Kātibī, Taḥtānī and the *Shamsiyya*

The Epistle for Shams al-Dīn on the Rules of Logic — for short, the *Shamsiyya* — is a remarkable book.[1] It is one of the most widely read logic texts of all time. Written some time after 1262 by Najm al-Dīn al-Kātibī (d. 1277), it attained immediate celebrity which it continues to enjoy down to today. It has been widely taught in madrasas, especially in the arc of Muslim countries running from Egypt through to India. So popular did it become, it effectively replaced the volume on logic in Avicenna's *Pointers and Reminders* (normally read with Naṣīr al-Dīn al-Ṭūsī's *Solution to the Problems of Pointers*);[2] most manuscripts of *Pointers* and *Solution* copied after 1400 no longer contain the logic section. Ultimately, as we shall see, even specialists in logic began to look on *Shamsiyya* logic as Avicenna's logic.

The *Shamsiyya* is a compact text, just over 12000 words in English translation, and deals with aspects of the philosophy of language and modal syllogistic. In spite of its brevity, the *Shamsiyya* covers a lot of ground. Few people in the past read it without a teacher, and no one would wisely think of reading it now without a commentary. The commentary with which it was most commonly read was written by Quṭb al-Dīn al-Rāzī al-Taḥtānī (d. 1364) in 1329, the *Redaction of the Rules of Logic in Commentary on the Epistle for Shams al-Dīn*. The *Redaction* is a classic in itself; indeed, the supercommentaries on it outnumber the commentaries on the *Shamsiyya* ((Wisnovsky, 2004) 163–165). Together, the *Shamsiyya* and Taḥtānī's commentary represent the level of logical training most Muslim scholars over the centuries have aspired to attain in the course of their education.

The *Shamsiyya* is a teaching text, the *Redaction*, a commentary; both were written after the Mongols sacked Baghdad in 1258. I think the prejudice against books written after the fall of Baghdad has finally been abandoned; so too the prejudice against commentaries as merely derivative. We remain unreformed, however, as to the true status of teaching texts.

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1. (Taḥtānī, 1948) contains the text of the *Shamsiyya* I have used; it also contains Taḥtānī's *Redaction*.

2. (Ṭūsī, 1971a); I check this version against British Library codex Or. 10901.

There is nothing necessarily derivative or uninteresting about such texts, nor — and this would be a perilous assumption with which to appraise much of the work done in Kātibī's Maragha — is an efflorescence of textbook writing indicative of a tradition in decline. The *Shamsiyya* is a classic precisely because it is so well suited to introducing students to a maze of logical innovations which — in the third quarter of the thirteenth century — had only just crystallised in a discipline going through upheaval and renewal.

In what follows, I say a few words about Kātibī and his working circumstances; I say even fewer about Taḥtānī. I go on to reflect on the *Shamsiyya*, its structure, contents and the broader project it forms part of. In the third section I consider two of Kātibī's logical proofs. I then concentrate on a short but significant section of the text (three of the text's one hundred and twenty lemmata) to show how immediately preceding discussions led Kātibī to write what we find in the *Shamsiyya*. Throughout, I draw on material from Taḥtānī's commentary to illustrate the nature of that work. In conclusion, I glance at the career of the *Shamsiyya* and its logical doctrine in the centuries after Kātibī's death.

The chapter has two appendices. One is a table of the *Shamsiyya's* contents. The second is a concordance to help navigate between the Arabic of the *Shamsiyya*, its English translation, and my numbering of the lemmata.

1– Kātibī and the Maragha project

The author of the *Shamsiyya*, Najm al-Dīn al-Dabīrān al-Kātibī al-Qazwīnī, was born in Qazwīn early in the thirteenth century. He was trained by Athīr al-Dīn al-Abharī (d. 1265), a philosopher and theologian whose logic has yet to be studied properly.[3] There is manuscript evidence that, in 1228 and 1229, Kātibī was reading Abharī's texts under Abharī's supervision ((Eichner, 2010) 130). Abharī had trained other scholars, among them, Naṣīr al-Dīn al-Ṭūsī (d. 1274).[4] Abharī, Kātibī and Ṭūsī are certainly among the greatest logicians of the thirteenth century. The trajectory of their logical commitments is

3. (Thom, 2010) makes it clear how sophisticated Abharī is as a logician.

4. That is, Ṭūsī read *Pointers and Reminders* under Abharī; (Endress, 2006) 411.

particularly interesting. Abharī comes across in much of what he wrote as a faithful Avicennan, though at a certain point he began to explore new paths in logic, especially in his *Revelation of Thoughts*.[5] By contrast, Ṭūsī remained unwavering in his commitment to Avicennan logic, and was to write, after Abharī died, a respectful but uncompromising critique of the *Revelation*. There is no indication Kātibī was ever concerned to defend Avicenna's logic, though he had surely read through *Pointers* with Abharī, and understood the arguments for and against Avicenna's positions. It becomes clear in section 4 below that he was intimately acquainted with the arguments in and against the *Revelation*.

Kātibī's other works on logic include an advanced text written after 1265, the *Summa of Subtle Points*,[6] a Commentary on the *Epitome* of Fakhr al-Dīn al-Rāzī (d. 1210), and a Commentary on the *Disclosure of Secrets*, a logic text by the Ayyubid jurist, Afḍal al-Dīn al-Khūnajī (d. 1248).[7] The *Disclosure* may have been written as early as the 1220s. Kātibī taught it to his students, and was led by it to adopt non-Avicennan positions on many issues (sections 2 and 4 below). He also produced a number of short works on logic, among them, important epistles on specific topics ((Pourjavady and Schmidtke, 2006) 211–220).

Kātibī lived through one of the major political events in Islamic history, the Mongol conquest. Soon after the fall of Baghdad in 1258, the Īl-Khānids set Naṣīr al-Dīn al-Ṭūsī the task of founding an astronomical observatory in their new capital, Maragha. Perhaps at some time Ṭūsī had shared a class with Kātibī. In any event, he had come to know of Kātibī somehow: Ṭūsī engaged four scholars in 1259 to help him with the observatory, and one of them was Kātibī ((Sayılı, 1960) 205; (Schmidtke, 1991) 15–16). Some time after its foundation, Abharī also worked at the observatory, though it seems he left before his death.

