking about the possibility of all men actually being writers—with reference to a *jiha* that expresses not the nature of things, but *mā huwa 'indanā*⁵⁰. The *jiha*, as a formal part of a proposition, may be redefined by us in terms of select material instances, so that a new formal system is abstracted from this delimitation. Thus, whereas the conversion will not be true for all material instances, it will naturally go through for those that participate in the formal structure of the new system. So we may say with the modified quantification reading that "Possibly, all men are writers" and "Possibly, all men are animals", for it is conceivable that all men exist as writers and animals. The *jiha* "possible" is the *mumkin 'ammī* type. It takes into its fold both the possible *mādda* of "writer" to "man" and the necessary *mādda* of "animal" to "man". Thus redefined, a universal affirmative possibility premise does convert to a particular affirmative, while retaining the mode. Again, the conversion is possible because the modified quantification speaks about the possibility of factual existence, which is compatible both with necessity and possibility. This, in turn, allows for the redefinition of the *jiha* "possible" as a mode that applies to a larger class of material instances.

For possibilities of the sort that have obtained in the present, i.e. for assertoric propositions, we can no longer speak directly about the nature of the relation that the predicate has with the subject. Instead, we must speak about the fact of the predicate holding of the subject.⁵¹ This means that there would be a shift from the application of the possibility mode to the copula to its application to the quantifier. This, in turn, means that we have moved from things as they are naturally to things as they are for us. This is a perfectly legitimate move. For if W holds possibly of M, it may be true that M is W. And so we may assume W to hold of M, without any logical contradiction⁵² Thus, we have an assertoric affirmative universal, which converts both under *mādda* and *jiha* readings: for if we inquire about the manner in which man and writer hold of each other, the proposition will convert as an assertoric, because, insofar as they are about things that exist, assertorics can amplify both with implied necessity (“some writers are men”) and implied possibility (“every man is a writer”).⁵³

If, on the other hand, we speak about modality as a *jiha* that does not correspond to the *mādda*, i.e. which is not due to the nature of things, but with reference to the way things are *for us* and *in our judgment* (*‘indanā*), we will turn to look at it with regard to its form only (*jiha* as a part of *eidos*). Thus we would say that if W can hold of M and actually does come to hold of it, M and W *being so defined* only with reference to each other, M also holds of W. For, on a purely formal level, I may choose to qualify my propositions without reference to *mādda*, and with a formal view to *how* a material instance has come to be. This technique allows for formal conversions. Thus, without speaking about the nature of the relation that a substrate has with its predicate, I can speak about it insofar as it is picked out by a certain subject term. I will then only be making a statement about a thing with regard to the description applied to it. Thus, “Everything moving is changing (i.e. insofar as it is moving)” converts to “Something changing is moving (i.e. insofar as it is changing).” These propositions are considered *wasfī* assertorics and fall, in some categorizations, under the necessary. This necessity does not refer to the nature of things; it is a formal necessity and is indicated by a *jiha* in accordance with the way things obtain and the way they are for us.⁵⁴

Finally, let us take the Avicennan example I offered above, but this time as a universal assertoric negative: “No man is a writer.” This proposition may be true, since writer applies in a possible manner to man – i.e. since the *mādda* of this proposition is possible, it may fail actually to obtain. To put it differently: $(Ax) (Mx \rightarrow P(Wx))^{55} \rightarrow (P) ((Ax) (Mx \rightarrow Wx)) \& (P) ((Ax) (Mx) \rightarrow \text{not}(Wx))^{56}$ is a valid supposition. The implied conjunction is compatible with (although it does not necessarily imply): $(Ax) (Mx \rightarrow Wx) \& (Ax) (Mx \rightarrow \text{not}(Wx))^{57}$. As Avicenna has already said, universal negative possibility propositions in the pure negative form can only support the modification of the quantifier. In other words, “No man is a writer” must be read as, $(P) ((Ax) (\text{Man } x) \rightarrow \text{not}(\text{Writer } x))$, which is implied by the possible manner in which writer holds of man, and insofar as this possibility actually obtains.

Now if we take the existential statement to be an implication of the possible manner in which writer holds of man, i.e. if we pay attention to the *mādda*, “No man is a writer” fails to convert. For, just as with the universal affirmative possible

proposition above, writer applies possibly to man, but man applies necessarily to writer. Thus there is an exception to the rule of conversions, namely, that the converted should maintain the quality of the proposition: the necessary predication of man to writer means statistically that writer can never fail to be man.⁵⁸ So, with regard to the *mādda* in a special absolute *dhātī* reading, this proposition does not convert.

However, if we consider the matter from the perspective of how things are judged by us, the proposition can certainly convert. For formally, I may choose to say, “All M fails to be W, for as long as it is M” (this would be a *waṣṭī* reading of the assertoric). Thus, without reference to the material relation of M and W, I may also say that formally all W is excluded from M (with the same qualification). This would be a reading of the proposition in accordance with our judgment, i.e. a *jiha* reading, and would be perfectly legitimate if the assertoric proposition is seen as something obtaining only from the possibility modification of a quantifier in a quantified universal negative proposition. I cannot redefine the *māddī* proposition, but I can maneuver it once I speak about it as something that implies a modified quantification (not a modified copula) which, in turn, is compatible with the assertoric. Once I have the second half of the assertoric conjunction, I may redefine the *jiha* (i.e. as a necessary *waṣṭī*) in the manner above and get a formal conversion. This is the business of ampliation.⁵⁹

Before closing, I would like to point out that until his late phase, Avicenna seems to have accepted both ways of looking at propositions as legitimate. This means that the generally accepted view that assertoric e-propositions do not convert for Avicenna applies only to this late phase.⁶⁰ He is familiar with the different ways of reading a proposition in *al-Shifā'*, *al-Najāt* and *al-Ishārāt*. In *al-Shifā'*, he points out that the conversion works if the proposition is understood as that which is used in the sciences⁶¹ and is taken with reference to common speech (*ta'āruḥ*). He then goes on to give *waṣṭī* readings of e-propositions; and they convert.⁶² He says very similar things in *al-Najāt*.⁶³ I say with some hesitation that, when we get to *al-Ishārāt*, Avicenna's attitude seems to have changed. For, although he does speak about e-conversion with respect to *waṣṭī* readings, he straightaway and categorically calls the latter and the principle of *mubāyana* tricks.⁶⁴ Avicenna had offered severe criticism of the method of *mubāyana* in *al-Shifā'*,⁶⁵ and had similarly said some harsh things of other alleged proofs for e-conversions.⁶⁶ But, to the best of my knowledge—and provided my understanding of *hiyal* is correct—he dismissed e-conversion of *waṣṭī* propositions only in the *Ishārāt*.

