A note: Ibn Sīnā on the subject of logic

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A couple of years ago, reading Ibn Sīnā's logic, I understood him to believe that the subject of logic is the notion 'idea that is known by being derivable from previously known ideas either by formal definition or by a formal inference step'. The wording is my own; Ibn Sīnā's text is problematic, and hence this note. Translating into modern language, what it boils down to is that the subject of logic is the two relations 'definable in terms of' and 'deducible from'.

This puts Ibn Sīnā's view securely into the mainstream of logic. A very similar description of logic was offered by Blaise Pascal in the mid 17th century and had a huge influence on the foundations of logic in the late 19th and early 20th centuries, particularly on early work of Alfred Tarski. But of course Ibn Sīnā wrote within his own framework, and nobody should try to interpret him in the light of the later doctrines.

When Khaled El-Rouayheb's edition of Khūnajī's *Kašf al-'Asrār* became available last summer, it was good to see that Khūnajī gives a neat summary of Ibn Sīnā's position on the subject of logic. More precisely he says that the subject of logic is the notion 'known by way of conceptualisation and assent' (*al-maᶜlūmāt al-taṣawwuriyya wa-al-taṣḍīqiyya*, [8] p. 9). To see how this ties into Ibn Sīnā's account one has to unpack the notions of *taṣawwur* and *taṣḍīq*. But in fact Ibn Sīnā's own accounts need some unpacking too.

More recently I looked at some reports of Ibn Sīnā's view of the subject of logic in the modern literature, and found I seem to be in a minority of one. Most accounts are so far removed from the one above that it seems hardly worthwhile to compare them. But one specific difference is worth noting at once. As far as I know, none of the accounts in the literature make the subject of logic a *relational* notion ('derivable from ...'). This is in spite

of the relational terms in Ibn Sīnā's own text ('second' (to what?) 'depend' (on what?), 'composition' (from what?)), and Ibn Sīnā's own constant insistence that when interpreting sentences we should look for the implied relations. But those accounts that I've seen don't even raise the question whether the subject of logic might be relational. I'm inclined to put this down to a widespread lack of awareness of Ibn Sīnā's approach to logic, which is hardly anybody's fault when there is still so much of Ibn Sīnā's logic to be explored.

Another discrepancy worth mentioning at once is the statement in some of the literature (for example Tony Street [11]), that Khūnajī disagreed with Ibn Sīnā about the subject of logic. Since Khūnajī doesn't say he is disagreeing with Ibn Sīnā, I suppose the evidence for this statement must be that Ibn Sīnā and Khūnajī express different views about the subject of logic. (It wouldn't be enough to observe that Khūnajī's statement uses different words from Ibn Sīnā's statement in *Metaphysics* [5]; Ibn Sīnā's own statements in *Metaphysics* and *Easterners* [6] have very few words in common.) But then what you think about this will depend on what you think Ibn Sīnā's view of the subject of logic was. So this discrepancy could just be a consequence of prior disagreements.

All recent published accounts of Ibn Sīnā's view of the subject of logic refer to a paper of A. I. Sabra, 'Avicenna on the subject matter of logic', *Journal of Philosophy* 77 (1980) 746–764 [10]. Sabra's paper contains a wealth of information and wisdom, but it is far from justifying all the points that are commonly attributed to it. On several points I found I agreed with Sabra against the views of people who cite it. Let me mention two.

First, this is from Bertolacci [1] p. 273:

> (1) The subject-matter of logic [in the relevant text in *Metaphysics*], namely the secondary intelligible notions, are concepts like "subject" and "predicate", "universal" and "particular", "essential" and "accidental"; they are based on the "first intelligible notions", namely the categories.

Bertolacci cites Sabra's paper in support of this view. But in fact Sabra says hardly anything about Ibn Sīnā's view on the relation of logic to the

categories. He does say this:

(2) Avicenna returns to the question of the relation of logic to philosophy and the related question of the subject matter of logic in other parts of the Logic of *Kitāb al-Shifā'*. In the section on *Categories*, for example, he again asserts his independence from the Peripatetics (including Fārābī and Ibn al-Ṭayyib) by emphatically excluding the doctrine of categories from the proper domain of logic. ([10] p. 764)

Sabra is certainly right about this, and it makes it highly unlikely that Ibn Sīnā would have endorsed any statement to the effect that the subject of logic is 'based on … the categories'.

