REVUE DE THÉOLOGIE ET DE PHILOSOPHIE, 153 (2021), P. 269-290

THE STRUCTURE OF KNOWLEDGE

Al-Fārābī, Avicenna, and the Classification of the Sciences

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Abstract

Medieval architectures of knowledge designed in the Islamic world constitute a special case: They neatly reflect the competition between different intellectual traditions and approaches. On the one hand, there are those classifications that are centered on what was perceived as the indigenous sciences during the formative period, i.e. those sciences that arose in connection with the new religion, Islam, and the language of its revelation, Arabic. On the other hand, scholars eagerly took over and adapted disciplines deriving from non-Arab and non-Muslim cultures, primarily Greek science and philosophy. These traditions, however, transmitted their own conceptions of knowledge that partly stood in conflict with Arabic-Islamic ideas. In this article, I first give an overview of the various approaches and then concentrate on Fārābī and Avicenna, in order to trace a remarkable development: the gradual dissolution of boundaries both within and between the different scientific spheres and paradigms on epistemological grounds.

1. Science in Arabic

For someone interested in architectures of knowledge and their histories, the emerging Islamic intellectual culture offers an intriguing object of study. With the immense conquests that occurred during the first century and a half of Islam (ca. 630-750),[1] a new player appeared on the scene of the Hellenized world (and beyond), namely the Arabs, who self-consciously brought with them a new monotheistic religion, Islam, and a language, Arabic, which before this point had no record as a language of science, but which was the medium of the Quranic revelation. As they spread East towards India and West towards the Maghreb and the Iberian Peninsula, the Arabs encountered not one, but several peoples who looked back on venerable scholarly traditions,

[1] All dates are CE.

DOI : 10.47421/rthph153_3_269-290

ranging from Indian mathematics, through Persian literature, to Greek philosophy.[2] Accordingly, if there ever was something like an Arab-Muslim identity, it was soon challenged by numerous "foreign" factors on basically every cultural level: religion, language, administration, customs and rites, scientific heritage, etc. This peculiar constellation, which – with regard to the intellectual atmosphere – might best be described as a marketplace of competing ideas and worldviews, with all sorts of ensuing rivalries and struggles for supremacy, reverberates in many sources from the formative period of Islamic thought (ca. 800-1100). It left its traces not only in proto-nationalist movements like the *shuʿūbiyya*,[3] but also in the development and reception of scientific disciplines, as well as both attacks on and defenses of these disciplines. Hence, it is hardly surprising that, during this period, various literary genres explicitly distinguishing between individual sciences and reflecting on their interrelations flourished.

While I intend to give some idea of this multiplicity of views and concepts, my primary focus will be on a specific group within this tangle of contending positions, namely the *falāsifa*, who, as their name betrays, were the adherents of the philosophical schools associated with Greek *philosophia*[4] – and particularly Abū Naṣr al-Fārābī (d. 950) and Abū ʿAlī ibn Sīnā (d. 1037), known as "Avicenna" in the Latin Middle Ages. This approach allows us to kill two birds with one stone. On the one hand, it permits us to establish a historical link between ancient Greek divisions of the sciences and the medieval Latin models devised during the scholastic period, thus contributing to the comprehensiveness of the overview intended by the papers gathered in this volume. On the other hand, this focus gives us the opportunity to address a major development within Arabic-Islamic intellectual culture itself, a development, that has largely been ignored outside a small circle of specialists, namely the integration of the line of *falsafa* represented by Fārābī and Avicenna into the *madrasa*s, the schools of higher learning.[5] Hence, with this focus we

[2] Besides general historical overviews, see, with a focus on intellectual history, state ideology, and the particular influence of Greek sciences and philosophy, Dimitri Gutas, *Greek Thought, Arabic Culture*, London, Routledge, 1998.

[3] On the *shuʿūbiyya*, "a movement within the early Muslim society which denied any privileged position of the Arabs," thus reacting to the counter-movement, Arab supremacy (on the basis of language and religion), see Suzanne Enderwitz, "*al-Shuʿūbiyya*," *in*: P. Bearman et al. (eds.), *Encyclopaedia of Islam, Second Edition*, http://dx.doi.org/10.1163/1573-3912_islam_SIM_6997, consulted online on 27 June 2019, from which the quotation is taken.

[4] Accordingly, in what follows I will use the following terms: *falsafa* for the approach; *faylasūf*, pl. *falāsifa* for the practitioners of *falsafa*.

[5] For the *madrasa*s, see J. Pedersen et al., "*Madrasa*," *in*: *Encyclopaedia of Islam, Second Edition*, *op. cit*., http://dx.doi.org/10.1163/1573-3912_islam_COM_0610, consulted online on 27 June 2019, particularly part I ("The institution in the Arabic, Persian and Turkish lands").

will be able, first, to trace the conceptual and, as a consequence, structural transformations that took place within a single field, *falsafa*, during the above-mentioned formative period. Second, this particular example offers insight into an intriguing trans-disciplinary process: the dissolution of boundaries between formerly distinct epistemic spheres, namely *falsafa*, as a major representative of the "foreign" sciences, and the "indigenous" religious or traditional disciplines taught at the *madrasa*s, particularly theology (*kalām*).[6]

2. Contending Ideas and Principles

Written evidence of scientific activities emerges gradually over the course of the eighth century. While the sources lay claim to oral traditions constituting the presumed roots of the respective disciplines, it is during the ninth and tenth centuries that the first sciences began to take clearer shape and to consolidate. Among these disciplines – all of which were closely linked with the new religion and its medium, the Arabic language – we find Quranic exegesis (*tafsīr*), linguistics (*naḥw* and *lugha*), law (*fiqh* and *uṣūl al-fiqh*), and theology (*kalām*), soon to be followed by history (*taʾrīkh*) and *ḥadīth*, that is the transmission of the Prophet Muhammad's sayings.[7] In connection with the quest for identity alluded to above, these disciplines were conceived of as the embodiment of an intrinsic Arab-Muslim intellectuality and distinguished – both in terms of subject matters and approaches – from those scientific fields that had been developed by and were associated with conquered peoples, such as the Greeks.

This is not to say that there was indifference towards or outright rejection of the cultural heritage of these peoples. Quite the opposite: As the translation of an immense number of scholarly texts into Arabic corroborates – a process that stretched over nearly two hundred years (ca. 800-1000) and required the concerted and persistent efforts of both patrons and scholars – there was tremendous interest.[8] Nonetheless, during

[6] This must be seen against the opposition adumbrated at the beginning of this paper between an Arab-Muslim identity (based on the Arabic language and Islam as the shared religion) and "foreign" elements, such as the cultural products of the recently conquered peoples (among which was the ancient Greek heritage with its particular strengths in the fields of science and philosophy).

[7] On the major scientific fields and their products, it is still useful to consult Wolfdietrich FISCHER, Helmut GÄTJE (eds), *Grundriss der arabischen Philologie*, 3 volumes, Wiesbaden, Reichert, 1982-1992. With a focus on probably the first disciplines to emerge, Quranic exegesis and philology, see Cornelis H. M. VERSTEEGH, *Arabic Grammar and Qurʾānic Exegesis in Early Islam*, Leiden/New York/Köln, Brill, 1993.

[8] The literature on the translation movement has, in the meantime, become abundant. Perhaps the most recent overview with substantial bibliographies is

most of the formative period the fields of knowledge transmitted via the translations were perceived as belonging to an intellectual sphere distinct from the set of linguistic-religious sciences mentioned above. It is this awareness that lies behind the major divide between "foreign" and "indigenous" disciplines characterizing the formative period – an ethnic divide, centered on the origin of the respective bodies of knowledge, that gradually gave way to an epistemic distinction between "traditional" and "rational" sciences that unfurled along the lines of modes of knowledge acquisition: through transmission versus through rational inquiry.