I am not sure why he took this position in his later work. I would venture a less than confident guess that it had to do with how he understood the function of modes in propositions. In the section on the *mawādd* of propositions in *al-Ishārāt*, Avicenna does not acknowledge the latitude that we have with respect to the *jihāt* of propositions. He simply says, “By *mādda* we mean these three conditions <i.e. necessary, possible, impossible> about which these three words <i.e. necessary, possible, impossible>, if expressed, are true with respect to affirmation and negation.” Certainly, *jihāt* should ideally express the true *mawādd* of propositions. But, as we saw above, they can do more than that. As part of our judgment, they can indicate modalities in any number of ways. In *al-Ishārāt*, Avicenna does not say

anything about how *jihāt* may be with reference to us or to our judgment. In fact, it is al-Ṭūsī who tells us this, extracting the information, it seems, from *al-Shifā'*.⁶⁷ I doubt that Avicenna meant to rule out the possibility of the creation of formal systems according to things as they obtain for us, but if he did mean to pose this limitation, it might explain his possible refusal to acknowledge the conversion of assertoric e-propositions. For, as we saw, on a *māddī* reading, they do not convert.

5 Conclusion

This article began with a word (*tropos*); it explored how this word became a technical term for the Commentators; how, as part of *eidos*, it came to be dichotomous with *hūlē*; how the *eidos-hūlē* and *tropos-hūlē* dichotomy was known to al-Fārābī; how Avicenna inherited this dichotomy; and finally, what role this dichotomy, along with several associated concepts, had to play in Avicenna's modal logic.

Although I must confess that there is no completely neat dichotomy that gathers *jiha*, modified quantifications, *muḥtamal*, and *waṣfī* assertoric propositions under one head, and *mādda*, modified copulae in quantified propositions, *mumkin khāṣṣī* propositions, and *dhātī* assertorics, under another, I hope that I have presented enough evidence in this article to cause us to recognize that they *generally* constitute two distinct communities of notions. Each side consists of related ideas, a number of which are simultaneously deployed by Avicenna to accept or reject a reading for a given proposition. How he reads the propositions determines, in turn, what he tells us about their conversions.

Select Translations from *al-Shifā'*, III: 112–118

<Quantification and Modal Propositions>

Just as it is suitable for the quantifier that the subject be delimited/encompassed by it (*an yujāwara bihi*) and for the copula that the predicate be delimited/encompassed by it, likewise it is suitable for the mode that the copula be delimited/encompassed by it if it <i.e. the copula> is not quantified. If it is quantified, it <i.e. the mode> would have two places (*mawḍi'ān*) <of application>, whether the sense remains one or differs, one of them being the copula, the other the quantifier. And it is up to you to connect it <i.e. the mode> with the one and the other. For you say, "It is possible for each one of men to be a writer."⁶⁸ And you say, "Every man, it is possible <for him> to be a writer."⁶⁹ Likewise you say, "It is possible for some men be writers."⁷⁰ And you say, "Some men, it is possible <for them> to be writers."⁷¹

As for the negative universal, there is only one utterance that is found in the language of the Arabs, which is, "It is possible that there not be one among men a writer."⁷² There is no other <utterance> in which <the mode> is attached to the copula, to the exclusion of the quantifier, unless you say, "There is not one among men except that it be possible that he not be a writer."⁷³ Or you say, "Every man, it is possible <for him> not to be a writer."⁷⁴ However, this utterance resembles more the affirmation.

As for the negative particular, with respect to it, we say both statements. For we say, "It is possible that it not be that each man is a writer"⁷⁵ and "Some men, it is possible <for them> not to be writers."⁷⁶ Before we verify the statement regarding these < matters > and investigate whether the meaning of that in which the utterance of the mode is connected

with the copula and of that in which the utterance of the mode is connected with the quantifier are one or not (and if not one, whether they follow from each other or not), it is necessary that you know something else.

<General Comments Regarding Negation>

We say that just as when you do not insert the copula in the individual (*shakhṣiyya*) proposition, when you intend a negation it is a natural necessity that you attach the particle of negation to the predicate; and when you insert the copula of the predicate⁷⁷ and intend the negation, it is necessary that you attach the particle of negation to the copula, so that the negation of our statement, “Zayd is just”⁷⁸ is not “Zayd is not-just,” but “Zayd is not just.” For how could this <not be so> if both your statements may be false if Zayd is non-existent.⁷⁹

<Negation of Modal Propositions>

Likewise, when you attach the mode to the copula and intend a negation, it is necessary that you attach the particle of negation to that which stands in front,⁸⁰ thereby removing the totality of that which follows, not some of it. Thus when you say, “It is possible for Zayd to be a writer,” its negation is not the possibility of the negation, but the negation of the possibility. I mean, it is not your statement, “It is possible not to be...” but “It is not possible to be...” For how could it <not be so> while your statement,⁸¹ “It is possible not to be...” is mutually sound with your statement, “It is possible to be...” if true.⁸² Likewise, if you say, “It is necessary for Zayd to be a writer.” Its negation is not, “It is necessary not to be a writer.” For both of them would be mutually sound if false. Rather, <the negation is,> “It is not necessary to be...” Likewise, if you say, “It is impossible for Zayd to be a writer.” Its negation is not, “It is impossible for Zayd not to be a writer.” For your statement, “It is impossible for Zayd not to be a writer,” is mutually sound with it <i.e. the former statement> if false. Rather, the negation of “It is impossible for Zayd to be a writer” is “It is not impossible for Zayd to be a writer.” As for “It is possible <for x> to be...” with “It is not possible <for x> to be...” and “It is necessary <for x> to be...” with “It is not necessary <for x> to be...” and “It is impossible <for x> to be...” with “It is not impossible <for x> to be...” — these <pairs> do not occur <together> at all after all the conditions obtain either <if both members of each pair are> true or <if both> are false. Likewise, “It is possible2⁸³ <for x> to be...” with “It is not possible2 <for x> to be...”

<Differences between Possible and Possible2>

It seems that by possible2 is meant that which is for us thus and so <i.e. possible> (*mā huwa 'indānā kadhālika*) and that possible is that which is thus and so <i.e. possible> by the very nature of the thing.⁸⁴ It seems that another meaning is meant by it, i.e. possible2, is that in which is expressed the condition of the future, while it <i.e. the condition> is non-existent at the <present> time. Possible is that which has no perpetuity in existence or non-existence, whether it exists or not. A group (*qawmun*) says that by possible is meant the common <possible> and by possible2 is meant the special <possible>. But their statement is not consistent with respect to the utterances <used for> it <i.e. possibility>.⁸⁵ It seems that there is another difference between possible and possible2, a difference which is not accessible to me; <but> there is not much of a need for elaboration and for seeking it.

<To What Does the Mode Attach>

We say that it is suitable for the mode to be attached to the copula. This is because it indicates in an absolute fashion (*muṭlaqan*) the nature (*kayfiyya*) of the copular connection, which the predicate has in relation to a thing. Or <it is suitable for it to be attached> to a quantifier which generalizes or specifies (*mu'ammim aw mukhaṣṣis*). For the quantifier explains the quantity of the predication and conditions the copular connection (*mukayyif al-rabṭ*). So if we say, “Every man, it is possible <for him> to be a writer,” this is natural

(*al-ṭabīʿīyyu*) and its meaning is, “Each one among men, it is possible for him to be a writer.”⁸⁶ For if it <i.e. the mode> is attached⁸⁷ to the quantifier and by this is not intended <its> removal from its natural place by way of expansion,⁸⁸ but the indication that its natural place is the delimitation/encompassing of the quantifier is intended, then the mode would not be for the copular connection. Rather, it would be a mode for generalization and specification. And so its meaning would change: the possible would come to <indicate> that the existence of each one of men — all of them — as writers is possible. The proof that the meaning has changed is that there is no doubt in the first <statement> in the minds of people generally.⁸⁹ For it is known that the perpetuity of writing or not writing is not necessary for each single man with respect to his nature. As for your statement, “It is possible for every man to be a writer” — taking the possibility to be a mode of the universality and the quantifier — there may be doubt regarding this. For there are those who say, “It is absurd that all men should be writers,” i.e. “It is absurd that it should be⁹⁰ that every man is a writer.” But then it comes to be that it so happens⁹¹ that there is not one among men except that he is a writer. Thus there is a difference between the two meanings.⁹²

As for the particulars, with respect to them, the two ways <of modifying> function in one way, both on the surface and underneath. But it may be known, despite this, that there is a difference in the two meanings if recourse is taken to the reality of that which is understood and if, with regard to it, consideration of the universal is relied upon.