In fact Ibn Sīnā does explicitly discuss the relation of categories to the subject of logic on page 10 of *Easterners* ([6]). The passage is uncomfortably brief, and as with all of *Easterners*, the text is not yet secure. But my own present and provisional reading of the passage is broadly as follows. The subject of logic doesn't involve the categories, but they have a role in the practice of logic, because they are helpful for seeing how the content of a particular word or phrase can form a part of a valid definition or inference.

For an example of a different kind, take this from the footnotes of McGinnis's recent and highly recommendable book on Avicenna:

(3) See Sabra (1980) for a complete discussion of the proper object or subject matter of logic. ([9] p. 261)

By contrast here is Sabra's view:

(4) I hope that the following remarks, despite their preliminary character, will not fail to show that Avicenna's style of thinking and writing does lend itself profitably to the kind of analytical approach attempted here. ([10] p. 750)

Sabra's description of his paper as having a 'preliminary character' is not just modesty; it is the literal truth. Sabra collects together information of various kinds that might be relevant to determining what Ibn Sīnā thinks is the subject of logic. On my reckoning, some of it is certainly relevant and some is not. Sabra does in several places make his own opinions clear about where the evidence points. On some of these opinions I am fairly sure he is wrong; but scientific disagreement begins not with opinions but with supporting arguments.

I also agree strongly with an implication in the final clause of Sabra's sentence. One of the largest questions that hang over the interpretation of Ibn Sīnā's writings is the question of methodology. How should we approach Ibn Sīnā's logical texts in order to make sense of them? Sabra is absolutely right to highlight this question. In fact most of what I say below will be about what one should do if one hopes to extract from Ibn Sīnā's text an understanding of what he takes the subject of logic to be. Of course this is only a single special case of the broad methodological problem of understanding Ibn Sīnā's logic, and perhaps not a particularly significant one. But it's always good to be concrete.

To grasp what Ibn Sīnā takes the subject of logic to be, the following three lines of enquiry are certainly necessary. (There is some hope that they are also sufficient if properly done.)

(a) One must establish what Ibn Sīnā means by the subject of a science.

(b) One must clarify which parts of Ibn Sīnā's text were intended as statements of the subject of logic, and how they relate to their context in Ibn Sīnā's works.

(c) When a putative subject of logic has been found, one must compare it with how Ibn Sīnā himself proceeds when he is writing as a logician.

It would be good if I could pursue all three lines, but maybe someone else will take them up before time allows me. In the remainder of this note I make some preliminary remarks about them.

(a) **Subjects of sciences**. Ibn Sīnā's main discussion of the subjects of sciences is in *Burhān* [4] book 2, particularly sections 2.2, 2.6 and 2.7. He says that he is mainly concerned with theoretical sciences, and henceforth we restrict to these.

At first approximation, the subject of a science is the meaning of a descriptive word or phrase. Thus using Jackendoff's semantic notation, the subject of arithmetic is the meaning [NUMBER] (i.e. the meaning of the word 'number'). Strictly a subject could have not one but a small group of subjects, provided they hang together in some appropriate way. For example [LINE] and [SURFACE] are both subjects of geometry.

The bulk of the questions discussed by a science are questions of the form 'Is it true that ϕ?', where ϕ is a sentence whose subject is either the subject of the science, or some appropriately related meaning. For example

arithmetic answers the question

(5) Is every number even or odd?

where the subject is that of the science. (The examples in this paragraph are my own examples to illustrate Ibn Sīnā's classifications.) But the subject of the question can be a species below the subject of the science, as when arithmetic answers the question

(6) Is every even number either 2 or a composite?

Or it can be an individual below the subject:

(7) Is the number 28 perfect?

In practice Ibn Sīnā extends the class of subjects of questions further than he explicitly admits. For example he certainly allows taking pairs:

(8) Is it true that for every pair of numbers, either the first is equal to the second, or the first is less than the second, or the first is greater than the second?