Since the *Shamsiyya* is dedicated to Shams al-Dīn al-Juwaynī, the vizier of the Īl-Khānids, it is a text written or redacted after Shams al-Dīn's accession to power in 1262. This in turn

5. *Tanzīl al-Afkār*, published with Ṭūsī's critique, *Taʿdīl al-Miʿyār fī Naqd Tanzīl al-Afkār:* (Ṭūsī, 1971b).

6. *Jāmiʿ al-Daqāʾiq*. I have consulted British Library Or. 11201. Pious respects for the dead Abharī are at 32v.

7. (Khūnajī, 2010), *Kashf al-Asrār*. The editor's introduction is useful for all points discussed here.

makes it a Maragha text. The period in which the Maragha observatory flourished was unique in several respects. Under non-Muslim rulers, Sunni legal scholars lost their privileged position, and the interests of scholars of the exact sciences — formerly funded through private patronage — were promoted. *Waqf*-monies were directed to support the teaching and research activities of the observatory ((Madelung, 2000) 1; (Sayılı, 1960) 207). In this environment, with its changed social expectations and funding arrangements, the scholars of the non-Islamic sciences confronted the need to produce introductory textbooks for their disciplines, textbooks which would in some way parallel the introductory textbooks for *adab* and the Islamic sciences. The *Shamsiyya* is one such text, an up-to-date introduction to the latest discussions in its rapidly changing subject.

Maragha provided the intellectual context for Kātibī's great works. In assessing the work at Maragha, modern scholars concentrated initially on its impact on Copernican astronomy, and in the 60s began to talk of the "Maragha School" and then, somewhat later, of a "Maragha revolution" which stretched to include non-Maraghan predecessors and successors (Saliba, 1991). More recently, Eichner has extended the idea of a Maragha revolution to the development of post-Avicennan philosophical and theological traditions ((Eichner, 2009) x). I would like to extend the idea yet further, to speak of a Maragha school in logic, and a Maragha revolution in the subject. This is not to say that logicians at Maragha agreed how to resolve problems in their subject; Ṭūsī and Kātibī differed on profoundly important issues. But by coming together, these scholars were able to recognize a canon of books that logicians had to read before participating in the enterprise. The Maragha logic-canon was ultimately based upon the works of Avicenna. But Avicenna was for these logicians as old as Kant is for us, and it was Rāzī and Khūnajī who had set the most urgent matters for debate. Maragha logicians also had a common set of technical terms, a common awareness of certain problems, and common ways of appraising candidate solutions to these problems. Finally, they had — and this perhaps is the most important single point — a self-confidence borne of the great successes of the school in the various fields its scholars worked in, a self-belief that lent itself to the production of books unencumbered by traditional expectations as to doctrine and format.

Some time after the Maragha observatory was founded, Kātibī taught al-ʿAllāma al-Ḥillī (d. 1325) and Quṭb al-Dīn al-Shīrāzī (d. 1311); both were to become famous scholars. Both were also taught by Ṭūsī, and so had a formation in logic from two men with differing views as to how the subject should be developed. Kātibī was connected with Maragha until shortly before his death, when he and Quṭb al-Dīn al-Shīrāzī left to establish a school in Juwayn in Nīshāpūr. In all likelihood Kātibī died there.[8]

Shīrāzī and Ḥillī both had a hand in training Quṭb al-Dīn al-Rāzī al-Taḥtānī (d. 1365) ((Schmidtke, 1991) 39, (Walbridge, 1992) 172), a Persian already of some scholarly standing. Taḥtānī later travelled west and ultimately died in Damascus. His commentary on the *Shamsiyya* was finished in 1329 ((Schmidtke, 2012) 205), by which time the Maragha observatory was no more than a wind-swept ruin. The commentary consists by turns in the provision of historical background to a dispute, the expansion of logical formulations, and rejection or modification of some of Kātibī's conclusions (all exemplified below, especially section 4). Going through Taḥtānī's commentary provides a glimpse of how lively it must have been to read the *Shamsiyya* with a learned teacher.

2– The Text of the *Shamsiyya*

In this section, I make two passes in introducing the text of the *Shamsiyya*. On the first, I compare its structure, style and contents in broad terms with that of Avicenna's *Pointers and Reminders*, because *Pointers* is the text from which, in the last analysis, it is descended. On the second pass, I look at how the *Shamsiyya* relates to the thirteenth-century project to present logic as an Aristotelian science.

The *Shamsiyya* and *Pointers*

As is characteristic of the great teaching texts of Islamic culture, the *Shamsiyya* is at points almost mnemonic. It was broken down, probably by Kātibī himself, into roughly 120 lemmata, divided into four treatises preceded by an Introduction: (1) On Simple Terms, (2)

8. From Al-Rahim's forthcoming *The Creation of Philosophical Tradition* (see below, Acknowledgements); (Schmidtke, 1991) 17, (Walbridge, 1992) 12.

On Propositions and their Valuations, (3) On Syllogism, and a (4) Conclusion dealing with demonstration and sophistical fallacies. The brevity of the *Shamsiyya* and its need for expansion through commentary would have compelled its readers to compare it to that "Koran of the philosophers" (as Ibn Taymiyya called it), *Pointers and Reminders*.

That said, a glance at the tables of contents of the two works makes it seem they are of quite distinct structure. In fact, however, the structure of *Pointers* had been keenly discussed from the time of Fakhr al-Dīn al-Rāzī, who had already restructured *Pointers* slightly in his *Gist of Pointers* ((Rāzī, 1355), *Lubāb al-Ishārāt*); the *Gist* is indicative of an ongoing discussion which issues in a text ordered like the *Shamsiyya*. Rāzī joined Paths One and Two of *Pointers* (respectively, on preliminary notions, and on the five predicables) as a single Path, dealt with Path Three (on preliminary matters to do with propositions) as an independent Path, joined Paths Four and Five (respectively, on the matter and mode of propositions, and on contradiction and conversion) as a single Path, dealt with Path Six (on syllogistic matter, which is to say, the epistemic status of propositions) as an independent Path, joined Paths Seven and Eight (respectively, on syllogism and meta-syllogistic) as a single Path, and joined Paths Nine and Ten (respectively, on demonstration and fallacies) as a single Path. In other words, Rāzī compressed the ten Paths of *Pointers* into six, keeping its overall structure intact.