One example of this process, discussed in detail in previous scholarship, is furnished by the so-called "mixed" encyclopedias,[9] which offered an introduction into what was understood by their author to represent the whole gamut of the sciences and which was structured according to the various fields and their sub-disciplines. Thus, al-Khwārazmī (fl. ca. 975-987) divided his *Mafātīḥ al-ʿulūm* (*Keys of the Sciences*) into the "Arab sciences" and the "foreign sciences."[10] Each part is further subdivided: part one into law, theology (further subdivided into specific branches), grammar, writing, prose and poetry, and history (further subdivided into periods, as well as sections on the technical terminology employed in the different languages); part two into *falsafa* (with sections on the division of philosophy, definitions of the divine science [i.e., metaphysics], and technical terminology used in philosophy), logic (structured according to the *Organon*), medicine, arithmetic, geometry, astronomy, music, mechanics, and alchemy. Several centuries later, by contrast, the polymath Ibn Khaldūn (d. 1406) offered the following subdivision in his *Muqaddima* (*Introduction*)[11]: part one on the "traditional sciences," embracing the Quran, *ḥadīth* (Muhammad's sayings), theology, Sufism, and the interpretation of dreams; part two

Ulrich Rudolph, Rotraud Hansberger, Peter Adamson (eds), *Philosophy in the Islamic World, Volume 1: 8th-10th Centuries*, Leiden/Boston, Brill, 2017.

[9] This paragraph and the two classifications (al-Khwārazmī and Ibn Khaldūn) are based on Francis E. Peters, *Aristotle and the Arabs: The Aristotelian Tradition in Islam*, New York, New York University Press/London, University of London Press, 1968, p. 109-112. On the role of encyclopedias in the classical Islamic tradition, see Hans-Hinrich Biesterfeldt, "Medieval Arabic Encyclopedias of Science and Philosophy," *in*: Steven Harvey (ed.), *The Medieval Hebrew Encyclopedias of Science and Philosophy*, Boston, Kluwer Academic Publishers, 2000, p. 77-98; Id., "Arabisch-islamische Enzyklopädien: Formen und Funktionen," *in*: Christel Meier-Staubach (ed.), *Die Enzyklopädie im Wandel vom Hochmittelalter bis zur frühen Neuzeit*, Munich, Wilhelm Fink Verlag, 2002, p. 43-83.

[10] On Khwārazmī and the *Mafātīḥ*, see Sabra, A.I., "al-Khwārazmī," *in*: *Encyclopaedia of Islam, Second Edition*, *op. cit*., http://dx.doi.org/10.1163/1573-3912_islam_SIM_4207, consulted online on 27 June 2019.

[11] On Ibn Khaldūn and the *Muqaddima*, see Abdesselam Cheddadi, "Ibn Khaldūn, ʿAbd al-Raḥmān," *in*: Kate Fleet et al. (eds), *Encyclopaedia of Islam, THREE*, http://dx.doi.org/10.1163/1573-3912_ei3_COM_30943, consulted online on 27 June 2019.

on the "rational sciences," dedicated to logic, mathematics (split into the four disciplines of the quadrivium), physics, and metaphysics. The individual disciplines are, by and large, the same as in Khwārazmī, but now the line between the two primary groups is drawn in light of epistemic considerations and not origin.[12]

With the encyclopedias, we encounter an important source for the study of architectures of knowledge in the Arabic-Islamic world, not only during the formative period but also later on.[13] Besides the encyclopedias, however, there are other genres that shed light on the various classifications. Particularly prominent among these genres are the bio-bibliographical dictionaries which appear on the scene soon after the rise of Islam. What is notable about this type of historical writing is the fact that it concentrates *not* on political leaders (as chronicles do), but instead on scholars and scientific oeuvres.[14] Often these dictionaries are dedicated to the protagonists of only one discipline or one branch of knowledge; occasionally however they aspire to comprehensiveness. Whatever their scope, these dictionaries offer, in virtue of the arrangement of the biographies and lists of writings attributed to the individual scholars, their authors' notions of the structure underlying the field(s) they cover.

[12] An interesting, yet quite peculiar case is that of Ibn Farīghūn (fl. ca. 950) who arranged the survey of the sciences in his *Jawāmiʿ al-ʿulūm* (*Compendium of the Sciences*) in the form of a *tashjīr* (tree structure). It consists of eight sections dedicated to Arabic grammar, the encyclopedic learning of the state secretaries (*ādāb al-kātib*), ethics (both from Greek and Muslim traditions), politics, a miscellaneous section (e.g., on medicine, etiquette, duties), religious studies (*dīn*), issues related to the (foreign/rational) sciences (embracing, it would seem, questions linked to the *prolegomena* literature [see the next section of this study]; metaphysics and logic), occult sciences. As previous research has noted, Ibn Farīghūn's *Jawāmiʿ* "does not present a coherent system." Rather, it seems to be "an extreme example" of the attempt, observable among some groups of scholars during the formative period, to reconcile "between *ʾadab*, *dīn*, and *falsafa*," i.e., to transcend the prevailing dichotomic take on the sciences, see Hans-Hinrich Biesterfeldt, "Ibn Farīġūn's Chapter on Arabic Grammar in his *Compendium of the Sciences*," *in*: Kees (=C.H.M.) Versteegh, Michael G. Carter (eds), *Studies in the History of Arabic Grammar II: Proceedings of the 2nd Symposium on the History of Arabic Grammar, Nijmegen, 27 April-1 May 1987*, Amsterdam/Philadelphia, John Benjamins Publishing Company, 1990, p. 49-56, here 50-51, the quotations 51.

[13] On the conception(s) underlying these encyclopedias, see Josef van Ess, "Encyclopædic Activities in the Islamic World: A Few Questions, and No Answers," *in*: Gerhard Endress (ed.), *Organizing Knowledge: Encyclopædic Activities in the Pre-Eighteenth Century Islamic World*, Leiden/Boston, Brill, 2006, 3-19; H.-H. Biesterfeldt, "Medieval Arabic Encyclopedias," *art. cit.*; Id., "Arabisch-islamische Enzyklopädien", *art. cit*.

[14] For this rich and pluriform genre, see Wadad al-Qadi, "Biographical Dictionaries as the Scholars' Alternative History of the Muslim Community," *in*: G. Endress (ed.), *Organizing Knowledge*, *op. cit.*, p. 23-75.

An early and especially instructive example of this kind is the *Fihrist* (*Index*) of Ibn al-Nadīm (d. 990), a bookseller in Baghdad who compiled a list of the books he had in stock, supplemented with short biographies of their authors and organized according to the scholarly fields with which they were associated.[15] The overall structure of this work resembles that of Khwārazmī's *Mafātīḥ*: Ibn al-Nadīm first (in units one to six) lists works associated with linguistic-religious disciplines – books on the holy scriptures (not only of the Muslims but also Jews and Christians);[16] linguistics; history; poetry; theology; and law and *ḥadīth* – and then (in units seven to ten) those devoted to "foreign" fields of study – philosophy and the sciences; magic, legends, and the like; non-monotheistic religious creeds; and alchemy. As this example but also Khwārazmī's *Mafātīḥ* and many other sources show, within less than a century *falsafa* and the sciences adopted primarily from the Greeks had become generally acknowledged vectors within the intellectual coordinate system, albeit vectors that belonged to a different scientific paradigm than the "indigenous" disciplines.

3. *Falāsifa* on the Sciences

Given its roots, it is unsurprising that *falsafa* was distinguished by a great deal of those features that already marked late ancient *philosophia*. As is now well known, the translation movement was by no means a homogenous process. As a consequence, *falsafa* itself is not a uniform field either, but encompasses several somewhat different approaches.[17] For the period primarily under consideration here, that is the late ninth to early eleventh centuries, the major factions were the Kindians (mid-ninth to late tenth centuries),[18] the Baghdad Aristotelians (early tenth to eleventh centuries, then given new life on the Iberian Peninsula in the eleventh to twelfth centuries),[19] and the so-called Brethren of Purity (dating uncertain,

[15] On Ibn al-Nadīm and the *Fihrist*, see Johann Wilhelm Fück, "Ibn al-Nadīm," *in*: *Encyclopaedia of Islam, Second Edition*, *op. cit*., http://dx.doi.org/10.1163/1573-3912_islam_SIM_3317, consulted online on 27 June 2019.