Note that a definition of [NUMBER] tells us not only that all numbers satisfy some defining conditions, but also that non-numbers fail to satisfy these conditions. Hence the question 'What is a number?' is not itself a question of arithmetic; as Ibn Sīnā says in good aristotelian fashion, such questions have to be answered in a higher science.

Even a quick reading of the relevant parts of *Burhān* will show that in his descriptions of the subjects of sciences, Ibn Sīnā relies very heavily on the notion 'with respect to' (*min jiha*). In any case this notion appears twice in the discussion of the subject of logic in *Metaphysics*, and its close relative 'insofar as' (*min ḥayṯu*) occurs twice in the corresponding discussion in *Easterners*. These notions are a huge obstacle between modern logicians and an understanding of Ibn Sīnā's logic. No logician of the last fifty years would be seen dead using 'with respect to' or 'insofar as' in a supposedly precise definition.

I think the obstacle can be broken down, but it needs patience and awareness of several deathtraps. It's a blessing that Ibn Sīnā himself gives many examples, and he generally chooses his examples with great care for the points that they illustrate. Let me just call attention to an example from *Burhān* 2.6 (page 110.17ff in the Badawi edition [4]). Ibn Sīnā observes that in some sciences the subject is taken absolutely, but sometimes a condition

is added by way of 'addition' (*ziyāda*) of a meaning to the nature of the subject. The example he gives is the science of moving spheres — presumably a reference to Autolycus' treatise of this name. Now in order to discuss moving spheres we need to have, in addition to the vocabulary of spheres themselves, notions like 'sphere x is at place y at time t', or perhaps 'the place where sphere x is at time t' (Ibn Sīnā is often careless about distinguishing between expressions that can be used to paraphrase each other). So the natural reading in this case seems to be that 'with respect to R' means 'using vocabulary that allows one to express basic notions about R'.

Then by analogy, when Ibn Sīnā says that medicine studies the human body 'with respect to' being healthy or sick, the nub of the matter is that the proper questions of medicine are those questions about the human body which are couched in terms of having or causing health or sickness. (There is a difficult question here about whether these added meanings are counted as part of the subject of the science. Ibn Sīnā has a discussion of *min jiha* in *Qiyās* [3] which is relevant to this, but we are close to a deathtrap and I prefer to say no more about it here.)

Note that both of the added expressions that we suggested for Ibn Sīnā's moving spheres example were relational in the sense that they had extra arguments. My impression is that this would be the typical situation. Most interesting sciences need to use relational notions. In the case of logic we need to be able to talk about x being defined in terms of, or deducible from, y; these are the two ways in which, says Ibn Sīnā, we pass from known y to unknown x.

It seems that none of the published modern accounts of Ibn Sīnā's view of the subject of logic address enquiry (a) at all. I have seen accounts that are incoherent through failing to articulate what kind of thing the subject of a science is.

(b) **The relevant texts**. Sabra of course identifies the place in *Metaphysics* [5] section 1.2 where Ibn Sīnā refers to the subject of logic. Ibn Sīnā begins 'As you know', which must be a reference back to some earlier passage in the *Šifā'*. Sabra must be at least broadly right when he identifies this earlier passage as being in *Madḵal* [2] sections 1.2–4. But this is only the beginning of the story.

First , there is Ibn Sīnā's most explicit statement of the subject of logic, which appears in *Easterners* [6] pp. 9f. We noted above that this passage has very little text in common with the account in *Metaphysics*. In particular there is no phrase in *Easterners* that corresponds to 'secondary intelligibles' (*al-maᶜqūlāt al-ṯāniyya*) in *Metaphysics*. Since this phrase appears just once in

Metaphysics, and not at all in either *Madḵal* or *Easterners*, I would be cautious with Sabra's description of it as a 'name' for the subject of logic ([10] p. 753), except in the sense in which 'the previous speaker' might be described a name of a member of a committee. It seems to have been later Arabic writers like Rāzī who elevated the phrase into the name of a theory.