In the light of *Gist*, the structure of the *Shamsiyya* can be seen as one stage further in the compression of *Pointers*. First, Kātibī joined Path Three with the already merged Paths Four and Five to form a treatise on the formal aspects of the proposition. Secondly, he used a distinction identified by Ṭūsī to be at play in the ordering of *Pointers*, between form and matter ((Ṭūsī, 1971a) 130 (ad 1.2 §4)); Kātibī treated all material considerations together, which gave him a reason to merge Path Six with the already merged Paths Nine and Ten. Taḥtānī summarised the rationale behind the structure:

> Text 1: Kātibī only ordered it in this way because, of that which must be known in logic, beginning in the discipline either depends upon it, or does not depend upon it. If it is the first it makes up the preface. If it is the second, then investigation of it either has to do with simple terms (the first treatise), or with combinations. Investigation into combinations must either be concerned with those which are not sought per se (the second treatise), or with those which are sought per se. Reflection about them must

> either be relative to form alone (the third treatise), or relative to matter (the conclusion). ((Taḥtānī, 1948) 4.4–4.8)

The preface and four treatises that make up the *Shamsiyya* are, in short, descendants of the ten paths that make up *Pointers*. Further, the mnemonic texture of the prose recalls the indicative style of presentation of *Pointers*. Such a style is motivated by a conviction that proper teaching should do no more than indicate to the student the outline of the proofs sought.[9]

In terms of content Kātibī is fundamentally an Avicennan logician. He accepted Avicenna's division of the syllogistic into *iqtirānī* and *istithnāʾī* as opposed to categorical and hypothetical (§89), he took a proposition without an explicit modal operator to be temporally modalized (§69), and he accepted all of Avicenna's propositional conditions for an investigation of modality (§§52–58) (see, respectively, (Ṭūsī, 1971a) 374, 307f., 264f). But the points at which Kātibī departed from Avicenna are especially noteworthy because, in every case, he followed Khūnajī. Above all, when dealing with the major exegetical problem in Avicenna's modal syllogistic, how to square all the inferences he accepted with one another, Kātibī simply gave up and adopted a different approach to stipulating truth-conditions for the propositions (see section four):

> Text 2: The status of the two possibility propositions with respect to conversion or its failure is unknown due to the fact that the demonstration mentioned to prove their conversion depends on the conversion of the negative necessity proposition as itself, and on the productivity of a possibility minor with a necessity major in the first figure, and neither of these can be verified. This in turn is due to lack of success in finding a proof which compels acceptance or rejection of the conversion of the possibility proposition. (§80)[10]

There are further, minor, points of difference with Avicennan doctrine not found in *Pointers*, including the designation of the subject matter of logic (§§5,6) (El-Rouayheb, 2012), and how to define a conversion with negative terms (§82) (see (Avicenna, 1964) 93–94; cf.

9. (Gutas, 1988) 307–311. See section 3 below for examples. I wouldn't want to push this comparison too far; unlike Avicenna, Kātibī did not intend to withhold knowledge.

10. (Street, 2002) section 2 lays out the problems in interpreting Avicenna's modal syllogistic; for Khūnajī's response, see (Khūnajī, 2010) 136, 144, and section 9.

(Khūnajī, 2010) 147–148); and there is a major difference. Kātibī devoted 21 of the *Shamsiyya's* 120 lemmata to outline a logic of conditional and disjunctive propositions, sketching how they contribute to inferences. The ordering, and the variations from Avicenna, are entirely in line with Khūnajī's work on the subject.[11]

Logic as Science

The *Shamsiyya* is typical of the Maragha movement's drive to square all disciplines against the requirements of an Aristotelian science. The most successful outcome of the move remained geometry, transcending all work at the observatory as astronomy's superordinate science. It is particularly in the Introduction of the *Shamsiyya* (§§1–6) that the groundwork is laid for this presentation of logic. There, logic is said to be not only a science (§§5, 6), but also an instrument for the other sciences (§3); this recapitulates Avicenna's position (for which see the classic (Sabra, 1980)).

In conceiving logic as a science and an instrument, a problem looms. If logic is a science and an instrument, and is the instrument which all the sciences stand in need of, will logic stand in need of itself? This might lead to a vicious circle. What follows is how Ṭūsī faced the potential problem.

> TEXT 3: The greater part of logic consists of technical terms to which one needs to be alerted; of primary propositions of which one needs to be reminded and which prepare for others; and lines of theoretical investigation which are such that one does not fall into error concerning them (the like of which geometry uses in its demonstrations). None of these stands in need of logic. Should any of these need logical canons (and that will be rarely), that need will only be for the first kind, [that is, the technical terms]; so there is no circularity of need at all. ((Ṭūsī, 1971a) 118.8–118.22)

Six lemmata are given to introductory matters, in which Kātibī silently adopted Ṭūsī's strategy to avoid the circularity problem; other preliminaries are also covered. Taḥtānī

11. A summary of what is given: definitions, §§38, 39; kinds, truth-conditions, quantification, §§60–66; contradictories, §72; conversions, §81; conversions by negation, §86; co-implication of molecular propositions, §87; syllogisms, §89, §§105–109, §§110, 111. Cf. (Khūnajī, 2010) section 10. This is a badly understudied subject; Khūnajī may have been preceded in these doctrines by others.

expanded on these, and his comments clarify how the study of logic was laid out as a science:

> TEXT 4: [4.apu] What is meant by prefatory material here is what beginning in the science depends on. Beginning either depends on conceiving the science, because if the beginner in a science has not conceived that science in the first place, then he seeks what is absolutely unknown, and that is inconceivable due to the impossibility of directing the soul towards what is absolutely unknown. . .
>
> [5.u] Or beginning depends on explaining the need for logic, because were the final cause and purpose of the science unknown, its study would be futile.
>
> Or it depends on [delimiting] its subject matter, [6] because the sciences are distinguished from one another according to distinct subject matters. Jurisprudence for example is distinguished from legal methodology by its subject matter (because in jurisprudence one investigates the acts of the ethically obligated in so far as they are licit or illicit, proper or corrupt, whereas legal methodology investigates traditional proofs in so far as they reveal juridical qualifications). Since the first has one subject matter and the second another, they come about as two distinct sciences, each individuated from the other. Were the beginner in a science not acquainted with what kind of thing its subject matter is, he wouldn't be able to distinguish the science he desires to learn, and he wouldn't be discerning in his study. ((Taḥtānī, 1948) 4.apu–6.apu)

Logic is to be conceived under its description: "the canonical instrument which, if implemented, preserves our mind from error in thinking" (§3); its instrumental nature provides it with a final cause derivative on the sciences it helps us come to think about correctly. Yet, as a science, it has its own subject matter:

> TEXT 5: The subject of logic is known conceptions and assents, because the logician investigates them in so far as they conduce to a conception or an assent. He also investigates them in so far as what conduces to conception depends on them, like their being universal, particular, essential, accidental, genus, differentia; and in so far as what conduces to assent depends on them, whether proximately (like their being a proposition, the converse of a proposition, the contradictory of a proposition), or remotely (like their being subject and predicate).
>
> It is customary to call what conduces to conception an explanatory phrase, and to call what conduces to assent an argument. (§§5&6)

In logic, one investigates the essential properties (that is, the necessary but non-constitutive properties) of conceptions and assents in so far as they lead to further

conceptions and assents. In the following section I examine two examples of the investigations conducted in the *Shamsiyya*.