[16] Based on references in the Quran, often itself simply referred to as "the book" (*al-kitāb*), there is a distinction in Islam between "peoples of the book" and those who do not have such a book. Besides the Muslims themselves, Jews and Christians are considered to have such books, which is why they have a different, more privileged status in an Islamic context than members of other religions.

[17] Among more recent studies, this pluriformity of *falsafa* is particularly visible in *Philosophy in the Islamic World*, *op. cit*.

[18] On Kindī and his school, see chapters 4 (by G. Endress and P. Adamson) and 5 (by H.-H. Biesterfeldt, E. Wakelnig, G. Endress, and C. Ferrari) *in*: *Philosophy in the Islamic World*, *op. cit*.

[19] On the Baghdad Aristotelians, see chapter 7 (by G. Endress and C. Ferrari) *in*: *Philosophy in the Islamic World*, *op. cit*.

but probably the tenth century and beyond).[20] Regardless of their specific affiliations, however, the *falāsifa* of this era adopted several practices and literary genres common among their late-ancient predecessors, which are of particular interest to us. As heirs to the Alexandrian school of philosophy, the *falāsifa* – first and foremost, the Baghdad Aristotelians – studied the wisdom of the Greeks through the lens of the Alexandrian curriculum.[21] This had several conceptual consequences. For one, philosophy thus presented itself as a coherent body of knowledge, which could be identified with, basically, one particular philosopher's teachings, namely Aristotle's. Nonetheless, this body of knowledge was deemed to comprise all human knowledge, and it was to be studied in a thematic sequence that corresponded to the arrangement of books constituting the corpus of Aristotle's texts.

Obviously, these assumptions, crystallized in the curriculum determining and structuring the study of philosophy, already imply a certain architecture of knowledge. But this was not the only source of inspiration deriving from the Greek commentaries. Along with the curriculum and its core readings, the Baghdad Aristotelians adopted the late-ancient *prolegomena* literature, the place of reflection *par excellence* on the conceptual presuppositions of philosophy.[22] Thus, before beginning to reading and commenting on the first treatise of the curriculum – which was not a work by Aristotle, but rather Porphyry's *Eisagoge* (*Introduction*) to Aristotle's *Categories* – a late-ancient teacher would make a few introductory remarks on philosophy in general. In this connection, he would not only mention

[20] On the Brethren of Purity and their encyclopedia, see chapter 9, §4.2 (by D. DE SMET) *in*: *Philosophy in the Islamic World*. Beyond the Brethren and the two other *falsafa* "schools" mentioned before, there are further trends and thinkers, often difficult to categorize; see, for instance, the highly idiosyncratic philosopher Abū Bakr al-Rāzī (d. 925) in chapter 6 (by H. DAIBER) *in*: *Philosophy in the Islamic World*, *op. cit*.

[21] The Alexandrian curriculum was basically arranged according to Aristotle's corpus of writings, as (presumably) arranged by Andronicus of Rhodes in the first century BC. Accordingly, the sequence would be (1) the logical writings (the so-called "long" *Organon*, comprising not only the *Categories*, *On Interpretation*, *Prior* and *Posterior Analytics*, *Topics*, and *Sophistical Refutations*, but also the *Rhetoric* and *Poetics*; the *Organon* was preceded by Porphyry's *Eisagoge*); (2) theoretical philosophy (subdivided into physics, mathematics, and metaphysics, and further into their branches); and (3) practical philosophy (ethics, economics, politics). On the role of the Alexandrian curriculum for the Baghdad Aristotelians, see chapters 3 (by D. GUTAS) and 7 (by G. ENDRESS and C. FERRARI) *in*: *Philosophy in the Islamic World*, *op. cit.*; Dimitri GUTAS, "Hellenic Philosophy, Arabic and Syriac Reception of," forthcoming in the new edition of the *Oxford Classical Dictionary* (I would like to thank Dimitri Gutas for kindly sharing this article with me prior to publication).

[22] On the *prolegomena* literature, see Christel HEIN, *Definition und Einteilung der Philosophie: Von der spätantiken Einleitungsliteratur zur arabischen Enzyklopädie*, Frankfurt am Main et al., Lang, 1985; Jaap MANSFELD, *Prolegomena: Questions to be Settled Before the Study of an Author or a Text*, Leiden *et al.*, Brill, 1994.

some of the definitions of philosophy defended by previous philosophers and schools, but also a number of common classifications.[23] He would return to the division of philosophy once again after having read the *Eisagoge* and before turning to the *Categories*. This was the moment to give an introduction specifically to the philosophy of Aristotle and, hence, the architecture discussed there was the very structure of Aristotle's corpus of writings, the rationale behind the Alexandrian curriculum.[24]

Among the *falāsifa*, the Baghdad Aristotelians were the most faithful in their appropriation of the late-ancient curriculum and teaching practices.[25] Just like the Alexandrians, the Baghdadis cherished the *prolegomena* literature and the practice of commenting on the curricular books.[26] The treatises dedicated to the *prolegomena*, in particular, give insight into their authors' conceptions of the structure of knowledge, as they would address the same range of issues tackled by the Alexandrians. Accordingly, a core topic they would cover is the division of philosophy, both in general and in relation to Aristotle's philosophy in particular. As we turn to our primary topic of interest, Fārābī and Avicenna, it is the Baghdadi notion and practice of philosophy – introduced by Abū Bishr Mattā (d. 940) in Baghdad in the early tenth century, continued in the same city by thinkers like Yaḥyā ibn ʿAdī (d. 974) and Ibn al-Tayyib (d. 1043),[27] and finally taken up and reinvigorated in the western parts of the Islamic world by scholars like Ibn Bājja (d. 1138) and the apex of this tradition, Ibn Rushd,

[23] The exclusive usage of the masculine here is due to historical circumstances: To our knowledge, only men, and no women, taught in late-ancient schools.

[24] For a succinct overview, see F. E. Peters, *Aristotle and the Arabs*, *op. cit.*, p. 79-87 (on "the *Eisagoge* complex").

[25] Here and in what follows, I concentrate on the Baghdad Aristotelians (and not the Kindians or Brethren of Purity), because they are the principal background against which Fārābī and Avicenna – as I see it, the most important thinkers for the further developments of *falsafa* – must be assessed.

[26] Among the Baghdad Aristotelians, these commentaries mostly took the form of glosses – noted in the margins of the texts used for teaching – or expository paraphrases, less frequently the guise of exegetical commentaries in which the teacher would first quote and then meticulously lay out passage after passage of the Aristotelian reference text. This last approach is particularly characteristic of Averroes in the west of the Islamic world. While he also produced epitomes of different lengths, he composed several so-called long commentaries (*shurūḥ*, the plural of *sharḥ*), among others on *De anima* and the *Metaphysics*. On Averroes, see below, n. 28.

[27] On these thinkers, see the respective chapters in *Philosophy in the Islamic World*, *op. cit*.

the Latin Averroes (d. 1198)[28] – that we need to keep in mind to appreciate the developments they initiated.

At first glance, Fārābī and Avicenna seem to be in perfect harmony with the Aristotelian tradition embodied by the Baghdadis. They both display intimate familiarity with the Alexandrian curriculum, as well as the commentary literature. Moreover, they both wrote treatises related to the *prolegomena* literature: in Fārābī's case, his famous *Iḥṣāʾ al-ʿulūm* (*Enumeration of the Sciences*) – a treatise, translated into Latin in the twelfth century, which became particularly influential on scholastic divisions of the sciences and which, for this reason as well, I have made a focal point of this study – while Avicenna composed a short survey entitled *Fī aqsām al-ʿulūm al-ḥikmiyya* (*On the Parts of the Philosophical Sciences*).[29] While Fārābī also authored commentaries, perhaps designed for the instruction he himself offered in the frame of the Baghdadi school, Avicenna was obviously not so keen about this genre, with the result that only a few glosses, possibly excerpts for his own purposes rather than notes for teaching, have been transmitted. Instead, Avicenna composed several encyclopedic works which at first sight might be mistaken for expository paraphrases – which they are not and which is why I have decided to concentrate on them as the second focal point of this paper.