As for the universal negation, there is nothing in the language of the Arabs which indicates truly the negation of the common possible.⁹³ Rather, common usage (*mutaʿārif*) in it <i.e. the language> only indicates the possibility of the negation of the common.⁹⁴ For this reason it is ambiguous to say, “It is possible that not one among men be a writer.”⁹⁵ Someone may say that it is not possible for this to be true; rather, it is necessary in an absolute fashion⁹⁶ that the disciplines exist in some <men>. Our discussion here is not about whether this statement is true or false; for the knowledge of this is not a part of the discipline of logic. Rather, our intention is that something regarding which there may occur a doubt is not that regarding which there occurs no doubt. That regarding which there occurs a doubt is the possibility of the negation of writing from each single man. However, there is nothing in the language of the Arabs that indicates this except by way of an affirmation, such as their statement, “Each one among men, it is possible <for him> not to be a writer.” As for their statement, “Not every man is a writer,” it is not possible to insert in it the mode of possibility except <that it again governs> the quantifier. Thus its meaning comes to be, “It is possible for every man not to be a writer.” So it indicates the possibility of the quantifier.

As for the our statement, “Some men, it is possible <for them> not to be writers,” in some way, it may be equal to our statement,⁹⁷ “It is possible for some men not to be writers.” And it may differ from it — although they mutually follow from each other — so that the intention of one of them comes to be that some men are described by the possibility of the negation of writing from them; the <intention of the> second is that it is possible — upon the verification of the statement, “Some men are not writers.”⁹⁸

<The Meanings of Possible>

Now that you know these states, when you investigate the state of the implication⁹⁹ of these propositions, it is necessary that you investigate the state of the implication of these four-fold propositions, which have modes, keeping in mind that they are modes of the copular connection, not modes of the quantifier.

Also, the true nature of the affair will not be revealed for us with regard to them <i.e. the propositions> until after the state of homonymity existing in the utterance “possible” is known. We say that the utterance “possible” was used by the common people¹⁰⁰ in a <certain> sense and is now used by the philosophers in another sense. The common people

used to mean by the possible that thing which is not impossible¹⁰¹ insofar as it is not impossible, and they did not turn <to ask> whether it was necessary or not-necessary.¹⁰² Then it occurred that there were things regarding which it was true to say that they were possible to be and possible not to be, i.e. <that they were> not impossible to be and not impossible not to be. So when the specialists found things in which the possibility of being and the possibility of not being were combined, i.e. as possibility common<ly occurs>¹⁰³, they specified its state by the name of possibility. So they made that thing in which the two possibilities existed together, i.e., of negation and affirmation, to be specifically designated by the name of possibility. It is that thing in which there is no Necessity.¹⁰⁴ Thus these specialists agreed regarding that <conception> which was among them and coined the technical term¹⁰⁵ “possible” for that thing whose existence and non-existence is not impossible.

So for them things came to be of three types: impossible of existence; impossible of non-existence; that which is neither impossible of existence nor of non-existence. If you wish, you can say: Necessary of existence; Necessary of non-existence; that which is neither Necessary of existence nor of non-existence. The meaning of Necessary is the perpetual, for as long as that which is described has an essence that exists, as we will explain in another place with proof.

If by the possible is meant the common meaning, everything would be either possible or impossible; and everything that is not possible would be impossible and that which is not impossible would be possible. There would be no third type. And if the special meaning is intended by it, everything would be either possible or impossible or necessary and that which is not possible would not be impossible but Necessary, either with respect to existence or non-existence.

Thereafter, another coinage was concocted among the specialists with regard to that which was among them <i.e. another concept>: they made the possible indicate a meaning more specific than this one. It is that the judgment about which is non-existent at the time the speaker speaks about it.¹⁰⁶ Rather, it is not-Necessary of existence or non-existence in the future, i.e. at an imagined time. Elaboration of the statement with respect to this meaning will be given in what is to follow.

Thus the possible is said of three meanings, some of which are ordered above some others, the more common above the more special. Statements about it, both with regard to the more common and more special <meanings>, <will occur> homonymously. <Possible> in the more special manner is said in two ways: one of them is with regard to that which is specific to it; the other is by way of the predication upon it of that which is more common. This is something you already knew from what preceded. The common meaning is that the judgment regarding a thing is not-impossible; I mean by judgment that which is judged about it of affirmation or negation. The meaning of the special is that its judgment is not-Necessary. The third meaning is that judgment about it is non-existent <for the present> and is not Necessary for the future.¹⁰⁷

The existent affair, the existence of which is not necessary, is not included in the most special possible, and only in the special and common <possible>. The necessary is neither included in the most special nor in the special; it is included in the common. A group of people raised doubts against themselves,¹⁰⁸ saying that the necessary must either be possible or must not be. If it is possible — and the possible to be is also the possible not to be — then the necessary becomes possible not to be. This is absurd. They answered with the following account: they said that the possible is homonymous; for it is said of that which is *in potentia* and of that which is Necessary. The former possible cannot be included in that which is said of the Necessary. <In the case of the latter,> the possible to be does not occur together with the possible not to be; rather, <only> the possible to be <obtains>. As for the possible which is said of the *in potentia*, it is that regarding which possible to be

and possible not to be are true together. Thus it is not the case that “possible not to be” is true of everything of which “possible to be” is said. For the possible is said of the Necessary. Likewise, it is not the case that everything of which possibility is denied must be impossible. For the possible <in the sense of> *in potentia* is negated of the Necessary; but from this it does not follow that it is impossible.

Acknowledgments I would like to thank Maroun Aouad for an afternoon of thought-provoking conversation on this topic; Rémi Brague for indulging me with some quick suggestions and comments during a social call; Tad Brennan for his generous comments on Alexander; Michael Cook for his meticulous reading of the first draft; Michel Crubellier for comments on a technical term; Dimitri Gutas for caveats on the evolution of Avicenna’s thought; Jon McGinnis for his helpful comments and reference to a relevant passage in Aristotle’s *Physics*; and Tahera Qutbuddin for checking the Gujarātī of my dedication. I would also like to express my deep appreciation to Tony Street for his encouragement and support and for his usual sharp comments and critique. The errors that remain are my own responsibility.