3– Proofs without Perfection

The *Shamsiyya* presents logic as a science, deriving all conclusions from first principles. I examine briefly two proofs taken from the modal syllogistic (which is Kātibī's chief interest in the *Shamsiyya*). The bulk of the difficulty in proving valid inferences in the modal syllogistic lies in the proofs for the conversions through which the syllogisms are — for the most part — proved. For example, in Kātibī's exposition, by proving that "no A is ever B" converts to "no B is ever A" (§75), a proof is available to show that the premise-pair "every J is always B" and "no A is ever B" leads to the conclusion, "no J is ever A" (§93). It is, in the terms of Text 5 above, an examination of conceptions and assents "in so far as what conduces to assent depends on them, [in this case] proximately (like their being... the converse of a proposition)."

By looking at these proofs, I hope to convey a sense of the work a student had to get through in coming to grips with the *Shamsiyya*. I also want to draw attention to a notion Kātibī has in play in these proofs when referring to some of them as self-evident (*bayyin bi-dhātihi*), which he called on rather than the notion of perfection used by Aristotle and Avicenna ((Wisnovsky, 2010) 259, 264). What I have to say goes to how Kātibī implemented the program which seeks to present logic as a science.

Conversion of a proposition is defined thus:

> TEXT 6: Conversion with unchanged terms consists of placing the first part of the proposition second and the second part first, with the truth and quality remaining in the converse as they were in the convertend. (§73)

The proofs that are given for conversions are of three kinds (see §79), but the most common method is by way of "the proof Avicenna was satisfied with", which is a proof method adopted by Fārābī but first used by Alexander. The first of the proofs given:

TEXT 7: The negative absolute necessity and absolute perpetuity e-propositions[12] both convert as a universal perpetuity e-propositions, because if it is of necessity, or always, true, "No J is B", then always, "no B is J"; otherwise, "Some B is once J", and this, together with the original proposition, would produce "Some B is not possibly B" in necessity propositions, and "Some B is never B" in perpetuity propositions; this is absurd. (§75)

I set out the proof for one of these conversions (of the perpetuity e-proposition) a little more clearly. Bear in mind that contradictories have been defined earlier, §69:

1. no J is ever B (to be converted)
2. not (no B is ever J) (assumed)
3. some B is at least once J (=2)
4. some B is never B (3, 1 by Ferio AXA, absurd)

So the original assumption that led to the absurdity, step 2, has to be rejected; and thus we know that "no J is ever B" converts to "no B is ever J." Let us dwell on what leads to step 4, the syllogism "some B is at least once J", "no J is ever B", therefore "some B is never B." This is taken to be self-evident. It is easier to contemplate with three terms:

FERIO AXA
1. some J is at least once B (premise)
2. no B is ever A (premise)
3. some J is never A (conclusion)

Expanded further according to the readings for externalist propositions (see Text 12 in section 4 below), we have: "something that is at least once J is at least once B", and "whatever is at least once B is never A", therefore "something that is at least once J is never A." Kātibī took Ferio AXA to be self-evident.

Here is the second proof in this section of the *Shamsiyya*.

12. I omit a list of Kātibī's propositional types; the reader should consult (Rescher, 1974) and (for the Arabic terms) (Street, 2000). Kātibī's examples (§52): "no man is possibly a stone" (absolute necessity e-proposition), "no man is ever a stone" (absolute perpetuity e-proposition).

TEXT 8: The negative general conditioned and the general conventional[13] convert as a universal general conventional, because if it is of necessity, or perpetually, true, "No J is B as long as it is J", then "No B is ever J as long as it is B"; otherwise, "Some B is J while B", and this with the original proposition produces "Some B is not B while B"; this is absurd. (§76)

The argument here goes like this (and this time I single out the general conditioned proposition, which converts as a general conventional proposition; for the scope of "while B", see footnotes 13 and 14):

1. no J is possibly B as long as it is J (convertend)
2. not (no B is ever J as long as it is B) (assumed)
3. some B is at least once J while B (=2)
4. some B is not always B while B (3, 1 by Ferio AwXwXw; absurd)

Obviously, this is also a reductio proof, but the syllogism called on is:

FERIO AWXWXW[14]
1. some J is at least once B while J (premise)
2. no B is possibly A as long as it is B (premise)
3. some J is not always A while J (conclusion)

Expanded once again according to the truth-conditions of the propositions, we have: "something that is at least once J is at least once B while J", and "whatever is at least once B is not possibly A as long as it is B", therefore "something that is at least once J is not always A while J." An example at this point may help: "Some afflicted with pleurisy sometimes cough while afflicted", "no one coughing is possibly silent as long as he is coughing", therefore "some afflicted with pleurisy are not always silent while afflicted." (The minor premise is one of Kātibī's examples (§69); I hope he would accept the major.)

13. Kātibī's examples (§52): "no writer possibly keeps his fingers still as long as he writes" (general conditioned e-proposition); "no writer ever keeps his fingers still as long as he writes" (general conventional e-proposition). The scope of the "as long as" clause is clear from these examples.

14. I use the "w" next to the capital letter to signify that the premise is read with a condition on the subject, "as long as the subject is described with what it is described by." The minor (premise 1) is what Rescher translates as the "absolute continuing" (Rescher, 1974), also with the temporal condition on the subject.