In order to substantiate and, at the same time, qualify the conceptual proximity between, Fārābī and Avicenna, on the one hand, and the Baghdad Aristotelians, on the other, let us have a look at the architecture of Avicenna's most voluminous encyclopedic work, the *Kitāb al-shifāʾ* (*Book of the Healing*), large parts of which were translated into Latin and, like Fārābī's *Iḥṣāʾ*, had a significant impact on the formation of the philosophical curriculum taught at medieval universities.[30] Considered

[28] On Ibn Bājja, see Josép Puig Montada, "Ibn Bâjja [Avempace]," *in*: Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy (Spring 2018 Edition)*, https://plato.stanford.edu/archives/spr2018/entries/ibn-bajja/; on Averroes, Jean-Baptiste Brenet, *Averroès l'inquiétant*, Paris, Les Belles Lettres, 2015.

[29] On Fārābī and the *Iḥṣāʾ*, see chapter 8 (by U. Rudolph) *in*: *Philosophy in the Islamic World*, *op. cit.*; on the Latin reception of the *Iḥṣāʾ*, Franz Schupp, "Einleitung," *in*: al-Fārābī, *Über die Wissenschaften. De scientiis. Nach der lateinischen Übersetzung Gerhards von Cremona*, Hamburg, Felix Meiner Verlag, 2005, particularly section 2.3 (on the "Fortwirken von al-Fārābīs *De scientiis* im lateinischen Mittelalter"); on Avicenna, Dimitri Gutas, *Avicenna and the Aristotelian Tradition: Introduction to Reading Avicenna's Philosophical Works*, Leiden/Boston, Brill, 2014[2]; on the *Aqsām*, still valuable is Jean Michot, "Les sciences physiques et métaphysiques selon la *Risālah fī Aqsām al-ʿulūm* d'Avicenne," *Bulletin de Philosophie Médiévale* 22 (1980), p. 62-73.

[30] On the Latin reception and impact of the *Shifāʾ*, see Henri Hugonnard-Roche, "La classification des sciences de Gundissalinus et l'influence d'Avicenne," *in*: Jean Jolivet, Roshdi Rashed (eds), *Études sur Avicenne*, Paris, Les Belles Lettres, 1984, p. 41-75; Édouard Wéber, "La classification des sciences selon Avicenne à Paris vers 1250," *in*: *ibid.*, p. 77-101.

through an Aristotelian prism, the *Shifāʾ* can be divided into three main sections:[31] (1) logic, (2) theoretical philosophy, and – as I will discuss in the next paragraph – (3) practical philosophy. Section one is further subdivided into nine treatises corresponding to Porphyry's *Eisagoge*, and Aristotle's *Categories*, *On Interpretation*, *Prior* and *Posterior Analytics*, *Topics*, *Sophistical Refutations*, *Rhetoric*, and *Poetics*.[32] Section two consists of eight treatises on natural philosophy (corresponding to Aristotle's natural philosophy plus Nicolaus of Damascus's *De plantis*), four books – representing the quadrivial sciences – on mathematics, and a treatise on metaphysics. So far, so Aristotelian.

Section three on practical philosophy, however, turns out to be a special case, as is immediately apparent: Remarkably, it is *included* in the treatise on metaphysics as the latter's tenth book and not set apart as a distinct branch of philosophy, as I did above in order to highlight the correspondence with the Alexandrian curriculum. Moreover, this part of the *Shifāʾ* chiefly addresses problems such as the (human) afterlife, prophecy, worship, the imamate and caliphate, and only secondarily topics that to some extent parallel Aristotle's treatises on practical philosophy. When seen in light of Fārābī's political thought,[33] it is certainly justifiable to consider Avicenna's discussions in this part as a specific Islamic interpretation and enhancement of Aristotelian ethics, economics, and politics, but it is clear that both their integration into metaphysics and the choice of topics is very remote not only from Aristotle himself, but also from his Greek commentators. This particular feature of the *Shifāʾ* thus betrays a peculiarity almost perfectly hidden by the rest of this work: Avicenna, following the lead of Fārābī, as will be argued in the next section, was about to develop a concept of philosophy that would have tremendous effects in the eastern parts of the Islamic world: It would culminate in a fundamental reorganization of philosophy itself (i.e., the division of the *philosophical* branches of knowledge) and a dissolution of the boundaries between *falsafa* and the religious or traditional sciences, specifically *kalām*, as taught at the *madrasa*s (i.e., the architecture of knowledge *in general*).

[31] With this division, I follow the presentation in Dimitri Gutas, "Hellenic Philosophy," *art. cit.*, for purposes that will become clear in the next paragraph.

[32] Note that in the Alexandrian tradition, the *Rhetoric* and *Poetics* are considered logical treatises (see n. 21 above) and together with the other writings constitute the so-called "long" *Organon*.

[33] See Nadja Germann, "Al-Farabi's Philosophy of Society and Religion," *in*: *The Stanford Encyclopedia*, *op. cit.*, https://plato.stanford.edu/archives/spr2021/entries/al-farabi-soc-rel/.

4. Fārābī and the Concept of Knowledge

Already Fārābī's *Iḥṣāʾ*, a treatise that thoroughly inscribes itself in the late-ancient *prolegomena* tradition, is full of traces heralding the imminent reconceptualization of *falsafa*. As the opening of this text shows, Fārābī's aim consists in giving a comprehensive account of all the known sciences,[34] including their contents and parts. For this purpose, he distinguishes five groups, according to which the ensuing sections of the *Iḥṣāʾ* are arranged: (1) the science of language; (2) the science of logic; (3) mathematics; (4) natural science and metaphysics; (5) political science, law, and theology. A *faylasūf* of the tenth century would immediately have noticed the hybrid nature of what Fārābī presents here as "the known sciences." At the core of the ensemble, we recognize the fields of philosophical knowledge taught by the Baghdad Aristotelians, but they are framed by three major linguistic-religious disciplines: philology (comprising both lexicography and grammar) preceding the Aristotelian canon, and law and theology following upon it.[35]

If we ponder this presentation, we might come to suppose that Fārābī, perhaps alarmed by trends such as those expressed in "mixed" encyclopedias like Khwārazmī's *Mafātīḥ*, acknowledged that, first, from the viewpoint of his contemporaries outside the field of *falsafa*, the notion of knowledge defended by the Aristotelians was perceived as incomplete; second, regarded from the exterior, the ancient philosophical disciplines did not succeed in embracing all the knowledge there is,[36] given that the linguistic-religious branches were obviously lacking; third, the system of sciences therefore had to be completed through the inclusion of the principal "indigenous" fields. If this was Fārābī's reasoning, that would already be a notable result, as it would imply his readiness to concede the existence of blind spots on the Aristotelian map of sciences requiring some insertions and additions. There is, however, more at stake here: The modifications Fārābī suggests are, I believe, echoes of more substantial conceptual considerations concerning the very notion of knowledge. Such considerations come more clearly to the fore in other Fārābian writings, like

[34] Fārābī's wording is (AL-FĀRĀBĪ, *Iḥṣāʾ al-ʿulūm*, ed. ʿU. AMĪN, Cairo, Maṭbaʿat al-anjulū al-miṣriyya, 1968³, p. 53): "Qaṣadnā fī hādhā al-kitāb an nuḥṣī al-ʿulūm al-mashhūra;" for the meaning of *aḥṣā* (translated above as "to give a comprehensive account;" a weaker translation would be "to count, enumerate"), see Edward W. LANE, *An Arabic-English lexicon*, vol. 2, London, Williams & Norgate, 1865, p. 590.

[35] Moreover, the structure does not boil down to simple additions (one field at the beginning, another one at the end). Rather, law and theology are interwoven with political science, suggesting that it is the whole set which constitutes practical philosophy.

[36] Recall that this was the idea behind the Alexandrian curriculum: to encompass and teach knowledge as a whole.

the *Kitāb al-ḥurūf* (*Book of Letters*), where he tackles, beyond the range of sciences, their nature or, more precisely, the quiddity of knowledge as such.