Notes

1. See his *Studies in Modality*, Oxford, 1974 (with R. Manor, et al.) and his *Temporal Modalities in Arabic Logic*, Dordrecht, 1967.
2. For references, see my “Avicenna’s Reception of Aristotelian Modal Syllogistics” in *Before and After Avicenna*, ed. David C. Reisman (Leiden: E. J. Brill, 2003), pp. 3–24.
3. See, for example, al-Fārābī, *al-Fārābī’s Commentary and Short Treatise on Aristotle’s De Interpretatione*, trans. with intro. and notes F. W. Zimmermann (London: Oxford University Press, 1981). Relevant pages cited in this article below under Zimmermann; Joep Lameer, *al-Fārābī and Aristotelian Syllogistics*, (Leiden: E. J. Brill, 1994), pp. 106–7.
4. See, for example, Tony Street, “Avicenna and Ṭūsī on the Contradiction and Conversion of the Absolute”, *History and Philosophy of Logic*, **21**, 45–56 (2000); Paul Thom, *Medieval Modal Systems* (England: Ashgate, 2003), pp. 65–80.
5. An exception is Tony Street, “Fakhraddīn ar-Rāzī’s Critique of Avicennan Logic” in *Logik und Theologie: Das Organon im arabischen und im lateinischen Mittelalter*. Eds Dominik Perler and Ulrich Rudolph (Brill, 2005), pp. 99–116 (in the series *Studien und Texte zur Geistesgeschichte des Mittelalters*).
6. For this article, I have used Avicenna, *al-Najāt min al-Gharaq*, ed. M. Dānispāzūh (Tehran, Dānishgāh-i-Tihārān: 1364 A.H.).
7. A. M. Goichon, *Vocabulaires comparés d’Aristote et d’Ibn Sīnā*, (Paris: Desclée, 1939) #384.
8. Goichon, #757.
9. See next paragraph.
10. In addition to the citations in Goichon, see, for example, a rare instance of *tropos-jiha* translation in the *Prior Analytics*, 32b15: *antistrephei men oun kai kata tas antikeimenas protaseis hekateron tōn endechomenōn, ou mēn ton auton ge tropon = fa-kullu wāḥidin min ṣanfay al-mumkini qad yan’akisū ‘alā al-muqaddamāti al-mutanāqīḍati ghayra anna dhālika laṣsa ‘alā jihatin wāḥidatin bi-’aynihā*. It is interesting to note that most of the instances of *tropos* in the Arabic translation of the *Prior Analytics* do not occur as *jiha* or some variant of it. In many cases, when speaking about the manner of something, the word *naḥw* is used. On the other hand, most instances of the word *tropos* that I have checked in the *Categories* occur as *jiha* or as some variant of the root. Its rendering as *naḥw* occurs rarely. I do not know whether this had to do with the particular tastes of the translators (Ishāq b. Ḥunayn for the *Categories* and Tadhārī for the *Prior Analytics*) or with the standardization of translation techniques. I opt for the latter, given the following: Tadhārī has been identified by Lameer, *al-Fārābī*, p. 4, as the brother of Iṣṭifān b. Baṣīl, a translator known to have collaborated with Ḥunayn b. Ishāq. Lameer reports that this translation was

submitted by Tadhārī to Ḥunayn for corrections. The *Prior Analytics* translation was therefore done some time in the second or third quarter of the ninth century and it was a product of Ḥunayn's generation. It is true that Ḥunayn's correction of this translation depended on the Syriac translation prepared by his son. This does not necessarily mean that it should be counted as a product of the next generation of translators. For some thirty-five years elapsed between Ishāq's and his father's deaths. It is thus imaginable that Ishāq standardized the translation of the term in question after he had prepared the Syriac translation. The difference in translation then very likely has to do with the stage of the translation movement. I would guess that it is only by Ishāq's time that *tropos* came to be translated in a standard fashion by *jiha*. See, for example, *Categories*, 4a29; 4b2; 9b10; 12b3; 12b11; 13a16; *awjuh* = *tropous*, at 14b22, etc. With respect to the *jiha-tropos* translation, the *Topics* is very similar to the *Categories*. The work was translated by Abū 'Uthmān al-Dimashqī, who was from the generation of Ishāq b. Ḥunayn. See 101b29 (*kull wajh = pantas tropou*); 101b36; 102a12; 106a4; 108a34, etc. Abū 'Uthmān also translated Alexander's treatise on the conversion of propositions (see below). To the best of my knowledge, there is no extant Greek for this work. The term *jiha* makes several technical appearances in this treatise and is very likely a rendering for *tropos*. This lends further support to the claim that the *jiha-tropos* translation had become fairly standard by Abū 'Uthmān's generation. All references to the Arabic translations come from Aristotle, *Mantiq Aristū*, ed. A. Badawī (Kuwayt: Wakālat al-Maṭbū'āt, 1980). See also al-Fārābī, *Short Commentary on Aristotle's Prior Analytics*, tr. N. Rescher (Pittsburgh: University of Pittsburgh Press, 1963) p. 32.

11. This list is not exhaustive and I am certain that there are many other contexts in which this word is used. The purpose of this list is to give the reader a sense of the wide contextual and semantic range of the word.
12. Same for the Stoics: see Henry George Liddell and Robert Scott, *A Greek-English Lexicon* (Oxford: Clarendon, 1996) "*tropos*".
13. This use definitely becomes technical in this sense of "method of proof" by the end of the Hellenistic period: *ho kata tēn homoiotēta tropos* (the method of proof according to similarity), which is opposite to *ho kat' anaskeuēn tropos tēs sēmeioseōs* (the method of proof according to denial of a visible sign). See Liddell-Scott, *tropos*.
14. The usual term for figures is of course *schēma*.
15. We can imagine how the frequent loose usage of a word in a given context might lead to its development into a *mot d'art* specific to that context. Thus, with regard to *tropos* or *modus* in the Greek-inspired medieval theory of modes in musicology, we have a rather late development of this word as a technical term. See Calvin Bower, "The Modes of Boethius", *The Journal of Musicology*, (III, 3:253); Henri Potiron, "Les notations d'Aristide Quintilien et les harmonies dites Platoniciennes", *Revue de musicologie*, (47e, 124e: 160). At *Prior Analytics*, 25a2, Aristotle says the following: "*hai men kataphatikai hai de apophatikai kath' hekastēn prosrēsin* (<Some are> affirmative, others negative, according to the each adjunct)." This phrase occurs within the context of a discussion of modes; "adjunct" thus refers back to them and is the closest we get to the use of a single expression that denotes them. *Prosrēsis* is translated as mode by A. J. Jenkinson (*The Complete Works of Aristotle*, ed. Barnes (Princeton: Princeton University Press, 1984) vol. 1: 40. Unfortunately, this is the only occurrence of this word in all of Aristotle's logical works. It is interesting to note that the Arabic translation of the *Prior Analytics* ignores the expression *kath' hekastēn prosrēsin*. It reads, "*wa-kullu wāḥidatin min hādhihi* (i.e. the three kinds of necessary, problematic, and assertoric propositions) *immā an takūna mujibatān wa-immā sālibatan*. (each one of these is either affirmative or negative)." In the Greek usage of the period, *prosrēsis* signified the manner in which one addressed someone. In other words, it was a word or expression used to speak about something. Thus "adjunct" may not be a suitable translation here and it is possible that only with Alexander was it glossed as such (see pp. 7–8 below). I thank M. Crubellier for this comment. See *Mantiq Aristū*, vol. 1: p. 109. On Alexander's comment on *prosrēsis*, see Section I, ii below.

