sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 9:1 (2020)

Contents

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 9:1 (2020), pp. 1—4
DOI: 10.2478/sh-2020-0001

Arabic and Islamic Philosophy and Sciences: Method and Truth

Hany Moubarez

Ain Shams University
Abbasia sq., Al-Khalifah Al-Maamoun Street
11566 Cairo, Egypt

e-mail: hany.moubarez@art.asu.edu.eg

Abstract: What are Arabic and Islamic philosophy and sciences? How and where did they come about? I am trying in this preface to provide a short and brief answer to those two questions. Having done this, I sketch the contents of five papers trying to study Arabic and Islamic philosophy and sciences from its perspective to method and truth.
Keywords: Arabic philosophy, Islamic philosophy, Arabic science, Islamic science, method, truth, logic, alchemy.

What we call Arabic and Islamic philosophy and sciences commenced nearly around the late of the ninth century of our era. This genesis had many factors, but the most important ones are; a) the translations from Greek, Sanskrit, Syrian and Persian into Arabic, b) the contention with other religions and disciplines. As it is well known, philosophy does not emerge suddenly from Athena‘s head, some intellectual activities should precede it. This was the emergence of the Qur’an amongst Arabs. This, with previous unwritten poems and religious prose, made an appearance of what we could call an Arabic-spoken culture which continues to the present day. But this culture is not pure Arabian as any culture should note.

The Qur’an itself is an outcome of many influences including Jewish, Syriac texts and practices. The religious prose is an extension to the semantic practices of prophecy and the like.

Arabs, around the eighth century, conquered many territories, including Persian and some of the Byzantine empires, and let many of the conquered peoples enter into Islam, thus we find what may be called formation of the spoken Arabic world or Arabic culture, whose members were often the believers in Islam (whether Arabs or not) or serving the Islamic empire. The non-Arab peoples transmitted to the new culture the components of the previous cultures which Islam conquered, such as Greek, Syriac, Jewish, Persian, Sanskrit, Assyrian, or Armenian, in addition those cultures you could put your finger on in the regions that the Arabs conquered.

However, the most influential cultures were Greek, Persian and Semitic. In the end of the eighth century, the new spoken Arabic nation (behold again, this new nation is not racial but cultural) had a great and respectable quantity of a mixed culture consisting of explanations of holy books, theories about the nature of the world, methods of interpretation, texts from Greek and Persian and Syriac, etc. All these resulted in the emergence of pseudosciences, sciences and philosophy before the beginning of the ninth century. The first such pseudoscientist known to us is Ǧābir Ibn Ḥāyān (d.813), who is an heir to Greek and Hermetic alchemy, the first such scientist and philosopher known to us is al-Kindī (d.873), who is an heir to the Hellenistic system of knowledge which incorporates philosophy with science. As you see, philosophy and science and even pseudoscience were all interwoven, because all of them took the Greek form and paradigm of

knowledge, i.e. the Hellenistic one: Man strives for knowledge (of God) to liberate himself from this mortal world. Most of cognition is unitary in its substance, even the contrary doctrines such as Aristotle's and Plato's. Why not! The translators attributed a neoplatonic text (a mélange of Plotinus and Proclus) to Aristotle, known as the theology of Aristotle, so that Aristotle became neo/Platonic par excellence in Arabic culture. This Hellenistic schema stamped nearly all Arabic Philosophy, thus al-Fārābī (d.950) wrote a book about "The combine between the opinions of the two wisdoms". The striving into unity and to Monism is a universal attitude in Arabic thought, philosophy, mysticism, even in pseudoscience. From Hellenistic thought Arabs got also their view of the universe; it is a Ptolemic universe. At the end Arabs had a Ptolemic-neo-Platonic worldview and universe with ten spheres inside each other, and each has nous and soul emanates from each other, and all emanates from the unnamable or God.

Accordingly, when we say Arabic science and philosophy, we should not understand from this term only one culture but many. In fact, it was not written only in Arabic but in other languages too such as Syriac, Hebrew, Persian, Turkish, etc. And its momentum did not stop since it was raised. There is a mythology that it stopped with Ibn Rušd (d.1198); this is not true. Writing and practicing what we have called Arabic philosophy continued after Ibn Rušd's death up to our days but mainly in other languages especially Persian.

Having presented a general conception of Arabic philosophy and science, I give in the following a very brief temporal sketch of the development of Arabic philosophy and sciences in seven stages:

(1) Around the beginnings of the ninth century Arabic as a tool for culture and sciences arrived at its maximal formation; it had many translations from many foreign sources of pseudoscientific, logical, medical and astronomical summaries; also sciences, especially law and linguistics had great developments.

(2) But in the middle of that century Arabic had more translations (even a house of translation was established by al-Mā'mūn (d.833)) for a great amount of the Greek writings on philosophy, mathematics, medicine, astronomy and astrology, pseudoscience, magic, etc. This made an intellectual revolution which produced the first Arabic philosophical school known as al-Kindī's school. This school was the foundation of Arabic and Islamic rationality versus the religious schools.