The second part of the *ḥurūf* offers a detailed discussion of the arts and sciences.[37] It stands out for the peculiar approach Fārābī has chosen: His thought process unfolds as if he were retracing an ideal-typical process of human evolution. In other words, this section is a hypothetical history of humankind by means of which Fārābī seeks to explore the developments that would take place if human beings (living under ideal climatic circumstances, etc.) were to follow their inborn nature. The first thing they would invent, he is convinced, is a language. Soon after, however, they would begin developing other cultural and intellectual skills, first and foremost the arts and sciences. One after the other, Fārābī has his primordial human beings discover rhetoric, poetry, the preservation of reports and poems, grammar, writing, mathematics, natural science, dialectic, sophistry, political science, demonstration, the perfection of theoretical philosophy, the perfection of practical philosophy, religion and religious legislation, law (*fiqh*), and theology (*kalām*). If we compare the Aristotelian curriculum, on the one hand, and the disciplines gathered in Fārābī's *Iḥṣāʾ*, on the other, it is noteworthy that, first, the range of non-Aristotelian fields has increased and, second, the order of the Aristotelian sciences deviates from the norm.

In order to grasp the implications of this arrangement, we briefly need to recall Fārābī's concept of scientific knowledge and the role ascribed to demonstration in this connection.[38] Fārābī's notion of knowledge (*ʿilm*) in general is fairly broad. However, on the basis of epistemic strength, he distinguishes between kinds of knowledge. On his account, there are weak forms, such as mere convictions, and strong ones, the most powerful of which is scientific or certain knowledge.[39] This last sort of knowledge is the one attained in the sciences, due to the application of a specific method:

[37] The summary in this paragraph is based on al-Fārābī, *Kitāb al-ḥurūf*, *in*: Muḥsin Mahdi (ed.), *Alfarabi's Book of Letters (Kitāb al-ḥurūf): Commentary on Aristotle's Metaphysics*, Beirut, Dār al-Mashriq, 1969, book II, §129-146, and Nadja Germann, "A Matter of Method: Al-Fārābī's Conception of Philosophy," *in*: Ueli Zahnd (ed.), *Language and Method: Historical and Historiographical Reflections on Medieval Thought*, Freiburg i.Br./Berlin/Vienna, Rombach Verlag, 2017, p. 11-38, particularly section 2 (on "The Speculative Beginning of Philosophy").

[38] For the analyses underpinning this paragraph, see Nadja Germann, "Logic as the Path to Happiness: Al-Fārābī and the Divisions of the Sciences," *Quaestio* 15 (2015), p. 15-30.

[39] This is *ʿilm* in the narrow sense of the word, corresponding to the Greek *epistēmē*. Fārābī occasionally calls it explicitly "*ʿilm yaqīnī*" (certain knowledge) or simply "*yaqīn*" (certainty), to set it apart from other types of knowledge (such as convictions and beliefs) that do not yield objective certitude (*yaqīn*). For details and references, see *ibid.*, and Deborah L. Black, "Knowledge (*ʿilm*) and certitude (*yaqīn*) in al-Fārābī's epistemology," *Arabic Sciences and Philosophy* 16 (2006), p. 11-45.

demonstration (*burhān*).[40] We cannot go into the details here, but if we revisit the sequence of sciences presented in the *ḥurūf* in accordance with their "historical" appearance, it is obvious that only with the discovery of demonstration does humanity attain a level of epistemic strength that amounts to science in the narrow sense of the word. The epistemic watershed constituted by demonstration has three consequences for Fārābī's architecture of knowledge that I would like to highlight in what follows.

First, only those disciplines that operate on the basis of demonstration are sciences in the strict sense. For Fārābī, these are the classical Aristotelian disciplines, provided they are ascertained appropriately. Second, without such an epistemic foundation no field of knowledge, not even an Aristotelian one, is a science properly speaking. It is in this manner that we must read the progression above, where we encountered "[…] mathematics, natural science, […] political science, demonstration, perfection of theoretical philosophy, perfection of practical philosophy, […]." Mathematics, natural science, and political science precede demonstration and are, therefore, at this "historical" stage proto-sciences. It is only after the discovery of demonstration that they can be furnished with a true scientific base. This idea resonates in the two phases that follow demonstration: the perfection of theoretical philosophy and the perfection of practical philosophy. Without even mentioning its name, Fārābī here introduces metaphysics into the scheme, as the science that yields the principles of all the other sciences, both theoretical and practical, and thus, along with demonstration as the "new" method, turns proto-sciences into veritable sciences.[41] Third, while the other (non-Aristotelian) fields preceding demonstration are and remain below the epistemic level of true science, according to the criterion we have applied so far, we should suppose that "religion and religious legislation, law (*fiqh*), and theology (*kalām*)" transcend it. Essentially, however, they do not, because according to Fārābī, these disciplines are practical or, more precisely, didactic in nature. In other words, they are "scientific" inasmuch as they convey the knowledge acquired (scientifically) in the Aristotelian fields. Yet they are "non-scientific" insofar as they are designed to transmit knowledge to people who do not have the intellectual capacities to do science themselves. For didactic reasons, these disciplines do not apply demonstration, but rather epistemically weaker forms of argumentation like rhetoric.[42]

[40] *Burhān* corresponds to the syllogistics taught in Aristotle's *Posterior Analytics*.

[41] Consequently, it is through the discovery of metaphysics that the natural and mathematical sciences are furnished with a sound epistemic foundation (the first principles upon which they rely, now secured by metaphysics). It is in this manner that they turn into true sciences *ex post* and that theoretical philosophy is "perfected." The same applies in the practical sphere to political science.

[42] As seen above, rhetoric and poetics are considered to be logical disciplines. Along with demonstration and dialectics (the discipline presumably taught by the

With this background, we can better appreciate the hybrid nature of the disciplines enumerated and outlined in the *Iḥṣāʾ*. Granted, the notion of knowledge encapsulated by this account is more comprehensive than that conveyed by the divisions of the sciences deriving from the late-ancient curriculum. However, the disciplines arranged in this treatise are not all on the same footing. The science of language is a proto-science serving propaedeutic purposes: It provides the linguistic means to express thoughts.[43] Language, however, exists by convention, and the study of language is nothing but the acquisition of conventional, practical skills.[44] Law and theology, by contrast, are didactic disciplines.[45] Although their content is (ultimately) ascertained by the demonstrative sciences,[46] they convey knowledge by way of sub-scientific modes of argumentation. As such, these methods are tailored to bring about beliefs and convictions, but not scientific knowledge.

What is remarkable about Fārābī's architecture of knowledge, as I see it, is not so much the broader range of sciences that he incorporates as compared to the Baghdad Aristotelians. In this regard, we could settle for "mixed" encyclopedias like Khwārazmī's *Mafātīḥ*. Rather, what distinguishes Fārābī's thought is its thoroughly epistemological grounding. To him, the complete body of knowledge is not simply an aggregate

Topics) they are understood as types of discourse. The strongest kind of discourse would be demonstration, the weakest poetics, which operates on the basis of imaginative suggestions. The entire paragraph relies on N. Germann, "Logic," *art. cit.*, particularly p. 21-25.

[43] Similarly, it is debatable whether logic itself is a part of philosophy or rather precedes it in a propaedeutic fashion, furnishing the tool applied in philosophy proper. For these discussions, which already emerged in late antiquity, see Ch. Hein, *Definition und Einteilung*, *op. cit.*, p. 33-237.

[44] In his *Kitāb al-burhān* (*Book on Demonstration*) Fārābī distinguishes the teaching of a language from the teaching of scientific knowledge even on the level of terminology: For him, it is "inculcation" (*talqīn*), see al-Fārābī, *Kitāb al-burhān*, *in*: M. Fakhrī (ed.), *Al-manṭiq ʿind al-Fārābī*, vol. 4, Beirut, Dār al-mashriq, 2012², p. 19-96, here 78: "Similarly, inculcation (*talqīn*) can be called 'teaching.' There are two kinds of inculcation: first, if a speaker employs an utterance with the intention that the listener often and repeatedly employs [it], so that he arrives at memorizing [it]. This is like the inculcation of languages or songs. It falls under the [category of] teaching to copy (*iḥtidhāʾ*)."

