Ibn Sīnā on logic as a tool (Qiyās i.2)

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This is an important section, not least because it is (or should be) central evidence for Ibn Sīnā's view of logic as a theoretical science. It needs some commentary, which will be added when I've checked it out. Many thanks to Amirouche Moktefi for helping with the translation, but blame me for errors.

1 Translation of Qiyās i.2

/10/ i.2 That logic is an indispensible tool in the learned sciences

[1.2.1] You have already learned what is the subject-term of logic, and 10.4
you have been given an explanation of the kind of error that people make
about it. Also you have been told in general terms how logic can be both 10.5
a part of wisdom and a tool [of wisdom], and that there is no contradiction between counting it as a part and counting it as a tool. In fact, noting that the subject-term of logic describes one kind of existing thing, and the name 'philosophy' applies to knowledge about any kind of existing thing, [it follows that] logic is a part of philosophy. It tells us the facts about some existing things, and how they are; its nature is to tell us how ideas that we didn't know can be reached or specified by means of those existing things.
Then to the extent that this status is specific to certain existing things, or 10.10
is an essential accident or a constitutive feature of those things, logic is an investigation of certain kinds of fact about existing things, and hence it is one of the sciences.

[1.2.2] But in the second place this particular kind of knowledge about 10.13
this particular kind of existing thing happens to be helpful for knowledge of other things; and so this knowledge is not just a piece of knowledge, it is also a tool for [obtaining] other knowledge. In fact one might say that the 10.15
main purpose of logic is to be a helper towards other knowledge. So the fact that logic consists of knowledge about a certain kind of existing thing makes it a part of philosophy. But this knowledge about some existing things /11/ is a help for other kinds of knowledge, and this helpfulness makes logic a tool.

[1.2.3] Now to say that logic is a part [of other sciences] is to say some- 11.1
thing broader than its being a tool [of other sciences], though it is not a part of whatever science it is a tool for. So it is not a part of what it is a tool for—namely those sciences which are assessed by logic and weighed in its scale. Or rather, it is a part of the absolute science which embraces all of these sciences. It is logic because it is a tool [for the other sciences], but also being a tool makes it have more general properties than being a 11.5
tool, just as [HUMAN] can be truly described as [ANIMAL] and said to be alive. The difference between logic being a part and its being a tool is not a difference between two meanings that are disjoint without exception; rather it is between two meanings where one of them is narrower and the other is broader. Everything that is a tool for such-and-such sciences is a part of absolute science, but the converse is false. This is how one should think about it. Even if what the outstanding more recent scholar said was in support of the view that logic is a tool and not a part, [what I have said] 11.10
is the most complete thing that can be said about the question.

[1.2.4] What makes logic a tool is that it gives help—but not every kind 11.11
of help. One branch of knowledge can help another branch of knowledge by being matter [that the other branch can use]; but it can also help by being a measure and a pair of scales, not as matter at all, even if the gauge could in a way be counted as a part or as matter [of a science]. Thus for example when we say

(1) Everything that moves is a body, and the soul is not a body.

(without saying any more) and then deduce 11.15

(2) So the soul doesn't move.

the matter under discussion here doesn't come from logic at all, and there is no way in which one could count logic as helping by providing matter.

Rather it helps by being a measure which tells us that this premise-pair is productive. The same would apply if instead of this we had a definition /12/ or a description. So logic makes itself useful [for the science] by measuring and weighing this [premise-pair or definition], and not at all by being a part [of the science]. Then if you elaborate [the example] and say

(3) This is a productive figure, and its conclusion is the proposition that the soul doesn't move.

contriving to fill out the discussion in this way, then the logical premise does form a part of the whole discourse. But when we set out the fact that logic is a part [of a science], as well as being a tool, we didn't intend that a 12.5
logical proposition forms some of the matter of the science in this sense—I mean in the sense that the logical proposition is included [in the science] so as to signify that the premise-pair is weighed and measured by logic.