Have we at this point taken what is to be proved back to first principles, back to what in Text 3 above is referred to as "technical terms... primary propositions... and lines of theoretical investigation which are such that one does not fall into error concerning them"? The conditions for first-figure productivity with respect to modality (§§98&99) do not mention the proposition which is the minor premise (in premise 1 above, a *ḥīniyya muṭlaqa*); the proposition isn't even among those investigated in the *Shamsiyya* (§§51–59, though it does come up in §69 as the contradictory of the general conventional). So is Ferio AwXwXw a line of investigation safe from error? Is it self-evidently productive? Kātibī's definitions of "self-evidence" need to be considered in answering this question.

Kātibī's notion of self-evidence is never defined in the *Shamsiyya* for syllogisms, but rather as something which is said of implicates. In a science, the subjects of the science are examined in light of the principles of the science, and essential accidents (necessary but non-constitutive properties) are proved to belong to those subjects. That some of these non-constitutive properties belong to their subjects is immediately evident (for example, that a triangle has three angles); the immediately obvious propositions recording these facts can be pressed into service along with the other principles to prove further, non-evident, essential accidents belong to the subjects (for example, that a triangle has internal angles summing to two right angles). The subjects are implicants of their properties, the properties are their implicates. The non-evident implicates call on an intermediate consideration — a middle — which makes it evident that they belong.

> TEXT 9: The implicate of the quiddity... is either evident, such that its conception along with the conception of its implicant is sufficient for the mind to declare an implication between the two (like divisibility into two equal parts for four); or it is not evident, such that it needs a middle for the mind to declare that there is an implication between the two (like three angles summing to two right angles for triangle). "Evident" may also be said of an implicate whose conception follows from the conception of its implicant; the first definition is the weaker. (§22)

The strong sense of evident implicate has the requirement:

> Given the conception of P, the mind can see without a middle that Q is an implicate of P.

On the other hand, by Kātibī's weak sense of evident implicate, we have:

> Given the conception of P and the conception of Q, the mind can see without a middle that Q is an implicate of P.

Kātibī, and Khūnajī for that matter ((Khūnajī, 2010) 33.14–33.16), call on the weaker notion of self-evidence. In saying first-figure syllogisms are self-evidently productive, it would seem that Kātibī takes the syllogisms to be the two premises, which imply (are implicant of) the conclusion (the implicate of the syllogism) (§88).[15] In the case of Ferio AwXwXw, then, that the conclusion follows is self-evident only in the weaker sense. Kātibī was not claiming that, given the two premises, it is evident that the conclusion follows. He was only claiming that — having tested various conclusions by trial and error — given both the premises, a putative conclusion and the truth-conditions of the propositions, it is evident that the conclusion follows.

4– The Subject Term

In what follows, I look in detail at a discussion which shows how much Kātibī was drawing on a contemporary debate involving Khūnajī, Ṭūsī and Abharī — in short, the logicians in conversation with whom Kātibī developed his logic. It is possible to reconstruct in quite precise stages the way the arguments about the subject term unfolded, and this reconstruction serves to highlight how directly responsive the *Shamsiyya* was to current logical debates (and also to show that it was likely written after 1265).

All the categorical propositions treated in Kātibī's logic have a subject term which is understood in one of two ways.

> Text 10: Our statement "every J is B" is used occasionally according to the essence, and its meaning is that everything which, were it to exist, would be a J (taken from among possible items) would be, in so far as it were to exist, a B; that is, everything that is an implicant of J is an implicant of B. And occasionally it is used according to external existence, and its meaning is that every J externally, whether at the time of the judgment or before it or after it, is B externally.

15. Ṭūsī speaks of syllogistic proofs as proofs of the reasoned fact, which supports this line of speculation. (Ṭūsī, 1971a) 391.17 needs to be corrected against Or. 10901, 75r.4, to read *bayānāt limmiyya* rather than *bayānāt thalātha*.

The distinction between the two considerations is clear. Were there no squares in external existence it would be true to say "every square is a figure" under the first consideration and not the second; and were there no figures in external existence other than squares, it would be correct to say "every figure is a square" under the second consideration but not the first.

On this basis, assess the remaining quantified propositions. (§§45–47)

The first way of taking the subject term allows a proposition to be true without referring to anything which actually exists. This probably fits Avicenna's truth-conditions for propositions better than the second way, and readers of Avicenna have explored versions of the essentialist reading as a way to make sense of his syllogistic.[16] What matters for present purposes, however, is a lively debate which is not concerned with the interpretation of Avicenna, but with difficulties in referring to non-existent subjects.

Before I consider this debate, two matters deserve attention. The first has to do with the curious terms used to refer to readings of the subject term, which are explained by Taḥtānī:

TEXT 11: "Every J is B" is considered at times according to the essence (whereupon it's called "essentialist", as though [the subject] is an essence in a proposition used in the sciences), and at other times according to external reality (whereupon it's called "externalist", and what is meant by "external" is what is external to the senses). ((Taḥtānī, 1948) 94.6–94.8)

The second is how the externalist reading is to be understood. Taḥtānī explains:

TEXT 12: What is meant by the second, [the externalist reading], is that every J externally is B externally; and the judgment in it is on the externally existent, whether its being described as J is at the time of the judgment or before it or after it (because what never exists externally cannot be B externally).

It is said "whether at the time of the judgment or before it or after it" just to dispel the impression of someone who supposes that the meaning of "J is B" is describing the J with B-ness at the time it is described with J-ness. For indeed the judgment on it is not linked to the description of J such that it must be realized externally at the time of the realization of the judgment; rather it is on the substance of J, and the judgment only

16. After Khūnajī (see Texts 14 and 15 below) the interpretive use of the distinction had to be reclaimed; (Ahmed, 2010) and (Ahmed, 2011) offer important material for a treatment of the distinction, which I glance at below. Everything I have written myself on the distinction to date fails to distinguish the — at least three — different ways the distinction was developed.

claims its existence [at some time or other]. The description of the subject with J-ness need not be realized at the same time as what realizes the judgment [with B]. If we say "every writer is a laugher", it is not among the conditions of the substance of the writer being subject that it be writing at the moment of being described with laughter; rather it is enough for this proposition that the subject be described with being a writer at a given time. In the same way our statement "every sleeper wakes" is true if the substance of the sleeper is described with two descriptions, even though at two different times. ((Taḥtānī, 1948) 95.pu–96.7)

The essentialist reading

In an affirmative proposition like "every triangle is a figure", do I intend the proposition to refer only to triangles that exist in external reality? If I do, then when there happen to be no actual triangles, it is true under the same understanding of the subject term to say "no triangle is a figure", and "no triangle has internal angles summing to two right angles." Alternatively, the subject of the proposition could be taken to refer to things which exist in the mind, like perfect geometric figures, whereupon the last two propositions would be false. Finally, when entertaining claims which turn out to be false, the subject might be taken to refer things which are in some way impossible. Before the Maragha period, it had been common to assume that a subject term could refer to external reality, intelligible reality, and the impossible. Ṭūsī wrote while still in Alamut:

TEXT 13: What we mean by the existence of the subject of an affirmative proposition is not only its existence in external reality, because in the sciences we make affirmative judgments of intelligible subjects even though we don't know whether or not they exist in external reality (just as we say, "the icosahedron is such and such"). Nor is its existence only in the intellect, because we also make judgments of external existents, about both the perpetual of existence and the non-perpetual of existence. What we mean by the existence of the subject, rather, is an existence more general than the external and the mental.