[45] As a consequence, the last branch of knowledge distinguished in the *Iḥṣāʾ* is heterogeneous, even epistemologically speaking: It consists of political science (turned into a real science methodologically, through demonstration, and epistemologically, by virtue of the principles provided by metaphysics) and the two didactic disciplines of law and theology.

[46] This description requires qualification: To be sure, quite a number of theological topics, such as the divine attributes, will be derived from absolutely certain first premises on this theory. However, specific prescriptions like the rites of religion (e.g., the daily prayer) cannot be deduced demonstratively, they are and remain particular and, in a way, arbitrary.

of disciplines to which new – that is hitherto "foreign" – ones can be added. It is an entity that possesses an internal, hierarchical, and epistemic structure. Hence, the sciences recognized by scholars, in Fārābī's view, are (or should be) interpretations of this structure accounting primarily for the epistemic strength and functions of the respective sciences and only secondarily for their subject matters. This shift from an aggregative understanding to an epistemological distinction of the sciences, which subsequently also increasingly marked "mixed" encyclopedias,[47] becomes particularly evident in Avicenna's engagement with the sciences.

5. Avicenna and the Reconceptualization of *Falsafa*

If we return to the layout of the *Shifāʾ*, it would seem that in almost exclusively focusing on the traditional fields of knowledge distinguished by the Aristotelian tradition, Avicenna picks out what Fārābī has identified as the epistemic core, the truly scientific disciplines, and leaves aside non-scientific propaedeutic and didactic disciplines.[48] Hence, for him, "knowledge" would be whatever can be deduced demonstratively. This, however, depends not only on the capacities of individual human beings, but also on the nature of the objects of which knowledge is sought, since not everything can be known demonstratively.[49] That it is indeed an intricate interplay between epistemological and ontological vectors that underpins Avicenna's division of the sciences can be seen from the second chapter of the *Madkhal*, the first logical treatise of the *Shifāʾ*.[50]

[47] *Cf*. Ibn Khaldūn's division mentioned above, whose primary criterion was related to the mode of knowledge acquisition: through tradition versus through reasoning.

[48] Perhaps this statement needs to be qualified to some extent in view of the tenth book of Avicenna's *Metaphysics*, which is dedicated to practical philosophy. His conception of practical philosophy, embracing among other things worship and prayer, seems heterogeneous in a similar way to the one Fārābī defends in the *Iḥṣāʾ*.

[49] Scientific knowledge is characterized by its necessity, eternity, and the fact that its opposite is impossible. The second feature on this list, eternity, specifically excludes all things that are subject to change from being objects of scientific knowledge: Since they are not eternal in their constitution, knowledge of them cannot be eternal either. It should be noted that already Fārābī was very well aware of this situation, as becomes particularly clear in his *Sharāʾiṭ al-yaqīn* (*Conditions of Certainty*); *cf*. D. L. Black, *art. cit*.

[50] The *Madkhal* as such corresponds to Porphyry's *Eisagoge* in the Alexandrian curriculum, and its first chapters to the *Eisagoge* complex discussed above, in section 3 of this study. Accordingly, the first chapter is designed as a prologue to the *Shifāʾ* and the philosophy it teaches as a whole. Along these lines, the second chapter discusses the division of philosophy in general, before Avicenna turns to logic, the first field to be approached in the curriculum.

Once again, Avicenna starts off in a quite traditional manner. In line with the *prolegomena* literature, he first gives a general definition of philosophy, stating that it seeks "to know the true nature of all things to the extent that man is capable of knowing."[51] He then turns to its division.[52] The major demarcation line that Avicenna immediately draws is the traditional Aristotelian one between theoretical and practical philosophy; from there he moves on to distinguish between the different theoretical sciences. In both cases, the decisive criterion is ontic: Existents are either voluntary or natural, and, if natural, they are either mixed with [matter and] motion or not.[53] Particularly interesting for our topic is the class of existents that mixes with matter and motion. This class can further be broken down into three different, basic types – and this is precisely the point where Avicenna moves from the traditional, object-centered Aristotelian perspective to an epistemologically directed perspective, intricately interlacing them. For now, as Avicenna introduces Aristotle's principle of separability (from matter), he immediately squares it with what will turn out to be the primary principle that sets sciences apart: their modes of *consideration*. This transition is effectuated by Avicenna's differentiation between two spheres: subsistence and estimation. Applying this distinction in combination with separability from matter, Avicenna discriminates three possible constellations applying to existents that mix with matter and motion: (1) the existent is neither separable in subsistence nor in estimation; (2) the existent is not separable in subsistence, but is in estimation; or (3) the existent is separable both in subsistence and in estimation.[54] While "subsistence" obviously refers to the manner in which things actually exist, "estimation" denotes

[51] Avicenna, *Al-Shifāʾ. Al-Manṭiq. 1 – Al-Madkhal*, ed. I. Madkour et al., Cairo, al-Maṭbaʿa al-amīriyya, 1952, I: 2, p. 12: "*Inna al-gharaḍ fī al-falsafa an yūqafa ʿalā al-ḥaqāʾiq al-ashyāʾ kullihā ʿalā qadr mā yumkinu al-insān an yaqifa ʿalayhi*;" the English translations of the *Madkhal* above are taken from Michael E. Marmura, "Avicenna on the Division of the Sciences in the *Isagoge* of His *Shifāʾ*," *Journal for the History of Arabic Science* 4 (1980), p. 239-251, here p. 241.

[52] This division has been studied by M. E. Marmura, "Avicenna on the Division," *art. cit.*; Nadja Germann, "Logik zwischen 'Kunst' und 'Wissenschaft': Avicenna zum Status der Logik in seiner *Isagoge*," *Recherches de Théologie et Philosophie médiévales* 75 (2008), p. 1-32, here 13-20. In what follows, I summarize Avicenna, *Madkhal*, *op. cit.*, I: 2, p. 12-13.

[53] At this early stage, Avicenna mentions only motion. But from the immediately following deliberations concerning separability, it is clear that he is also implying matter, since motion presupposes matter, which is why I added "matter" in square brackets above.

[54] From a logical point of view, one would expect a fourth type that can be separated in subsistence but not in estimation. Avicenna does not even mention this option, but given his epistemology this possibility can be immediately excluded: Estimation, on his account, can represent *everything* that occurs in subsistence, plus carry out a few additional operations (which is why things can be separable in estimation while they are not in subsistence). Hence, in view of Avicenna's

the way in which things can be mentally represented, i.e., can be thought about.[55]

As a consequence, on Avicenna's account there are four kinds of existents[56]: the three just mentioned plus (4) those existents distinguished at the beginning of the breakdown, namely those that do not mix with motion at all. As examples, he gives: (1) humanity; (2) squareness; (3) identity (*huwiyya*), unity, plurality, causality; and (4) God and intellect. At first sight, one might believe that, with this partition, Avicenna (still largely in line with Aristotle) has finally identified the kinds of objects that are proper to the individual disciplines, namely: (1) natural philosophy; (2) mathematics; (3) (perhaps) metaphysics as the universal science; and (4) (perhaps) metaphysics as theology. Yet Avicenna's architecture turns out to be more complex and more intricately rooted in epistemology. Having identified the four classes of existents, he turns toward modes of consideration. According to him, objects can be considered: (a) as they are in themselves; (b) in abstraction from matter and motion; and (c) in relation to matter and motion. On his account, it is precisely these modes of consideration that separate the theoretical sciences: (a) metaphysics; (b) mathematics; and (c) natural science.[57] Sciences, in other words, are primarily modes of consideration.

That these three modes of consideration do not directly correspond to the four sorts of existents is obvious. As it turns out, in almost all cases the question of whether something can be the object of a particular science hinges on the mode of consideration applied to it. This is definitely true for case (3). Objects like identity, unity, etc., can be considered from all three viewpoints and thus become objects of metaphysics, mathematics,

epistemology it is impossible for something to be separable in subsistence, while being unable to be represented in this fashion by estimation.