[1.2.5] Since we know logic, there is no need for us, every time we use 12.6
a syllogism, to explain explicitly that it is measured by logic, so that that fact is made explicit and forms part of the inferential discourse. Rather, when a premise-pair is stated, we know in ourselves that it is productive; or when it is a definition, we know in ourselves that it is a definition that we have derived, so we content ourselves with giving the definition. In just the same way a grammarian who says

(4) Zayd hit.

is content that his purpose is served by saying just this; it wouldn't be 12.10
appropriate for him to say

(5) And Zayd is in the nominative because he is the agent.

Rather he knows this, and there is no need for him to mention it when he uses the facts that allow him to know it.

[1.2.6] The sense in which logic is a helper in the sciences is not that logi- 12.13
cal matter is adopted in them for proving goals that are not logical. It's true that logical premises and syllogisms are often adopted in the foundations of debate and rhetoric and poetry, but this is when their goals are logical, 12.15
for example to show that

(6) This thing is either preferable or not preferable.

and

(7) This is either unjust or not unjust.

and things like that. These are logical goals, and some logical premises are adopted as matter to be used in proving them. But this is not what we are talking about.

[1.2.7] /13/ Sometimes logic is introduced as a part [of a science] in 13.1
some topics when one can't rely on the student to remember what he has been taught about this logical gauge; then this will be by way of a reminder. It is similar to how a grammarian or a lexicographer, when he brings a strange inflection or word into his discussion for some reason and he fears that the hearer will not understand it, is not considered out of order if he calls attention to the point. In calling attention to it he will use a premise that comes from grammar or lexicography.

[1.2.8] Also there are sometimes goals that are common to both logic 13.5
and another art. Most of these are goals shared with first philosophy; their definitive explanation will be in first philosophy, while in logic they will be explained from some other point of view, or simply adopted as assumptions. So these goals are applied as matter in scientific syllogisms. Then if you refer to them in terms of a logical feature that you are studying [in the argument], then that would be by way of a reminder, and this mention would be something superfluous [in the argument itself]. If you refer to them as significant in their own right, that would make them principles, 13.10
which are posited assumptions when they are used in sciences. An example of this is what was said:

(8) Because physics is a knowledge about things that have principles;
and knowledge about things with principles is just obtained from knowledge of their principles;
therefore one should investigate the principles first.

The major premise is one of the things that are taught in the volume devoted to teaching about demonstration, and it is also given a proper justification in the art of first philosophy. If you introduce it as a posited assumption and an adjudication, for example with someone who hasn't heard about logic and has never learned it, then this premise is a posit that 13.15
the physicist takes over from the expert in first philosophy. He posits it in his science, just like most principles of the sciences. [This applies] even if the only thing noted and mentioned about these principles is that they have been dealt with exhaustively /14/ in logic and have had their truth established, so that the only role they play is one that is not worth noting

or mentioning– just as it is not worth mentioning that a syllogism is productive, or that an agent is in the nominative, since this is just a known fact that can be used in the sciences as a measure and gauge, not as something that is put into the measure or gauge [to be measured]. Examples like this are introduced just as a reminder of something that probably won't be the sort of logical study that stands shining in the mind all the time. It is the 14.5
sort of thing that can properly be known and taken into account in what is learned without being stated explicitly. So if it is stated explicitly, that will be in order to give a reminder.

[1.2.9] The outstanding more recent scholar thought that the premises 14.7
used in the refutation of Melissus and Parmenides are logical, because they talk about quantity and finitude, and that finitude belongs primarily to quantity, both in itself and in relation to something else, and things like that. But in this he was mistaken. The theory of quantity and the things that go with it is not a logical theory. We covered this thoroughly in our 14.10
explanation of the *Categories*.