Moreover, affirmative judgments may be made of non-existent subjects like the vacuum and the atom. Such a judgment is either in a negative sense, as in "the void is impossible of existence", or [the subject is] assumed to exist at the time of the judgment in the way claimed by those who hold it to exist, as in "the vacuum is an immaterial dimension", and "the atom is a holder of a position", and so forth. ((Ṭūsī, 2004) 110.6–13)

Even while Ṭūsī was rehearsing these loose provisions as to how the subject term should be taken, Khūnajī was forging an entirely different approach. Adopting existing terms and formulations, which he however developed in ways unforeseen by those who first

instigated them, he traced inferences from proposition with impossible subjects. He formulated the essentialist reading thus:

> Text 14: We mean by the second not everything that has entered existence, but rather everything which would be a J, were it to exist, (and that it would be a B, in so far as it were to exist). ((Khūnajī, 2010) 84.14–84.15)

From this point on, to the best of my knowledge, Khūnajī's investigations into the essentialist reading are without precedent. This becomes clear from the moment he started to investigate how propositions with essentialist readings of the subject term contribute to inferences. Everyone — Khūnajī, Abharī, Ṭūsī, Kātibī — agreed with Avicenna that an actualist e-proposition in the externalist reading does not convert like an assertoric e-proposition in Aristotle's syllogistic. The counter-example, "no man is always laughing", disproves the conversion, because "no laughing is always a man" is false; the substances of which the term "laughing" has at least once been true are necessarily men. But for Khūnajī, the counter-example only has force if the subject term is taken in the externalist reading.

Taken in Khūnajī's essentialist reading, however, "no J is always B" converts to a perpetuity o-proposition, "some B is never J." To show this is so, Khūnajī had to offer a proof for the conversion, then resist counter-examples to it. I offer a schematic presentation of his proof ((Khūnajī, 2010) 129.4–129.13).

> No J is always B converts to some B is never J:
> 1. No J is always B
> 2. every always-B is at least once B (self-evident)
> 3. no always-B is ever J (see below)
> 4. some B is never J (Felapton, 2 and 3)
>
> Proof for 3 in proof above:
> 5. not (no always-B is ever J) (assumption)
> 6. some always-B is at least once J (=5)
> 7. some always-B is not always B (Ferio, 6 and 1; absurd)

Khūnajī then dealt with counter-examples.

> Text 15: They argue conversion fails for these propositions because it is true, "no moon is eclipsed"... and "no animal is breathing"... yet [130] their converses are not true, namely, "some eclipsed is not a moon", and "some breathing is not animal" ...

> The answer to this is that we reject that "some eclipsed is not a moon" and similar statements are false if the subject is taken according to the essentialist reading. This is because, in this case, its meaning is some of what would be eclipsed, were it to come to exist, would not be a moon, in so far as it had come to exist. [The claim this is false] is to be rejected; the most that can be said in this matter is that every eclipsed that has come to exist is a moon, but from this it does not follow that it is true that everything that is eclipsed, were it to come to exist, would be a moon in so far as it comes to exist. This is because [the proposition with an essentialist subject] deals with actual, possible and impossible items [that come under the subject term]. Were we to stipulate the possibility [of these items] along with [the other stipulations], their status would be that of externally existent things. So the eclipsed-which-is-not-a-moon, even though it is impossible, is among those individuals which would be eclipsed, were they to come to exist, even though it is not necessary that any would be a moon if they came to exist.
>
> Overall, if these propositions are taken in the essentialist reading, the proof we have given for their conversion works, the counter-arguments are not compelling, and the proper view must be that the conversion is correct. ((Khūnajī, 2010) 129.14–130.12)

What this means for the counter-example considered before, "no man is always laughing", is that it will convert on this account to "some laughing is not ever a man." This is because we may, under Khūnajī's essentialist reading, posit the impossible "laughing-which-is-not-a-man."

The next stages in the refinement of the essentialist reading prior to its inclusion in the *Shamsiyya* involve Abharī and then Ṭūsī. (I defer an account of the arguments themselves to Text 16 below.) In the *Revelation of Thoughts*, Abharī took up Khūnajī's understanding of the essentialist reading (though without noting that it is Khūnajī's), and investigated further its consequences ((Ṭūsī, 1971b) 161–162); the upshot of his further investigation shows that the e-proposition can never be true on the essentialist reading. Some time after Abharī's death (c. 1265), Ṭūsī came across a copy of *Revelation*, and wrote a critique of it. On this point, among many other criticisms (Ṭūsī would have preferred to abandon the externalist-essentialist distinction altogether), Ṭūsī argued that Abharī had not gone far enough in his critique, and showed that not only will the e-proposition never be true, nor will the a-proposition ((Ṭūsī, 1971b) 163).

Kātibī accepted the validity of the further inferences from Khūnajī's reading made by Abharī and Ṭūsī, which is why he specifically limited the items under an essentialist subject

to "possible items" (or, perhaps better, "self-consistent items"). Taḥtānī set out the arguments (still making no mention of Khūnajī by name):

> TEXT 16: Kātibī only restricted the items to the possible because, were the items left unrestricted, no universal proposition would ever be true. Take the affirmative: Were it to be said, "every J is B" on this reading, we would say that this isn't the case. That is because J-which-is-not-B, were it to exist, would be J and not B, so some of that which, were it to exist, would be J, would be, in so far as it were to exist, not B. But this contradicts "every J is B" on this reading...
>
> [95.3] Now take the negative: Were it to be said, "no J is B", we say it is false. That is because J-which-is-B, were it to exist, would be a J and a B, so some of that which, were it to exist, would be a J, would be, in so far as it were to exist, a B. But this contradicts the claim that nothing which, were it to exist, would be a J, would be, in so far as it were to exist, a B.
>
> When Kātibī restricted the subject term by possibility, he drove off this line of objection. ((Taḥtānī, 1948) 94.12–95.6)

Recall that in his argument against the counter-example in Text 15 above, Khūnajī made the following claim:

> This is because [the proposition with an essentialist subject] deals with actual, possible and impossible individuals [that come under the subject term]. Were we to stipulate the possibility [of these individuals] along with [the other stipulations], their status would be that of externally existent things.