16. There is a discussion at *In Aristotelis Topicorum*, 38, where he uses *tropos* to refer to the different modes of predication (essential, accidental, etc.), i.e. he uses the word to refer to the kind of relation that holds between subject and predicate, but not with reference to the logical constants “necessary” and “possible” of his formal system. Thus he comes somewhat close to Aristotle’s *Topics*, 135a7, mentioned above.
17. On Alexander’s use of *tropos* as mode, see his *In Aristotelis analyticorum priorum librum i commentarium*, 197,2 (*ton gar tropon tēs huparxeōs ou tēn huparxin anairein epaggelletai*); 202,6 (*ean de metatethōsin hoi kata tas protaseis tropoi*), etc. This of course does not mean that the word did not continue to be used in several other ways: *tropos* as mood occurs at his *In Aristotelis Topicorum*, 2,4; as manner of expression (*tropos kata tēn lexin*) at *Id.*, 37,17; 40,18, etc.
18. This is the translation given by J. Barnes, “Logical Form and Logical Matter” in *Logica, Mente e Persona*, ed. A. Alberti (Firenze: L. S. Olschki, 1990), p. 41.
19. See Barnes, ‘Logical Form’ p. 41.
20. For other senses of *hūlē* in the logical tradition, see Barnes, “Logical Form” p. 41. For Avicenna, it is not matter in the sense of *pragmata*, but in the sense of modal relation that is important. This is one of the meanings indicated by Barnes. He discusses this further at pp. 44–45, for which see below. According to Barnes, it is very likely that this distinction existed before Alexander, but there is no solid evidence to suggest it. See Barnes, ‘Logical Form’ p. 43.
21. *Ta hupokeimena*, i.e. the objects referred to by the terms.
22. I thank Tad Brennan for discussing this passage in an e-mail communication.¹ I doubt, with Zimmermann, *al-Fārābī’s Commentary*, p. 243, n. 1, that Aristotle himself envisioned this distinction. It is very likely a Peripatetic invention.
23. This passage seems somewhat out of place and seems to be an afterthought. See Alexander, *On Aristotle’s Prior Analytics*, trans. Barnes et al. (Ithaca: Cornell University Press, 1991) p. 81, n. 165.
24. As in the previous paragraph.
25. This discussion reduces to the old and well-known point of Porphyry’s school that entities qua entities were the subject matter of metaphysics and that logic was about statements regarding these things. See Zimmermann, xxxix. It was perhaps this formal space created for logic that lay behind its survival in the Neoplatonic curriculum. See Richard Sorabji, “The Ancient Commentators on Aristotle” in *Aristotle Transformed*, ed. R. Sorabji (Ithaca: Cornell University Press, 1990). For an identical argument in Themistius, see Rosenberg and Manekin, ‘Themistius’ p. 97.
26. At least this is how I understand the evolution of the term. Barnes points out that, for Ammonius, *hūlē* was the equivalent of *pragma*; the latter was defined as something signified by words in a *logos*. The *significans* must either be an *onoma* or a *rēma*. Thus the *hūlē* must be that which is referred to by the subject and predicate terms. This brings us back to *hūlē* as matter, as opposed to the form of a proposition/syllogism. Barnes then says that the other items of a sentence do not signify *pragmata*, even though they do signify something, including relations. Perhaps he means that *hūlē* as relation is something entirely distinct in Ammonius. See Barnes, “Logical Form” pp. 45–6. For the latter sense of the term, see this paragraph. See also C. Ehrig-Eggert, “Zur Analyse von Modalaussagen bei Avicenna und Averroes” in XXII, *Deutscher Orientalistentag*, 1983, p. 196. Here Themistius identifies *hūlē* with *schesis* (relation; Verhältniss).
27. Thus the mode of “Necessarily, every man is an animal” and “Necessarily, every man is a writer” is the same, i.e. necessary; but the matter in the former is “necessary” and it is “possible” in the latter. The mode is “due to us” and the matter is “due to the nature of things”. In the case of the first proposition, what is due to us corresponds with what is due to the nature of things. Not so in the second. See also Stephanus, *In de Interpretatione*, 25, 20.
28. The same idea is expressed by Themistius. See Rosenberg and Manekin, “Themistius” p. 92.

29. Zimmermann translates *mādda* here as material <modalities>. I am not sure that this is what al-Fārābī means. For he goes on to explain that matters are things which produce qualities when connected. Certainly material modalities do not produce qualities, for the latter are themselves those qualities. I suspect though that this is a slip in translation, for Zimmermann knows that al-Fārābī is not only familiar with both uses of the term, but also with how they relate to each other. For he writes, “These <i.e. necessity, possibility, impossibility> had been called <<the three <kinds of> matters>>. Al-Fārābī not only shows himself familiar with this usage, he also contrasts a proposition’s <<matter>> (rendered as <<material modality>> in my translation) with its <<mode>> (i.e. modality expressly specified by means of words like ‘necessarily’) as features of <<matter>>, i.e. content, and <<composition>>, i.e. structure.” This is not very different from the suggestion I made above regarding the appearance of the *tropos-hūlē* dichotomy as a concomitant of the *eidōs-hūlē* one. For the distinction between form and matter in al-Fārābī, see Zimmermann, p. B. For material and formal contrariety, see *Id.*, xl; for a treatment of the same subject in Alexander, see K. Flannery, *Ways into the Logic of Alexander of Aphrodisias*, (Leiden: Brill, 1995), Chapter Three. In speaking about the subject matter of logic, al-Fārābī states that the *De Interpretatione* is about the compositions (*ta’līf*), not the matter (*mādda*) of propositions. The former is the form (*ṣūra*) of sentences. It is clear on the basis of philological analysis that his inspiration comes from the commentary tradition: for *ta’līf* = *sumplokē*; *mādda* = *hūlē*; *ṣūra* = *eidōs*. See Barnes, “Logical Form” 42, where these distinctions (along with the aforementioned Greek terms) are found throughout the Greek and the Greek-inspired Latin traditions. Zimmermann (p. xxxix) seems not to be familiar with these connections (though he does have a definite hunch about them): “Striking an individual note in the very first sentence of his *Commentary* al-Fārābī says that the *De Interpretatione* is about <<composition>>...I do not find this opposition of terms, which recurs as a kind of *leitmotiv* throughout the work, in the Greek commentaries.” Indeed he seems to think that the notion of matter as content was a Fārābian invention, extracted from his understanding of material modalities (or at least this is what I understand him to be saying (xxxix-xl)): “He <i.e. al-Fārābī> thus appears to have arrived at his own term ‘matter’ in the sense of content simply by extending an earlier usage from a particular aspect of subject-matter <i.e. material modality?> to subject-matter in general.”
30. Again, Zimmermann has ‘material <modalities>’
31. Here I agree with Zimmermann’s translation.
32. See Zimmermann, pp. 243–4.
33. I do this lest all this talk about the commentary tradition should be considered obsolete in the absence of relevant Arabic translations.
34. In *Commentaires sur Aristote perdus en grec*, ed. A. Badawī (Bayrūt, Dār al-Mashriq, 1971) p. 62.
35. The distinction between *tropos* as form and *mādda* is also found in the Hebrew translation of Themistius: “A sentence such as ‘Every man is an animal,’ though considered necessary ‘according to the nature of things’ or ‘according to the materials (*ha-homerim*)’ is *de inesse* simply because the modal qualification ‘necessarily’ is absent.” See Rosenberg and Manekin, “Themistius” p. 87. On the matter of premises, see also *Id.*, pp. 92, 96.
36. *Al-Shifā’*, 3:112 (Avicenna, *al-Shifā’*, ed. I. Madkour (Cairo, 1991)). This is Avicenna’s most comprehensive treatment of the subject.
37. *Naw’* usually corresponds to *eidōs*. Now the latter, when translated by the former, means species. But *eidōs* is also translated into Arabic as *ṣūra*. The two senses of *eidōs* are of course related to the extent that they refer to things on an abstract and formal level. It is a long shot, but I wonder if Avicenna is not thinking about *naw’* not in its very specific sense as species/kind, but in the related sense as form. If this is the case, my claim that the *tropos-hūlē* dichotomy is subsumed under the larger category of the *eidōs-hūlē* is further substantiated. See Zimmermann, I; Goichon, #372, #723. Another possibility is that this text was dictated to a scribe who mistook *naw’* for *naḥw*. The latter was widely attested as a