[1.2.10] So logic is a helper in the sense that it is a pair of scales, not in the 14.10
sense that it is one of the things put in to be weighed. And it just is logic because it's like that. In the case of other sciences, one of them helps another in the sense that a goal in the one that helps forms a premise and matter for the one that is helped, and not in the sense that one determines the other. And if someone asserts that the word 'philosophy' doesn't include everything that is knowledge about existing things, but rather the name applies to philosophy specifically because it is a science which is sought for its own sake and a science of existing things, not because it is helpful in every other 14.15
science, then this person should count logic as a tool and not as a part of philosophy. But this is a tiresome elaboration that we can do without.

[1.2.11] /15/ Logic is a great help in coming to understand any of the 15.1
sciences. Because of this, the outstanding more recent scholar can be excused for going overboard in his praise of logic. But he went so far overboard as to say that logic occupies among the other sciences the place of a master and not a servant, because it is a gauge and a measure [of them]. My own view is that being a gauge doesn't raise the status of a science, and neither does the fact that it helps [other sciences] by positing matter [for them]. What does make a thing superior and higher is being required 15.5
for its own sake rather than for the sake of other things. So his attempt to establish the supremacy of logic over the other sciences is unsound.

[1.2.12] We do need to have an answer to people who ask the following 15.7
question.

(9) If logic is needed for intellectual investigations, then it would have to be needed for learning the art of logic itself. But then one would need to know the contents of this book *Qiyās* (Syllogisms) in order to learn the earlier things that lead up to it.

There is also the question

(10) What is going on when people make demonstrations without using any rule, like Archimedes who proved things mathematically at a time when logic was not yet available? The same goes for other people such as debaters and orators and poets and whichever sophists you care to name.

[1.2.13] We start our answer by saying that there are two kinds of teach- 15.13
ing. The first kind of teaching consists of supplying information that has the character of being previously unknown, as when one teaches that the three angles of a triangle sum to two right angles. The second kind of teaching consists of reminder and preparation. Reminder is where something 15.15
that was already known is brought fully into the working mind. The thing that is not present in the working mind is unknown in the sense of not being knowledge /16/ that is fully actual. Rather it is knowledge that is potential and close to being actual, in fact closer than the potential to be represented by a visual shape in the working mind. This is reminder.

[1.2.14] We turn to preparation. Preparation for a proposition X con- 16.2
sists of bringing into the working mind, at the same time as X, propositions that behave the same way as X does, where knowledge of any one of them will not provide knowledge about anything else; but then when X is brought into the working mind in close proximity to the other proposition, this causes the two together to provide new knowledge. It can be unavoidable that we use facilitation by presenting more than one propo- 16.5
sition, when the intention is to teach something that can be expected to emerge from putting propositions into close proximity. For a proposition to become known when it enters the working mind is not the same thing as for the proposition to enter the working mind as a known proposition. Nor is it the same thing for a proposition to be brought into the working mind on its own, and for it to be brought in together with something else.

[1.2.15] So this is one kind of teaching, [namely reminder and prepara- 16.7

tion]. What we mentioned before, [namely providing new information,] is another kind of teaching, and it also comes in two kinds. One kind is integrated and orderly, and information presented like that is unlikely to lead to error; the other kind is not like that. An example of the first kind is what we teach in the sciences of arithmetic and geometry. An indication of this is 16.10
the small number of differences of opinion about arithmetic and geometry. An example of the second kind is what we teach in the natural sciences, and an indication of this is the large number of differences of opinion that occur about them.

[1.2.16] Some of the things that are taught in the science of logic are 16.12
taught as a reminder or a preparation; some are taught as posited assumptions, and some are taught as things that entail or that form entailments. More specifically, you need to reckon that most of what is in *Categories* is either posit or reminder and preparation, given that it is not really logical science. *Peri Hermeneias* consists mostly of reminder /17/ and preparation, though some of it is argumentation and reasoning. What comes after that is partly reminder and partly teaching of things that don't allow difference of opinion when you understand them in the right way, because they belong to the orderly kind of teaching. But mostly the kind of teaching needed in logic belongs to the other kind.