(3) This school continued up to the tenth century when there appeared beside it what is known as the Baghdad school of philosophy which goes back to the Syrian philosopher Matta Ibn Yunūs (d.940) and his disciple al-Fārābī who is the first of the systems builders in Arabic and Muslim philosophy. In this century were also founded many scientific Arabic paradigms in law (disciplinary schools in law such as al-Šāfiʿiya), linguistics (Ibn al-Sarrāġ's Kitāb al-'Uṣūl), physics, mathematics (Ibn Sīnān (d.964) and others), astronomy (the Aristotelian-Archimedean paradigm), etc.

4) By the thirteenth century, there were in the philosophical circles a spread of works of another great systematizer philosopher of the eleventh century, i.e. Ibn Sīnā (d.1037) who developed al-Fārābī's studies in logic and philosophy on the one hand, and medicine and sciences on the other hand. But the price of this spread was more penetration of neo-platonic thought which Ibn Sīnā was influenced by too much. al-Ġazālī (d.1111), in the twelfth century, developed Ibn Sīnā's thoughts to serve his own theological, legal and mystical purposes. In the farthest west of the Islamic world, appeared Ibn Rušd who tried to disarm Ibn Sīnā's influence by providing a literal interpretation of Aristotle by which though he restored the original Aristotle, he cancelled the Arabic advancement in sciences in favor of Aristotelian science. In fact, this was a regressive move in Arabic science resulting in its delay.

(5) Around the end of the fourteenth century, after the Islamic caliphate had fallen in Baghdad to the Moghuls, Ibn Ḥaldūn (d. 1406) tried to theorize the movement of history and societies especially Islamic ones; he tried to establish scientific humanities.

(6) in the sixteenth century and beyond, the Islamic world was divided into the far east Islamic kingdoms of India and the middle of Asia on the one hand and the near east ones: the Safavids in

Persia, Turks in the middle east and east of Europe. The philosophy of Ibn Sīnā spread in India and Persia and had great development in modal logic and metaphysics. In the Middle East legal science and mysticism overwhelmed over other sciences and philosophies.
(7) But at the beginning of the nineteenth century as a result of European colonialism there occurred two intellectual movements, especially in India and Egypt; one for the revival of the past, the other for incorporating the advancements of knowledge and the global, especially western, societies. However, in the twentieth century philosophy written in Arabic was revived again alongside the continuing tradition of Ibn Sīnā in Iran and beyond.

The papers which this volume contains deal with the methods and logic of Arabic and Islamic philosophy and sciences, on the one hand, and the nature of truth in it, on the other hand.

Thus, in his paper *Three Notes on the Method of Analysis and Synthesis in its Ancient and (Arabic) Medieval Contexts*, Moubarez tries to prove that there were in ancient Greek philosophy and mathematics two traditions that interpreted the analysis and synthesis method so that this interpretation was reflected in Arabic mathematics and philosophy. In addition, Moubarez points out that the whole systematic structure of Ibn Sīnā's philosophy can be grasped if we look at it as constructed according to the analysis and synthesis method. From this point of view, he finds resemblance between both Ibn Sīnā and Kant (we could add even Hegel) in the mechanism of system building. This new and bold perspective to Ibn Sīnā's philosophy needs more evidence and studies.

Concerning the logic of Arabic and Islamic philosophy and sciences, it is well known that it is a result of the Greek through Syriacs and Hebrews (some argue against the latter). However, both Yagoubi and Fatahine try to prove, in their two papers in this volume, i.e. *The Status of Conditional Syllogism in Syllogistics*, and *Theory of Syllogisms with Categorical, Conditional and Disjunctive Connectives Developed by Arabian Logicians*, that Arabs and Muslims added new syllogism(s) to the Greek logical traditions. The second sketches the figures and forms of this new syllogism(s) while the first is trying to prove the novelty of this syllogism. Thus, the second depends on the first, so let's talk about this last only. If Moubarez tried to join Ibn Sīnā with Kant, Yagoubi and Fatahine try to confirm the originality of Ibn Sīnā's logical thinking and the logical tradition which he created (al-Sinūsī and and Ibn ʿArafa) as an expression of Arabic and Islamic originality. Yagoubi and Fatahine, as I understand them, have two claims: (1) that Ibn Sīnā was the first to discover the hypothetical syllogism, (2) that was because of the advancement of Islamic law (formulations). Yagoubi and Fatahine are not the only ones to claim (1); a well-known historian such as Khaled El-Rouayheb did that too before. But (1) is clearly not true, Boethius specified hypothetical syllogism about four centuries before Ibn Sīnā. Even, as it is very known for the students of the history of logic, as we could specify Theophrastus as the first one to know it. And this solves the problem of how Ibn Sīnā got that syllogism without needing to reference Islamic law. This brings us to (2); it is not probable that Ibn Sīnā got hypothetical syllogism from the Islamic law reasonings, but he more probably got it from the translations of Theophrastus' writings, as Arabs knew the latter and his writings very well. In fact, Ibn Sīnā did not have legal writings or interests in law except to the extent he could expose with it his whole system of philosophy. The field of his actual scientific practices was in medicine, and we know how conditions are the essence of practicing and theorizing in medicine. Therefore, if we denied Theophrastus' influence, medicine would be the best candidate.