- translation of *tropos* in Ḥunayn b. Ishāq's generation. But I am unfamiliar with the use of *naw'* as a technical term used to translate *tropos* in the sense of mode. See footnote 11.
38. Something like this distinction was already found in Aristotle's commentators, e.g., Ammonius. See Thom, *Medieval Modal Systems*, p. 67; pp. 74–5. See also Street, "Avicenna and Ṭūsī", pp. 45–7.
 39. See my 'Avicenna's Reception', pp. 17–18. See also Rosenberg and Manekin, "Themistius" pp. 94–5.
 40. The division bears some *loose and surface* similarity to Abelard's divided/compound readings. But I do not think that there is really anything underneath the surface. For example, a *de rebus* compound reading (given as a comparison to Avicenna by Thom) does not correspond much to a *waṣṫī* reading: "It is possible for those standing to sit while remaining standing," for "while remaining standing," although descriptive, is not a condition that allows for the predication of sitting for the subject. What might have misled Thom in this instance is that both the *dhātī* and *waṣṫī* readings may be conditioned in Avicenna. And it is this condition that determines the truth of the predication. However, they are conditioned in different ways: the *dhātī*, by the existence of the subject's essence, the *waṣṫī*, by descriptions of that subject. See Thom, *Medieval Modal Systems*, pp. 47, 68. See Tony Street, "An Outline of Avicenna's Syllogistic" in *Archiv für Geschichte der Philosophie*, **84**, p. 133.
 41. I explain below the two types of possibilities hinted at here.
 42. *Al-Shifā'*, III: 112–118. See translation of selected passages from this section at the end of this article.
 43. Although he does say that one reading is more natural than the other and that, as far as inferences are involved, one ought to be concerned with modes of copular connection. See translation, p. 30 below.
 44. I think that the inability to modify copulae with the possibility mode in universal negative propositions is a meta-linguistic problem. For one can say that the relationship of A and B is a possible, impossible, or necessary one. But how does one assert that no A is possibly B in terms of the relationship that holds between A and B? "No A is possibly B" is a concomitant of the possible relation between A and B, and it must be expressed with existential force. The assertion of the possibility modified copulae in such statements must be affirmative, as such statements can only express the nature of the relationship between something A and something B. I will say more on this below.
 45. I don't see why not.
 46. The Abelardian *de sensu/de rebus* distinction seems to have similar implications. See Thom, *Medieval Modal Systems*, p. 47.
 47. For a similar doubt expressed by Alexander (according to Themistius), see Rosenberg and Manekin, "Themistius" p. 96.
 48. See my "Avicenna's Reception", pp. 15–16. See also Street, "Outline" p. 135.
 49. See Street, "Outline" p. 145. Avicenna does not offer an argument in my fashion in the *Ishārāt*, p. 385. In fact, he uses *ekthēsis* for his proof. However, he does hint that he has my kind of reasoning in mind when he points out that possibility e-conversions do not go through because the subject may be necessary for the predicate, but the predicate may only be accidental for it. For this article, I have used *al-Ishārāt wa-t-tanbīhāt*, ed. S. Dunyā (Egypt: Dār al-Ma'ārif, 1957–68).
 50. That is as we judge things to be and perhaps also as they are with reference to us with their existential import.
 51. There is of course always the possibility of speaking about how a predicate holds of a subject in assertoric propositions, since they are understood temporally by Avicenna and can amplify with the statistical readings of necessary and possible propositions. I explain myself further below. See also note 56 below. From the statistical readings, we can revert to the alethic ones. For a statement on the relation between necessity, possibility, and assertoric propositions, see *Ishārāt* p. 322.
 52. See my "Avicenna's Reception". This move, a false but possible supposition, is used by Avicenna in some syllogistic proofs. See Tony Street, "An Outline", p. 141.

53. This is of course if we revert to a consideration of the *mādda*. This is a problematic conversion because it understands assertoric propositions in two different ways – with a necessary and possible *mādda* – and places both readings under one head. Conversion of possibility universal affirmatives, as we saw in the previous paragraph, may be supported by a similar argument.
54. See *al-Shifā'*, 4, p. 91, where Avicenna gives the example of “Every writer is awake” which converts to “Some awake are writers”. Avicenna seems not to agree with this conversion. But I am not sure whether this is a general rejection of the conversion of a *waṣṭī* proposition. It is more likely that he is interested here in giving a more precise manner of understanding the conversion. In summary form, he reasons as follows: if all writers, insofar as they are writers and for as long as they exist, are precisely those that are awake, then some that are awake are writers, for as long as their essence exists. Now, the fact of some As being Bs does not rule out the possibility of some As not being Bs. Likewise, some As being necessarily Bs does not rule out the possibility of some As being non-necessarily Bs. Thus, if by the argument above, some awake are writers by necessity, there may also be some that are so without necessity. Given this, we need not accept that writers, <only> insofar as writers, are awake. For some awake may be writers (i.e. those things that are writers) without this condition (i.e. of being a writer). In other words, “All writers are always awake while writers” converts to “Some who are awake are only sometimes writing while awake” and not to “Some who are awake are always writing while awake”.
55. This is *mā huwa fī naṣṣ al-amr*. It is certainly expressed by a *jīha*, but only insofar as this *jīha* is a sign for the *mādda*. “A” is the universal quantifier.
56. With its existential import, this is *mā huwa 'indanā*. It is not a statement about the nature of things, but about how they obtain for us and how we judge them to obtain. This judgment, expressed in the *jīha*, may or may not be compatible with the *mādda*. Since it is not a statement about the nature of relationships, but about the possibility of subjects coming to be with certain predicates, this proposition is open to be defined in a manner suitable to the speaker. As before, I am tempted to add an existential quantifier to this proposition.
57. I am tempted to add an existential quantifier to this proposition.
58. *Al-Ishārāt*, p. 369. Here he also offers a proof by *ekthēsis* aimed at proving that this conversion follows. The proof goes as follows: “No A is B”; so “No B is A”; if not, then “Some B is A”; let that B which is A be J. So, “All J is B” and “Some J is A”; so some of A is B, namely, that which is J. But since “No A is B,” this is absurd. Avicenna explains that this proof is perfectly fine in itself, except that “No A is B” is compatible with “Some A is B” – presumably under the *dhātī* reading, which is compatible with modified possibility quantifiers, which reflect a contingent *māddī* relation. For, “All things picked out by As (whenever that may be) are at least once picked out by Bs and at least once not picked out by Bs” is the case only if it is possible for all As to be Bs and not to be Bs, which, in turn, is possible if B holds contingently of A. See also Street, “Outline”, p. 135.
59. In Alexander’s *On Conversion*, e-conversions go through, pp. 63–65. This happens also in his *In Aristotelis analyticorum priorum librum i commentarium*, 30,1ff. For a long discussion of challenges to conversion in propositions like “No drink is in a jug” and “No jug is in a drink” and the manipulation of “in” required for this e-conversion to work, see his *On Conversion*, pp. 69–74. This is also discussed by Avicenna at *al-Shifā'*, 4:87.
60. See Street, “Outline”, p. 143, where says that e-conversion fails, without pointing out that Avicenna makes room for this conversion in his middle period for *waṣṭī* readings. Cf. Street, T., “Avicenna and Tūsī”, p. 47. Avicenna does allow the traditional square under *waṣṭī* readings at *Ishārāt*, p. 358, but, in this same work, he seems not so amenable to these readings when it comes to conversions (see below).
61. I wonder if the reference is to propositions that are possible and true in most cases. They approximate the necessary and are isomorphic with the assertorics. See “Themistius on Modal Logic”, p. 102.
62. Here he also includes the *dhātī* necessity (“All A is B for as long as the essence of A exists”) among the kinds of assertoric e-propositions that convert. See *al-Shifā'*, 4:75–6.