[1.2.17] Because of this, not all of logic is a prerequisite for [teaching] all 17.3
of logic. The part which is taught by reminder and preparation is needed 17.5
in the part which consists of acquiring [assent to conclusions], so that the part which is taught by reminder and preparation is invoked by the part which is taught by argumentation and acquisition. The part that is taught by argumentation is one where there are few differences of opinion about what the truth is. We estimate that the part in which differences of opinion occur is the result of the verbal expressions and the occurrence of differences of opinion about what the expressions are taken to mean. Also the different schools all have their different aims; if they managed to agree on one and the same aim then they wouldn't keep disputing about so many things. But this is not an issue of logic, though it does interfere in logic. 17.10

[1.2.18] And furthermore we don't deny that non-logicians demonstrate, 17.12
non-logicians debate and non-logicians orate. When a logician is learning these arts, the mere fact that he knows these rules doesn't give him much benefit, until practice and exercise have brought him to the point where the use of these rules becomes his aptitude. In the same way, when the 17.15

grammarian learns grammar, his knowledge of grammar will only give him the benefit of being able to make a thorough use of grammar when he has practised and so acquired the aptitude. People can acquire the aptitutde of speaking grammatically without knowing the rules, just as they can acquire aptitudes of debating and other things, but there will be something missing. As a result /18/ the aptitude can go missing or break down, just as the aptitude for speaking grammatically has broken down among Arabs, because they relied on the aptitude [rather than the rules]. If they had not only the aptitude but also the rules, so that their habitual actions resulted not just from the aptitude but also from the rules acting as gauges, then what has happened wouldn't have happened. It makes a difference whether a person has an aptitude which he has learned through all the rules, an aptitude represented in his intellect and abstracted from the matters that his actions relate to, or whether he simply has an aptitude that is 18.5
not supported by any knowledge of the rules. But it's better to have the skill and then build up the aptitude according to the rules of the skill. So then logic is indispensible for a person who wants to be in control and not to rely on the aptitude without the skill [supporting it].

2 Notes on *Qiyās* 1.2

[1.2.1] **10.4** The definition of the subject-term of logic is given (without using the word 'subject') at *Madk̲al* [6] 16.10–12. The reference to error could be read as 'how errors occur in it (i.e. logic)'. But in fact there has been no such discussion earlier in *Šifā'*, and he must mean as translated. This is a reference to *Madk̲al* 23.5–24.7.

10.5 The reference is to *Madk̲al* 15.18–16.5, where he says 'we will give a fuller explanation of this later'.

10.7 This refers to the explanation of what philosophy is at *Madk̲al* 12.3ff.

10.8 In *Burhān* [9] Ibn Sīnā discusses the notion of one science being 'part of' another one. At 132.15ff (*Burhān* ii.2) he may be distinguishing two senses: the subject individuals of the one science may be a proper subclass of those of the other, or they may be the same but in the first science studied with a more limited set of properties in mind. The first sense would be the relevant one here.

10.9 From the sense I suppose it's *yuᶜayyanu* here and not *yuᶜīnu*, in

spite of the frequent references to *muᶜīn* in this passage. Not the happiest choice of terminology. The text is difficult to parse; probably *tabīᶜatuhā* should be *tabīᶜatuhu*, and the *hā* is a mistake by an early copyist who thought that *ḥāluhā wa-ṭabīᶜatuhu/ā* formed a unit. The Cairo text as it stands could just about be read as 'their nature is—as logic shows how—that ideas that we didn't know can be reached or specified by means of them'.

1.2.2 11.1 Logic as a tool is not here described as a *ṣināᶜa* ('art' or 'craft', feminine in Arabic)—Ibn Sīnā sticks with masculine endings. In fact the distinction between logic as an *ᶜilm* ('science') and logic as a *ṣināᶜa* seems to play no role in Ibn Sīnā's thinking.