[55] For instance, I can consider the pyramids of Sakkara as they really exist, i.e., as built from specific stones, constructed under certain angles, and having particular heights; I can, however, likewise think about the pyramid as such, that is as a certain geometrical figure with distinctive features – this corresponds to the mathematical approach (see next paragraph).

[56] Despite their "mixed" status, due to Avicenna's entwining of ontological and epistemological criteria, I will nevertheless refer, in what follows, to these classes as kinds of existents, in order to separate out this stage from the stage in which he actually distinguishes between the different sciences.

[57] Avicenna, *Madkhal* I: 2, p. 13.8-18: "*Fa-hādhihi [al-umūr] fa-immā an yunẓara ilayhā min ḥaythu hiya hiya* […]*, wa-immā an yunẓara ilayhā min ḥaythu ʿaraḍa lahā ʿaraḍ lā yakūnu fī al-wujūd illā fī mādda; fa-hādhā ʿalā qismayn: immā an yakūna dhālika al-ʿaraḍ lā yaṣiḥḥu tawahhumuhu an yakūna illā maʿa nisba ilā al-mādda al-nawʿiyya wa-al-ḥaraka* […] *wa-immā an yakūna dhālika al-ʿarḍ* […] *fa-innahu qad tutawahhamu aḥwāluhu wa-tustabānu min ghayr naẓar fī al-mādda al-muʿayyana wa-al-ḥaraka al-naẓar al-madhkūr*."

and natural science.[58] Case (4) is in a way the opposite. The objects here are existents that never mix with matter and motion so that the question of separability is pointless: Both in subsistence and in estimation they are perfectly separate. Hence, they are the "natural" objects of metaphysics and exclusively studied by it. Cases (1) and (2) lie somewhere in between these two extremes. It appears that existents like (1) humanity can only be the object of natural science, whereas existents like (2) squareness can be considered both mathematically, i.e., in separation from matter and motion in estimation, and physically, i.e., as an accident of certain material substances belonging to class (1). This reading of cases (1) and (2) might seem to contradict the famous passage in Avicenna's *Metaphysics* of the *Shifāʾ*, centered on "pure horseness" (*farasiyya faqaṭ*).[59] However, I believe that it does not. "Pure humanity" – in analogy with the *farasiyya faqaṭ* – would be a member, not of class (1) but of class (3); and the same is true for squareness and other mathematical entities.[60]

Despite these primarily epistemological reflections, as we have seen, the actual division and arrangement of the sciences embodied by the *Shifāʾ* essentially corresponds to the traditional Aristotelian classification – a classification, however, which Avicenna equipped with a carefully elaborated epistemological foundation: Modes of consideration (primary distinction) directed toward specific kinds of objects (secondary distinction) determine, on his account, the individual sciences.[61] In his later works,

[58] This is not particularly surprising, given that the entities that Avicenna lists here are all transversal attributes, i.e., attributes that can be found *across* the categories.

[59] See, for instance, Avicenna, *The Metaphysics of the Healing*, ed. and trans. M. E. Marmura, Provo (UT), Brigham Young University Press, 2005, V: 1, §4, p. 149.21-25: "For, in itself, [horseness] is nothing at all except 'horseness'. […] rather, in terms of itself, it is only 'horseness'" ("*Fa-innahu* [*al-farasiyya*] *laysa shayʾ min al-ashyāʾ al-batta illā farasiyya.* […] *bal min ḥaythu huwa farasiyya faqaṭ.*")

[60] I do not have the space here to flesh this point out and provide a proper argument. Hence, the following consideration will have to suffice: Regarding class (3), what would be the extension of the definition "natural existent that mixes with matter and motion but can be separated from both not only in estimation (like mathematical entities) but *also* in subsistence," if not "mental existent." As regards "humanity-in-mind," I can consider humanity on the metaphysical level, just like horseness, squareness, or number (another Avicennian example), which is to say, as an essence to which universality attaches, i.e., as a specific kind of concept. In this state, i.e., as a member of class (3), I could also consider humanity on the logical level: i.e., as a universal term falling under the category of substance. Squareness, by contrast, would turn out to fall under the category of accidents. The additional, logical viewpoint is introduced a little later in chapter 2 of the *Madkhal* (see M. E. Marmura, "Avicenna on the Division," *art. cit.*, p. 247, second half).

[61] Even though in the *Shifāʾ* Avicenna explicitly adheres to the Aristotelian tradition, not only in doctrine but also in arrangement, as we have seen above (book ten of the *Metaphysics*) there are a number of places where he breaks with the

most of which are summas like the *Shifā'*, Avicenna, who continuously hones his epistemology along the lines just outlined, is much less willing to accommodate to the formal conventions of the Aristotelian tradition. If the nature of the corpus of knowledge attainable by humanity is not constituted by an aggregate of books, but must rather be analyzed as an entity determined by hierarchically structured epistemological and ontological features – that is, by a comprehensive set of modes of consideration attuned to the kinds of existents, to all there is – then it is only coherent to also delimit and rearrange the sciences in accordance with these epistemological-ontological principles. From the outset Avicenna's encyclopedic oeuvres are philosophical summas rather than mere paraphrases or aggregative encyclopedias.[62] However, the later in his career we get, the more explicitly they are construed on the basis of a progressively refined theory of knowledge.[63]

Many of the results of this process and its impact on posterity are now well known to scholars working in the field. However, what is most noteworthy for the topic of this paper is certainly Avicenna's rearrangement of the corpus of philosophical knowledge. Thus, to list but a few major aspects, in contrast to the *Shifā'*, his latest summas, for instance the *Ishārāt wa-tanbīhāt* (*Pointers and Reminders*)[64] consists of only three parts: (1) logic, (2) physics, and (3) metaphysics. Mathematics and practical philosophy have disappeared, while the theory of the soul has moved to the end of physics and marks the transition to metaphysics. The part on logic has been clearly modified as compared to the classical *Organon* structure: Since the two essential operations of mind are, according to Avicenna who takes his cue from Fārābī, concept formation (*taṣawwur*) and assent (*taṣdīq*), logic becomes bipartite.[65] In the first section, a

tradition, the most notable of which may be his reconceptualization of metaphysics as a transcendental science. For this reconceptualization of metaphysics, see Amos Bertolacci, *The Reception of Aristotle's Metaphysics in Avicenna's Kitāb al-Šifā'*, Leiden/Boston, Brill, 2006; Tiana Koutzarova, *Das Transzendentale bei Avicenna: Zur Metaphysik als Wissenschaft erster Begriffs- und Urteilsprinzipien*, Leiden/Boston, Brill, 2009.

[62] This feature is highlighted by D. Gutas, *Avicenna*, *op. cit.*, for instance p. 104: "It has become a commonplace to refer to [the *Healing*] as an 'encyclopaedia'; it is obvious from the above tabulation, however, that this is at best misleading. In contemporary terminology, an encyclopaedia is a collection of unrelated and disparate articles on some or all branches of knowledge; it does not have the organic unity and coherent approach of a summa like [the *Healing*]."

[63] See also the evolution of Avicenna's methods and different styles of writing across his works, *ibid.*, p. 335-358.

[64] On the *Ishārāt*, see *ibid.*, p. 155-159.

[65] On the distinction between *taṣawwur* and *taṣdīq* and its origins in Fārābī, see Joep Lameer, *Conception and Belief in ṣadr al-Dīn Shīrāzī (ca 1571-1635): Al-Risāla fī al-taṣawwur wa-l-taṣdīq*, Tehran, Iranian Institute of Philosophy, 2006, particularly chapter 2 (on "The origin of the notions *taṣawwur* and *taṣdīq*"); on

theory of *taṣawwur* is developed, and in the second, a theory of *taṣdīq*. In contrast to the Aristotelian tradition, the categories are no longer addressed in logic, since as kinds (or species) of existents they fall under the auspices of metaphysics. Finally, metaphysics, just like logic, has completely changed its structure and layout.[66] As the science of being qua being in Avicenna's transcendental sense, it is structured according to the kinds of existents – hence the integration of the categories. These are but a few of the chief modifications of the architecture of knowledge that reflect Avicenna's epistemological considerations, but they give an impression of the profound formal and conceptual changes these considerations elicited. The reverberations of this reconceptualization of philosophy have distinguished the eastern hemisphere of the Islamic world down to the modern period and beyond the confines of *falsafa* as it was established during the late ninth to early eleventh centuries.