Even when we have the relevant areas of text correctly identified, there is still the question what parts of them state Ibn Sīnā's own view of the subject of logic, what parts of them are about rival views of the subject of logic, and what parts of them are neither of these. In his *Risāla on the subdivisions of the intellectual sciences* [7], Ibn Sīnā gives as one of the aims of metaphysics:

(9) The second subdivision is examination of the foundations and principles, as of the science of physicists, that of mathematicians, and the science of logic, and to refute the false views about them.

This reflects a format that Ibn Sīnā does use: we describe a science, and then we formulate and refute false descriptions of the science. The accounts of the subject of logic in both *Metaphysics* and *Easterners* have exactly this format. So very likely we should read the relevant passage of *Madḵal* in this way too. The attack on false views of the subject of logic seems to begin at *Madḵal* 23.5 in section 1.4. Where does it finish, and does any of the rest of *Madḵal* section 1.4 contain statements of Ibn Sīnā's own position? This needs to be settled; I remember seeing an account of Ibn Sīnā's view of the subject of logic that cited sentences from later in section 1.4 as if they were clearly Ibn Sīnā's own opinion.

Working backwards, where in *Madḵal* does Ibn Sīnā start to discuss the subject of logic? There is a sentence at *Madḵal* 16.10f, in section 1.2, that could be about the subject of logic. It refers to 'the aforementioned things' (*al-'umūr al-maḏkūra*). But Ibn Sīnā has mentioned several things; which does he have in mind here?

(c) **Ibn Sīnā's own writings as logician**. This is a reality check. Given the other uncertainties in the interpretation of Ibn Sīnā, it really is quite essential. Ibn Sīnā is highly unlikely to have given a description of logic which is simply not true of logic as he himself performed it.

The only author I'm aware of who makes any attempt at (c) is McGinnis. After reporting that the 'objects of logic' include genus, differentia and species, he notes that on Ibn Sīnā's account in *Madḵal*, genus and differentia are used in forming definitions ([9] p. 29f). But I don't think the point holds water. Genus and differentia appear in the definition of 'definition',

but neither of them plays any role at all in the basics of syllogistic inference. One can check how the notion of 'genus' appears in *Qiyās*. Ibn Sīnā discusses the genus of 'syllogism', as indeed he would have to in order to define 'syllogism'. He also uses *jins* in the broad sense of 'kind', for example to talk about 'kinds of propositional syllogism'. The other appearances of genus in *Qiyās* are variants of these two kinds. As for species, it plays no role either in Ibn Sīnā's account of definition or in his account of inference. It is a basic item of Ibn Sīnā's intellectual vocabulary, but there is nothing in his logical works to suggest that he sees it as more closely related to logic than to any other science.

References

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[2] Ibn Sīnā, *Al-Madḳal*, ed. I. Madkour et al., Cairo 1952.

[3] Ibn Sīnā, *Al-Qiyās*, ed. I. Madkour et al., Našr Wizāra al-Ṯaqāfa wal-'Iršād al-Qūmī, Cairo 1964.

[4] Ibn Sīnā, *Al-Burhān*, ed. A. Badawī, Dār al-Nahḍa al-ᶜArabīyya, Cairo 1966.

[5] Avicenna, *The Metaphysics of The Healing*, ed. and tr. Michael E. Marmura, Brigham Young University Press, Provo Utah 2005.

[6] Ibn Sīnā, *Manṭiq al-Mašriqiyyīn*, Al-Maktaba al-Salafiyya, Cairo 1910.

[7] Ibn Sīnā, *Risāla fī 'aqsām al-ᶜulūm al-ᶜaqliyya*, pp. 104–119 of Ibn Sīnā, *Tisᶜ Rasā'il*, Maṭbaᶜa Hindīya, Egypt 1908.

[8] Khūnajī, *Kašf al-'Asrār ᶜan Ġawāmiḍ al-'Afkār*, ed. Khaled El-Rouayheb, Iranian Institute of Philosophy and Institute of Islamic Studies, Free University of Berlin, Tehran 2010.

[9] Jon McGinnis, *Avicenna*, Oxford University Press, Oxford 2010.

[10] Abdelhamid I. Sabra, 'Avicenna on the subject matter of logic', *Journal of Philosophy* 77 (1980) 746–764.

[11] Tony Street, 'Arabic and Islamic philosophy of language and logic', Stanford Encyclopedia of Philosophy.