[1.2.3] 11.3 The ms text *bi-ᶜibāratin* (بِعِبَارَةٍ) has no clear meaning here. The sense requires *bi-miᶜyārihi* (بِمِعيَارِهِ, cf. 11.3 below) or possibly *bi-mīzānihi* (بِمِيزَانِهِ).

11.10 The reference is to al-Fārābī *Alfāẓ* [1] 107.1–108.3.

[1.2.4] 12.3 Ibn Sīnā uses *ḥīla*, *ḥiyāl* for contrivances, not necessarily involving any kind of deception.

[1.2.7] 13.4 The point is not clear. The case that Ibn Sīnā cites seems to be where a linguistic premise is introduced into linguistic science; but this is not parallel to introducing logic as a part of another science. Possibly the 'grammarian or lexicographer' that Ibn Sīnā has in mind is in fact talking about some non-linguistic issue, but he notices a place where linguistic facts would be helpful, and so since he has them at his fingertips he introduces them.

[1.2.8] 13.11 'What was said': he refers to the opening words of Aristotle *Physics*, 184a10–12. Ibn Sīnā discusses the point further at *Physics* [10] i.1, 7.13ff, citing *Burhān*.

13.14 I can't find any evidence on the logical force of *ḵiṭāb*, which is a verbal noun from the form III *ḵāṭaba*. Ibn Sīnā uses it too rarely to give any clear idea, and of course the logical glossaries are unaware of it. I base 'adjudication' on a passage in the *Qānūn* where Ibn Sīnā uses it in explaining the meaning of the Greek word *krisis*. Lane notes a usage referring to legal decisions.

[1.2.9] 14.7 The refutation of Melissus and Parmenides occupies Aristotle's *Physics* i.2f, 184b15–187a12. The 'outstanding more recent scholar' is Al-Fārābī, as Street [14] showed. To Street's arguments we can add the reference to *fāḍilu l-muta'aḵḵirīn* at *Maqūlāt* [7] 231.15, where Ibn Sīnā quotes Al-Fārābī's *Ḥurūf* [2] 62.2ff.

[1.2.11] 15.3 This is evidence that the descriptions *mi^{c}yār* and *mikyār* go back to Al-Fārābī, presumably to his commentary on the *Prior Analytics*. It's important to know how Al-Fārābī thought this gauge was applied. The passage quoted by Gutas [5] p. 308 from the *Risala on Logic* suggests that Al-Fārābī regarded logic as measuring the truth of propositions as much as the productivity of syllogisms. If this is so, then (1) Al-Fārābī was making claims unjustified by anything that Aristotle and his successors had made available, and Ibn Sīnā was merely pulling back to the logical facts. Also (2) Al-Fārābī was repeating the absurd claim attributed to Mattā in the Sīrāfī debate, indicating that either Al-Fārābī was unaware of this debate or he had learned nothing from it. Al-Ḡazālī in his use of similar language sometimes supports Al-Fārābī's view (if indeed it was his view).

[1.2.12] 15.10 Goichon [4] quotes *Najāt* for this use of *ta^{c}ālīm*. Better is *Burhān* 69.7, 196.6, 210.5.

[1.2.13] 16.1 This weaker potential may be what Ibn Sīnā refers to at *Burhān* 197.2, that some mathematical questions become easier to answer if we can draw labelled pictures of them. I'm guessing that the point is that being able to draw such a picture is weaker than already knowing the facts that can be proved using the figure.

[1.2.14] 16.2 I say 'proposition' since the knowledge in question here seems to be propositional. Thus *X* is something that can be in the mind and then become 'known'.

[1.2.15] 16.8 'What we mentioned before': The reference is to 15.13f above.