6. Dissolving Boundaries

Avicenna set the example for later thinkers, who both chose the form of the summa as their preferred medium and continually modified its structure for epistemological reasons. Notably – and this development can hardly be overestimated – these summas found their way into an institution that was to dominate the intellectual sphere in the eastern parts of the Islamic world, just as the universities would leave their stamp on that of the late Middle Ages in the Latin West, namely the *madrasa*s, the schools of higher, and this is to say, of religious learning. Remarkably, these *philosophical* summas, as recent research has shown, thus became part of a curriculum that came to embrace all the different sciences considered fundamental for *ʿulamāʾ*, i.e., *religious* scholars. Thus, the former boundaries between *falsafa* and theology (*kalām*) dissolved. On the one hand, philosophy – now usually termed *ḥikma* (wisdom) rather than *falsafa* – became to be integrated into the same epistemic paradigm as the linguistic-religious disciplines; it was no longer a "foreigner" or "outsider." On the other hand, however, it

Avicenna's logic (with an interest in the technical details and only remarks in passing on the structural developments), Riccardo Strobino, "Ibn Sina's Logic," *in*: *The Stanford Encyclopedia of Philosophy*, *op. cit.*, https://plato.stanford.edu/archives/fall2018/entries/ibn-sina-logic/; on the impact of Avicenna's logic on posterity, Khaled El-Rouayheb, "Post-Avicennan Logicians on the Subject Matter of Logic: Some Thirteenth- and Fourteenth-Century Discussions," *Arabic Sciences and Philosophy* 22 (2012), p. 69-90; Id., *The Development of Arabic Logic (1200-1800)*, Basel/Berlin, Schwabe Verlag, 2019.

[66] The most detailed study of Avicenna's reconceptualization of metaphysics is A. Bertolacci, *op. cit*. On the transcendental turn initiated by Avicenna's metaphysics, see T. Koutzarova, *op. cit*.

constituted only one branch of knowledge among several others, forming only a part of a bigger whole.[67] Moreover, already as a result of Avicenna's rearrangements, philosophy started to be gradually dismantled: Fields like mathematics became "outsourced" and were no longer considered parts of philosophy, but autonomous domains. In this regard, philosophy underwent a process quite comparable to that of its modern counterpart in the West: In terms of comprehensiveness, it dwindled, as individual fields emancipated themselves.

Nevertheless, the quest for the ideal structure and composition of knowledge was carried on within the new context, the *madrasa*s, by Avicenna's successors, culminating in the work of Fakhr al-Dīn al-Rāzī (d. 1210). In his *Mulakhkhaṣ fī al-ḥikma* (*Epitome of Philosophy*), a summa that would "dominate most prominent expositions of philosophy and/or theology for centuries to come,"[68] Rāzī rearranges the individual fields of knowledge in virtue of principles deriving from Avicenna's metaphysics. For Avicenna, metaphysics, as indicated above, is a consideration of things as they are in themselves. The most basic or general "things" upon which one hits when one applies this mode of consideration are what he calls the "principles of conceptualization" (*taṣawwur*), that is transcendentals such as existent, thing, and one.[69] If one follows this track of thought, the first disjunctive pair of transcendentals one encounters, according to Avicenna, will be the necessary and the possible. They constitute the fundamental divide perceptible in the consideration of the existent qua existent: between necessary being and contingent being. Notably, it is this specific distinction that Rāzī applies in order to structure his *Mulakhkhaṣ*: the first section is dedicated to "general things" and embraces topics such as existence, essence, unity, and multiplicity,[70] that is the principles underlying the two

[67] And within the whole range of disciplines, it would belong to the branch of rational (*ʿaqlī*) sciences in contrast to the traditional ones (*naqlī*).

[68] Heidrun Eichner, "Philosophy in a Web of Science: Classifications of Sciences as a Source for the Conception of Philosophy up to the Ottoman Tradition," forthcoming *in*: Ulrich Rudolph (ed.), *Concepts of Philosophy in Asia and the Islamic World*, vol. 2, Leiden-Boston, Brill (forthcoming 2022), subsequent to n. 22 (I am grateful to Heidrun Eichner who generously shared her paper with me prior to publication). My remarks on post-Avicennian developments are based on this article and on Ead., *The Post-Avicennian Philosophical Tradition and Islamic Orthodoxy: Philosophical and Theological Summae in Context*, unpublished habilitation, Halle, 2009.

[69] The core passage is Avicenna, *Metaphysics*, *op. cit*., I: 5, §1-5, which culminates in the claim (*ibid*, §5, p. 23, Marmura's translation slightly adjusted): "The things that have the highest claim to be conceived in themselves are those common to everything as, for example, 'the existent,' 'the thing,' 'the one,' and others" ("*Wa-ūlā al-ashyāʾ bi-an takūna mutaṣawwira li-anfusihā al-ashyāʾ al-ʿāmma li-al-umūr kullihā ka-al-wujūd, wa-al-shayʾ, al-wāḥid, wa-ghayrihi*").

[70] The similarity with those kinds of existents that Avicenna distinguishes as class (3) in the division of the *Madkhal* of the *Shifāʾ* is striking. This group further

kinds of existents treated in the following two sections, namely contingent being (divided according to substance and accident)[71] and necessary being (God).[72] While Rāzī's profoundly Avicennian division was adopted as a framework for philosophical writings during most of the thirteenth century,[73] starting from the 1280s the schema of the *Mulakhkhaṣ* came to be applied in theology (*kalām*) itself, perhaps initiated by Naṣīr al-Dīn aḷ-Ṭūsī (d. 1274), who had used it for his *Tajrīd al-iʿtiqād* (*Abstract of Belief*). This period was also marked by a renewed theoretical engagement with the structure and interrelations of the sciences. Ṭūsī had already authored a treatise on the division of the sciences, and he is followed by a long line of scholars throughout the Ottoman period.[74]

It is in view of these developments, stretching over several centuries, that the epistemological approach initiated by Fārābī, and expanded and put into practice by Avicenna acquired its historical significance. Far from merely serving as faithful transmitters of the Aristotelian heritage to the Latin West,[75] the two thinkers laid the foundation for a properly Islamic philosophical tradition emerging in the East. While the Greek origins of major building blocks used to create this foundation cannot be denied, the architecture of knowledge erected upon it was obviously structured along the lines defined by an intellectual culture that was driven by its own epistemic concerns and for these purposes developed its own conceptual devices.

reminds us of the issues Avicenna discusses in books I: 5-8 and V (particularly 1) of the *Metaphysics* of the *Shifāʾ*, i.e., what is usually referred to as the transcendental notions.

[71] Here the parallel with Avicenna's treatment of the categories as "species" of existent in books II and III of the *Metaphysics* of the *Shifāʾ* is conspicuous.

[72] This section corresponds to book VIII of the *Metaphysics* of Avicenna's *Shifāʾ* on the necessary existent and its attributes.

[73] Eichner mentions "more than a dozen encyclopaedic expositions" for this period, H. Eichner, "Philosophy in a Web," *art. cit.*, subsequent to n. 23. However, these authors apparently took a step "backward." as they merged the structure of the *Mulakhkhaṣ* with the classical Aristotelian division "into logic, physics, metaphysics" (note that mathematics and practical philosophy remain absent).

[74] These later developments are the core of Eichner's analysis (*ibid.*), centered on three authors from the fourteenth, seventeenth, and eighteenth centuries respectively.

[75] This focus on the transmission between Greek and Latin is an allusion to an old, yet persistent historiographical *topos*; for this and related patterns characterizing Western research on philosophy in the Islamic world, it is still useful to consult Felix Klein-Franke, *Die klassische Antike in der Tradition des Islam*, Darmstadt, Wissenschaftliche Buchgesellschaft, 1980; see also the collected articles in Charles E. Butterworth, Blake A. Kessel (eds), *The Introduction of Arabic Philosophy into Europe*, Leiden/New York/Cologne, Brill, 1994.