I take it that Kātibī accepted that this is true: if the subject term is limited in the essentialist reading to self-consistent items, the status of propositions with an essentialist subject will be that of propositions with an externalist subject. Further, I take it that to have the same "status" means that all and only the inferences that can be drawn from one or more externalist propositions can be drawn with equal validity from the corresponding essentialist propositions.[17]

17. In *Jāmiʿ al-Daqāʾiq* (British Library Or. 11201), at 61r.1, Kātibī states that limiting essentialist subjects to self-consistent items blocks Khūnajī's proof; that is a necessary preliminary to the stronger claim I am assuming he accepted. I have not examined Kātibī's commentary on *Disclosure*, and it may settle the question. However, (Ahmed, 2011) presents the arguments of an 18th-century logician who effectively comes to a similar conclusion; see section IV and the translated text.

"Taken from among possible items", then, is a rider added to the formulation of the essentialist reading to block Khūnajī's line of reasoning. What about "every implicant of J is an implicant of B", presented as a gloss on "everything which, were it to exist" and so forth? Its explanation allows us to see that Taḥtānī was not simply a faithful commentator, but had his own logical program. The essentialist reading considers an underlying substance, and posits that "if it were to exist, then it would be J." Is this "if" strong (in this tradition, an implicative) or weak? In other words, is it that the underlying substance is inseparable from J, or merely compatible with it?

> TEXT 17: Khūnajī and his followers interpreted it as implicative, so they say that the meaning of "everything which were it to exist would be J would be in so far as it were to exist a B" is that everything that is the implicant of J is the implicant of B.[18]

Taḥtānī strongly — and rightly — disagreed; this reading would exclude most propositions from logical analysis, except for those with subject- and predicate-descriptions which are implicates of the substance underlying the subject.

In summary: The *Shamsiyya* provides us with a way to construct propositions which refer to things in the world, and another way to construct them to refer to a domain of things, not all of which are instantiated. The *Shamsiyya* does not specify which of the two readings it investigates because — I believe — the investigation applies to both. There is no longer any way to construct propositions along the lines of "the vacuum is an immaterial dimension", and Taḥtānī resigned himself to this philosophically:

> TEXT 18: It is not to be levelled as a criticism that, because the craft should have general rules, there are propositions that cannot be taken under either of these two considerations (namely, those whose subjects are impossible, as in "the co-creator is impossible", and "every impossible is non-existent"). Because we say: No one claims to limit all propositions to the essentialist and the externalist. They do however claim that propositions used in the sciences are used for the most part under one of these two considerations, so they therefore set these readings down and extract their qualifications so they may thereby benefit in the sciences. The qualifications of the

18. (Taḥtānī, 1948) 95.12–95.13. I think Taḥtānī has arrived at this neat criticism by way of responding to Urmawī, at least, if I understand the argument analysed in (Ahmed, 2010) section 1 correctly. I cannot find Khūnajī using the phrase, "every implicant" etc, but Abharī and Kātibī — his "followers" — do make frequent use of it.

propositions that cannot be taken under either of these two considerations are not yet known; the generalization of rules is only to the extent of human capacity. ((Taḥtānī, 1948) 95.pu–96.11)

5– After Kātibī

The *Shamsiyya* was warmly received among readers of vivid reputation. It had been used for teaching during Kātibī's lifetime, and one of its earliest readers, al-ʿAllāma al-Ḥillī (d. 1325), wrote the first commentary on it, *Clear Rules in Commentary on the Epistle for Shams al-Dīn* (Ḥillī, 1432). A manuscript of this text survives from 1280 ((Schmidtke, 2012) 205), which means Ḥillī must have written it while Kātibī was still alive, or soon after he died. It is a commentary which is often critical of Kātibī's project. In his later commentary on Ṭūsī's *Tajrīd*, however, Ḥillī quietly adopted much of the logical doctrine of the *Shamsiyya*.

The next commentary to be written on the *Shamsiyya* was the one we are concerned with, by Ḥillī's student Taḥtānī, finished in 1329 ((Schmidtke, 2012) 205). Taḥtānī unpacked the tightly-folded pronouncements of the *Shamsiyya*, and from time to time corrected its mistakes. Taḥtānī was far from a slavish commentator, and shifted the focus of study slightly away from Kātibī's interests. If we compare how Taḥtānī's commentary tracks against the treatment in the *Shamsiyya*, we find that the first 37 lemmata of the *Shamsiyya's* 120 take up roughly half the commentary, the last 33 lemmata less than a quarter. Even by Taḥtānī's day there was a tendency to concentrate on the front matter of the *Shamsiyya*; that tendency only strengthened with the passage of time.

Taḥtānī's commentary became famous in its own right; as noted above, it has been superglossed more than the *Shamsiyya* has been glossed. It was also mined by other commentators on the *Shamsiyya*, notably by Saʿd al-Dīn Taftāzānī (d. 1390); Taftāzānī also made use of Kātibī's major treatise on logic, *Summa of Subtle Points*. Although Taḥtānī's commentary is historically more important for the way logicians have understood the *Shamsiyya*, the massive number of higher-level commentaries written on — many more than those on Taftāzānī's commentary — tend to make it seem even more influential relative to Taftāzānī's than it really was.