[1.2.16] **17.3** A curious remark, particularly since Ibn Sīnā doesn't explain which parts of logic are orderly and which are disorderly. My guess, and it is only a guess, is that he intends to distinguish Aristotle's categorical syllogisms, perhaps including his own recombinant syllogisms with these, from other syllogisms (modal, probabilistic, temporal etc.) and the theory of analysis of arguments. So 'what comes after' (line 17.1 above) refers mainly to the theory of syllogism set out in *Qiyās* ii.4. Elsewhere Ibn Sīnā mentions that Aristotle regarded his non-categorical syllogisms as 'for testing (*'imtiḥān*)'. I think Ibn Sīnā agreed with this view, and he understood it to mean that these other syllogisms have to be learned in a more personal way, largely by building up skills on the basis of 'testing' examples. Teaching this kind of material would inevitably be less 'orderly' than teaching categorical syllogisms, which are governed by the precise rules of productivity and following as explained in *Qiyās* ii.4. Note also that the masculine *al-manṭiq* is picked up by the feminine *fī-hā*. This might be because he is thinking of logic as a craft (*sinā^{c}a*). Alternatively *fī-hā* refers back to the plural *akṯar*: 'most things [in logic], what is needed in them is . . . '; though this strikes me as a bit forced, and since *al-ḥāja* would become the subject, the verb should be *kānat*.

[1.2.17] **17.3** This seems to be intended as an answer to the question raised at 15.10, but I can't say I understand the answer—see below.

17.5 What part of logic is 'by way of acquisition' (*^{c}alā sabīli l-kasb*)? Both *kasb* and *iktisāb* mean 'acquisition', but Ibn Sīnā uses at least the second of these words in two senses. There is 'acquiring assent to a conclusion' (e.g. *Mašriqiyyūn* 46.7f *iktisābu l-taṣdīq fī-hā*), which is the sense in which Ibn Sīnā uses *kasb* in the preceding section *Qiyās* i.1. But there is also 'acquiring logical skill', as at 17.16 below (*iktisābu l-malakati*). Since the first meaning is the one he has recently invoked, and he is about to couple *kasb* with 'argumentation' (*iḥtijāj*) in the next line, probably he is talking here about a part of teaching logic that consists in getting the student to draw syllogistic conclusions. He is saying that this part refers back to previous material, though he is not specific about what that previous material is. One possible problem with this reading is that he is about to say that the 'argumentation' part of teaching logic allows few differences of opinion; but it should

include drawing conclusions from modal or otherwise difficult premises, and it seems that Ibn Sīnā doesn't regard that as an 'orderly' part of logic. I think there is a reconciliation if we remember his quoted remark "In analysis, limit the effort that you put into taking care of the forms of syllogisms, since that is one of the less important things and it doesn't often happen that one makes an error about which premise-pairs are sound. But do practise verifying the matters.' (*Mubāḥaṯāt* [13] 84.8. *al-qarā'inu l-ṣaḥīḥa* means 'sound premise-pairs', not 'sound instinct' as Gutas has. I guess Gutas silently emends the text.) His point is that once the meanings have been clarified, there will normally be no doubt about whether we should assent to the conclusion; the controversial parts of logic are those where the meanings are dubious. This would fit exactly with what he is going to say below about how disagreement on meanings interferes with logical deduction.

[1.2.18] **17.12** Here Ibn Sīnā answers the question raised at 15.10.

18.3 'Gauges' *maᶜīrāt*. Not in the dictionaries, but it has to be a nonstandard plural of *miᶜyār*. Lane's Dictionary notes a nonstandard *li-yaᶜīra* for *li-yuᶜāyira*, from the same root.

18.4 An aptitude not just based on rules he has been taught, but based on rules that he himself consciously extracted from matters that he came across. See *Nafs* [11] 51.9–10 for the *nazᶜ ᶜan al-māddati* which Ibn Sīnā explains in terms of the forms of abstraction in different kinds of awareness. Maybe also recall the quote from *Mubāḥaṯāt*.

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