- Along the way, he also offers several criticisms of those who argue for the conversion of e-propositions on the basis of *ekthēsis* proofs that involve the conversion of particular affirmatives, of those who offer proofs via the principle of *mubāyana*, of those who argue for the conversion of assertorics insofar as the latter can be taken to be limited by the period in which something fails to obtain, etc. See *al-Shifā'*, 4:76–85.
63. *Al-Najāt*, pp. 45–6. It is true, as Street says (“Outline” p. 155), that Avicenna gave a “rather cavalier treatment of, and claims for, the syllogistic with propositions in the descriptive reading.” But I do not think that in his middle period he was averse to them (see e-conversions mentioned in this paragraph). Street tells us that these readings became very important in the post-Avicennan logical tradition.
 64. *Wa-l-ḥaqqu laysa laḥā 'aksun illā bi-shay'in mina al-ḥiyal*. See *al-Ishārāt*, I:369. *Mubāyana*, according to Avicenna, was an argument invented by “recent philosophers” to prove e-conversions. The underlying principle it worked with was: that which separates from something which is separated is separated from it (*mubāyin al-mubāyan mubāyan*). He discusses it in *al-Shifā'*, 4:77–9. A very similar argument is also found in Themistius as a proof for the conversion of absolute e-propositions. See Rosenberg and Manekin, “Themistius” p. 98. For al-Fārābī's use of a *mubāyana* proof (apparently appearing also in Theophrastus and Eudemus), see Lameer, *al-Fārābī*, pp. 101–103. See also Alexander's *On Conversion*, pp. 64–65. See also Alexander's *In Aristotelis analyticorum priorum librum i commentarium*, 31,1.
 65. See *al-Shifā'*, 4:77–79.
 66. See, for example, *ibid.*, 4:77.
 67. See Tūsi's commentary on this passage in *Ishārāt*, I:307, *mā yufhamu wa-yutaṣawwaru minhā* <i.e. *al-mādda*> *bi-ḥasbi mā tu 'ṭhi al-'ibāratu min al-qadīyyati allatī ḥiya al-jiha*.
 68. *Yumkinu an yakūna kullu wāḥidin mina an-nāsi kātiban*. The mode is being applied to the quantifier.
 69. *Kullu insanin yumkinu an yakūna kātiban*. In this case, the mode is applied to the copula.
 70. *Yumkinu an yakūna ba 'ḍu an-nāsi kātiban*.
 71. *Ba 'ḍu an-nāsi yumkinu an yakūna kātiban*.
 72. *Yumkinu an lā yakūna aḥadun mina an-nāsi kātiban*. As an analogy to the affirmatives, this would be a mode applied to the quantifier.
 73. *Wa-lā wāḥida mina an-nāsi illā wa-yumkinu an lā yakūna kātiban*.
 74. *Kullu insānin yumkinu an lā yakūna kātiban*.
 75. *Yumkinu an lā yakūna kullu insānin kātiban*.
 76. *Ba 'ḍu an-nāsi yumkinu an lā yakūna kātiban*.
 77. I would have much preferred to read “*adkhalta ar-rābiṭata 'alā al-maḥmūl*” i.e. “when you insert the copula to the predicate,” as below, “*alḥaqta al-jihata 'alā 'r-rābita*.” No such reading is offered in the apparatus.
 78. This is the first instance in this discussion when the copula is indicated by *w-j-d* and not *k-w-n*.
 79. He must mean the statements, “Zayd is just” and “Zayd is not-just” would be false if Zayd did not exist. Thus the latter cannot be a negation of the former. I would much prefer to read *wa-tānika* as *wa-qawlānika* in analogy to *fa-kayfa wa-qawluka* below.
 80. *Bi-mā taqaddama*. The idea is that each new element attached to the growing proposition comes to govern the character of the whole. So, in order to change the proposition, one needs to operate on that new element.
 81. I would have much preferred to read *fa-kayfa wa-qawluka* in place of *wa-kayfa wa-qawluka* but no such alternative reading appears in the apparatus.
 82. That is with regard to their truth-value “True”.
 83. *Muḥtamal*.
 84. Possible = *mumkin*. Possible₂ = *muḥtamal*. The Arabic of the last two phrases is, “*al-muḥtamalu innamā yu 'nā bihi mā huwa 'indanā kadhālika wa-l-mumkinu mā huwa fī nafsi -l-amri kadhālika*.”
 85. *Lākinna qawlahum ghayru mustamirrin fī alfāzihi*.