I would merely be recapitulating work by Wisnovsky and Schmidtke in tracking the myriad of commentaries on the *Shamsiyya* ((Wisnovsky, 2004), (Schmidtke, 2012)). Instead, I trace in outline the western reception of the *Shamsiyya*. This came about by way of the Indian logical tradition, one of the most important regional traditions of Arabic logic ((Ahmed, 2012); I use especially Stage One and Tree I). It is said — though it has the whiff of legend about it — that a number of Taḥtānī's direct disciples settled in India, and until the end of the fifteenth century, Taḥtānī's commentary on the *Shamsiyya* was the only logic work read in the region. Perhaps it was the only work on the formal curriculum, which would not exclude the reading of other texts in less formal settings. Even by the beginning of the sixteenth century, when distinct traditions of logic teaching had crystallized, the *Shamsiyya* featured prominently. The British found it firmly positioned in the teaching curriculum when they arrived, and came to regard it as so culturally important that it was printed, along with Taḥtānī's commentary, at Fort William in 1815 (Taḥtānī, 1815). Fifty years later, working in India, Aloys Sprenger edited and partly translated the *Shamsiyya* (without the commentary); in this form, it was to become the foundational text for the western study of the history of Arabic logic (Sprenger, 1862).

The main significance of the Sprenger translation was that, one hundred years later, it attracted the attention of the logician Nicholas Rescher. Sprenger had excused himself from translating the more complicated modal sections of the *Shamsiyya*, saying that modal logic was no longer taught in Indian schools; but what he had translated was enough to show that something interesting was being investigated. Rescher translated what Sprenger had omitted, and offered a partial analysis of the system. He did this a number of times (at least four that I know of), beginning in 1967 and ending in 1975. The early efforts were dogged by a mistranslation of a difficult lemma (§91) (Rescher, 1967). But his cousin, the famous Orientalist Oskar Rescher, had made him aware of an extraordinary little text written by Muḥammad ibn Fayḍallāh al-Shirwānī (d. 1707),[19] which was bought from Oskar Rescher by the British Museum in the late 50s (now in the British Library as codex Or. 12405). Or. 12405 presents the same system we find in the *Shamsiyya*, with much fuller

19. A scholar identified by Khaled El-Rouayheb.

explanations. It enabled Nicholas Rescher to correct his translation of §91 along with other errors, and to offer a semantics for the system in modalized predicate calculus (Rescher, 1974).

I would like to end this essay by drawing attention to an irony in the reception of Kātibī's logic, and its interplay with the reception of Avicenna's logic. An eighteenth-century Ottoman logician, Muḥammad b. ʿAbdallāh al-Āmidī, with a floruit of 1761, was so famed for his work on syllogistic that he was given the nickname, "Syllogism." He was, clearly, primarily a logician, and by the time he took up his pen, the reading of Avicenna's original texts must have been mainly an antiquarian pursuit. In any event, by that time, the reading of the *Shamsiyya* and the texts influenced by it had completely overshadowed Avicenna's logic; Āmidī claimed to be writing on Avicenna's logic, but in fact, he was writing on Kātibī's.[20]

The *Shamsiyya* is a true classic, not merely because it has been taken by Muslims over the centuries to have a non-negotiable role in the formation of a cultured mind. It projects a moment when a number of gifted logicians shared a vision of the field and its major problems; they had at their disposal a fully developed technical language; they felt a sense of urgency to give a clear exposition of logic, not just as a science, but as an instrument for all the sciences. Many of these factors — maturity, language, urgency — are precisely the pre-conditions for the production of a classic in the larger, Eliotic sense of the word. In this case, the conditions were met because of the nature of the Maragha community, the discourse it fostered, and the scholars it trained. Not without flaws, the *Shamsiyya* exercises its fascination by way of the energy it still conveys of debates underway even while Kātibī was writing: the logical discussions of the late 1260s in Maragha, crystallized as a paradigm for engagement with an evolving discipline.

20. (Ahmed, 2011) 352. See footnote 17 above; I agree with Āmidī's understanding of the essentialist reading.

ACKNOWLEDGEMENTS: I am grateful to Riccardo Strobino, Khaled El-Rouayheb and especially Paul Thom for various helpful suggestions, not all of which I have adopted; I have been most torn about allowing the third section's depiction of Kātibī's logic as psychologistic to stand, but I believe it is true to Kātibī. I am indebted to Ahmed al-Rahim, who allowed me to see parts of his forthcoming (2014) book, *The Creation of Philosophical Tradition: Biography and the Reception of Avicenna's Philosophy from the Eleventh to the Fourteenth Centuries C.E.*, Diskurse der Arabistik (Wiesbaden: Otto Harrassowitz); this has allowed me to correct claims about Kātibī's death date, his travels, where he taught Ḥillī, and various other matters. Last, and never least, thanks to Joep Lameer, who obtained for me a copy of the 1280 manuscript of Ḥillī's commentary, and of Ḥ. Tabrīziyān's valuable edition; it is only in light of Ḥillī's commentary that we can appreciate how fraught the *Shamsiyya's* reception into the canon was.

Contents of the *Shamsiyya*

Concordance

A concordance among (Taḥtānī, 1948; Taḥtānī, 1948) (Q), (Sprenger, 1862) both Arabic (K) and English (S), and (Rescher, 1967) (R). I cite the page-numbers for Sprenger from the Hodges' transcription, which is more easily obtainable than the original:
e.g. at https://cambridge.academia.edu/TonyStreet

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§83	134,10	19, §70		72/70
§84	135,21	19, §71		73/71
§85	136,9	19, §72		74/72
§86	137,1			
§87	138,1	20, §73	25, §75	
§88	138,29	20, §74	26, §76	
§89	140,8	20, §75	26, §77	
§90	141,1	20, §76	26, §78	

§91	141,25	21, §77	26, §79	
§92	143,11	21, §78	27, §80	
§93	143,28			
§94	145,4	21, §79	28, §81	
§95	146,23	22, §80	29, §82	
§96	148,7			
§97	149,10		30, §83	
§98	149,23	23, §81		83/81
§99	150,2			
§100	151,25	23, §82		84/82
§101	152,27			
§102	154,13	23, §83		85/83
§103	155,13	23, §84		86/84
§104	156,23			
§105	160,1	24, §85	30, §87	
§106	160,25	24, §86	30, §88	
§107	161,9	24, §88	30, §89	
§108	161,21	25, §88	31, §90	
§109	162,12	25, §89	31, §91	
§110	163,6	25, §90	32, §92	
§111	164,5			
§112	164,25	26, §91	33, §93	
§113	165,5	26, §92	33, §94	
§114	165,15	26, §93	33, §95	

§115	166,3	26, §94	34, §96	
§116	166,21	27, §95	34, §97	
§117	167,23			
§118	168,4	27, §96	35, §98	
§119	169,17	28, §97	36, §99	
§120	170,11	29, §98	37, §100	

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