86. According to the earlier paradigms, the mode attaches to the copula in the first statement. I would expect the mode to apply to the quantifier in the second statement. But part of it is worded in the manner where the quantifier takes the mode and part of it where the copula does: *Kullu wāhidin mina an-nāsi yumkinu an yakūna kātiban*. I would expect, *yumkinu an yakūna kullu wāhidin mina an-nāsi kātiban*. But perhaps Avicenna means to say, “There is a possibility for each member of the class ‘man’ to be a writer” which is different from “It is possible for each one among men to be a writer.” The former modifies each member of a larger class separately; and this can be generalized as the possibility attached to the class as a whole. The latter, on the other hand, modifies each and every member of the class.
87. Reading *qurinat* for *qurina*.
88. That is of *kullu insān* to *kullu wāhidin mina an-nās*.
89. *’inda jumhūri an-nās*.
90. *Yūjjada*.
91. *Hattā yakūnu’ ttafaqa*.
92. The text says *farqān*, but I did not record two differences. The difference between the two applications of the mode may be summed up symbolically (Ax = universal quantifier; Ex = existential quantifier; P = possibility): (1a) modified quantifier: P ((Ax) (Mx --> Wx)). Since the argument carries existential import, which is exactly what carries the doubt, a better rendering might be: (1b) (P) ((Ax) (Mx --> Wx)) & (Ex) Mx. Modified copula: (2) (Ax) (Mx --> P(Wx)).
93. Perhaps because the common possible, as not-I, is itself ambiguous, as it can be isomorphic with the necessary. Therefore its negation poses the following problem: P --> not-I; not-I --> N or non-N; but non-N = not-N (if one fails to make a distinction between contingency and possibility); not-N --> P or I. Thus P --> I. See, for example, my ‘Avicenna’, pp. 15–16. A nice tree for this as Boethius’ understanding of Stoic positions is also offered in Benson Mates, *Stoic Logic* (Berkeley: University of California Press, 1961) p. 37, n. 51.
94. *Imkān salb al-’amm*. Perhaps he means the possibility of the negation of the predicate of all subjects, as in the example that follows, not the negation of the possibility relation between subject and predicate. The problem with the latter negation is discussed in the previous footnote.
95. The form of this statement allows for the modification of the quantifier. As Avicenna said, this means that the possibility of the negation of the predicate from all subjects is being conveyed, not the negation of the mode of possibility in the relation of the subject and the predicate: *yumkinu an lā yakūna wāhidun mina an-nāsi kātiban*.
96. *Lā maḥālata*.
97. *Qad yusāwī min jihatīn qawlanā*.
98. *Annahu mumkinun ihqāqa qawli al-qā’ili laysa ba’du an-nāsi kātiban*. I read *laysa* with MS readings S, H, instead of omitting it and *kātiban* with S, H, instead of *kātibun*.
99. *Talāzum*.
100. *Al-jumhūr*.
101. *Mumtani’*.
102. *Wājib aw ghayr wājib*.
103. *Al-imbkān al-’ammī*. I am tempted to translate this as “the common possible”, but this is not what Avicenna could have meant, since the common possible is that of the common people and the description of the possible given here is that of the special possible.
104. *Darūra*. I translate *darūra* with Necessity, using a capital letter to indicate that this encompassed both the *wājib* and *mumtani’*.
105. *Iṣṭalāḥū ’alā an yusammū*.
106. That is its present existential status is not in question.
107. This of course implies that the *state of affairs*, say, a man’s being white, does not obtain at the present. Otherwise, we would be able to affirm or negate the predicate of man.
108. *Tashakkakū ’alā anfusihim*.

References

- Alexander: 1991, *On Aristotle's Prior Analytics*, trans. Barnes et al., Cornell University Press, Ithaca.
- Alexander: 1883, *In Aristotelis analyticorum priorum librum i commentarium*, ed. by M. Wallies. Berlin, Reimer.
- Al-Fārābī: 1981, *al-Fārābī's Commentary and Short Treatise on Aristotle's De Interpretatione*, trans. with intro. and notes F. W. Zimmermann, Oxford University Press.
- Al-Fārābī: 1963, *Short Commentary on Aristotle's Prior Analytics*, tr. N. Rescher, University of Pittsburgh Press, Pittsburgh.
- Ahmed, Q. A.: 2003, "Avicenna's Reception of Aristotelian Modal Syllogistics" in David C. Reisman (ed.), *Before and After Avicenna*, Leiden, E. J. Brill, pp. 3–24.
- Aristotle: 1980, *Manṭiḡ Aristū*, ed. A. Badawī, Kuwayt: Wakālat al-Maṭbū'āt.
- Badawī, A. (ed.): 1971, *Commentaires sur Aristote perdus en grec*, Bayrūt, Dār al-Mashriq.
- Barnes, J.: 1990, "Logical Form and Logical Matter" in A. Alberti (ed.), *Logica, Mente e Persona*, L. S. Olschki, Firenze.
- Bower, C.: 1984, "The Modes of Boethius" in *The Journal of Musicology*, III, 3–253.
- Ehrig-Eggert, Carl: 1985, "Zur Analyse von Modalaussagen bei Avicenna und Averroes" in: [22. Deutscher Orientalistentag... 1983 in Tübingen. Ausgewählte Vorträge. Ed. W. Röhlig.] *Zeitschrift der Deutschen Morgenländischen Gesellschaft. Supplement* 6, 195–199.
- Flannery, K.: 1995, *Ways into the Logic of Alexander of Aphrodisias*, Brill, Leiden.
- Goichon, A. M.: 1939, *Vocabulaires comparés d'Aristote et d'Ibn Sīnā*, Desclée, Paris.
- Ibn Sīnā: 1364, *al-Najāṭ min al-gharq*, ed. M. Dānispāzūh, Dānishgāh-i-Tihrān: 1364 A.H., Tehran.
- Ibn Sīnā: 1991, *al-Shifā'*, ed. I. Madkour, Cairo.
- Ibn Sīnā: 1957, *al-Ishārāt wa-t-tanbihāt*, ed. S. Dunyā, Dār al-Ma'ārif, Egypt.
- Jenkinson, A. J.: 1984, *The Complete Works of Aristotle*, ed. Barnes Princeton University Press, Princeton.
- Lameer, J.: 1994, *al-Fārābī and Aristotelian Syllogistics*, E. J. Brill, Leiden.
- Liddell, H. G., and Scott, R.: 1996, *A Greek-English Lexicon*, Clarendon, Oxford.
- Mates, B.: 1961, *Stoic Logic*, University of California Press, Berkeley.
- Potiron, H.: 1961, "Les notations d'Aristide Quintilien et les harmonies dites Platonicienne", *Revue de Musicologie*, 47e, 124–160.
- Rescher, N., Manor, R. et al.: 1974, *Studies in Modality*, Oxford.
- Rescher, N.: 1967, *Temporal Modalities in Arabic Logic*, Dordrecht.
- Rosenberg, S. and Manekin, C.: 1988, "Themistius on Modal Logic: Excerpts from a Commentary on the *Prior Analytics* Attributed to Themistius", *Jerusalem Studies in Arabic and Islam* 11, 83–103.
- Sorabji, R.: 1990, "The Ancient Commentators on Aristotle" in R. Sorabji (ed.), *Aristotle Transformed*, Cornell University Press, Ithaca.
- Stephanus: 1885, *In libro Aristotelis De Interpretatione commentarium*, ed. Michael Hayduck, Berlin, G. Reimeri.
- Street, T.: 2000, "An Outline of Avicenna's Syllogistic" in *Archiv für Geschichte der Philosophie*, 84, 129–160.
- Street, T.: 2002, "Avicenna and Tūsī on the Contradiction and Conversion of the Absolute", *History and Philosophy of Logic* 21, 45–56.
- Street, T.: 2005, "Fakhraddīn ar-Rāzī's Critique of Avicennan Logic" in Dominik Perler and Ulrich Rudolph (eds), *Logik und Theologie: Das Organon im arabischen und im lateinischen Mittelalter*, pp. 99–116 (in the series *Studien und Texte zur Geistesgeschichte des Mittelalters*, Brill).
- Thom, P.: 2003, *Medieval Modal Systems*, Ashgate, England.