All that can be accepted from Yagoubi and Fatahine's argument is that Muslim (not Arabian) logicians reinforced but did not discover the hypothetical syllogism. This makes some sense to El-Rouayheb's project.

Yagoubi and Fatahine tried to support their position by a quotation from Piaget about hypothetical syllogism that "Such reasoning largely ignored in this general form by classical logic," but I think Yagoubi and Fatahine missed the point. Piaget was talking about hypothetical syllogism as a metalanguage notion not as an object language law like the one on which Theophrastus and Boethius worked, thus he uses "→" and "imply" as metalingual signs; that is why Piaget said "ignored … by classical logic;" he means ignored as a rule.

We come now to Arabs and truth. Mlika in his paper *Perspectives on the Notion of Truth in the Arabic Philosophy* tries to perform mainly twofold tasks: 1) to refute Paul Jorion's claim in his book *Comment la vérité et la réalité sont inventées*; that "truth was born in 4th century BC Greece, and "reality" (objective) in 16th century Europe." Under this refutation he is questioning the idea that Arabic philosophy and sciences were just images of the Greek, an idea which Moubarez insisted on, 2) and to understand the kind of truth which Arabic philosophers claim. Concerning the first point, Mlika points out that the notion of truth was prevalent in Arabic systems of knowledge; we find even trivalence suggestions in some of these systems (Rhetoric for example). To understand the notion of truth in Arabic philosophers, Mlika studies it in four eminent Arabic philosophers: al-Kindī, al-Fārābī, Ibn Sīnā and Ibn Rušd. From this study one realizes how Arabian philosophers were realistic and objective concerning truth; truth is transcultural (al-Kindī), its core is logic (al-Fārābī and Ibn Sīnā) and one and unique (Ibn Rušd). From this Mlika claims that the Arab philosophers' notion of truth is a good tool for supporting rationality against religious fundamentalism. But I see that history falsifies what Mlika seeks, the failure of Arab philosophers themselves is the greatest evidence against Mlika's project, this project is a repetition of a failure. I notice, in passing, that Mlika did not answer the question of whether Arabic philospophy and sciences is an image of the Greek or not.

If Moubarez tried to join Ibn Sīnā with Kant, Professor Forster tried to join Islamic alchemy and Max Weber. Forster in her paper *Reaching the Goal of Alchemy – or: What Happens When You Finally Have Created the Philosophers' Stone?*, tries to discover the real goal of Islamic alchemy, especially of Ibn Arfaʿ Raʾs, which is different from the western one. She tries to prove that this goal is not to get gold by the transformation of metals but to become divine through knowledge and grasping the all truth. Gold appears as a by-product in this process; hence it is gifted to the poor. Collecting gold is not a goal in itself. Do we find here seeds of capitalism *a la* Weber? Forster did not say that directly, but I think the reader would feel it after reading her prominent paper. However, Professor Forster's analysis is not external, i.e. it is not socially trying to discover the sociological factors in Islamic thought and culture, on the contrary it is internal, i.e. trying to grasp the intellectual essence of Arabic and Islamic *al-chemy*, i.e. truth.

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 9:1 (2020), pp. 5—11
DOI: 10.2478/sh-2020-0002

Three Notes on the Method of Analysis and Synthesis in its Ancient and (Arabic) Medieval Contexts

Hany Moubarez

Ain Shams University
Abbasia sq., Al-Khalifah Al-Maamoun Street
11566 Cairo, Egypt

e-mail: hany.moubarez@art.asu.edu.eg

Abstract:
Most historians and philosophers of philosophy and history of mathematics hold one interpretation or the other of the nature of method of analysis and synthesis in itself and in its historical development. In this paper, I am trying to prove – through three points – that, in fact, there were two understandings of that method in Greek mathematics and philosophy, and which were reflected in Arabic mathematical science and philosophy; this reflection is considered as proof also of this double nature of that method. Thus, we have to rethink the nature of Arabic philosophy systems.
Keywords: Analysis, synthesis, Arabic philosophy, history and philosophy of mathematics.

1. Introduction and the First Note on the Method of Analysis and Synthesis in its Ancient Context

The modern historiography about the method of analysis and synthesis, as a method of discovering (analysis) and proving (synthesis) had been in agreement up to the first quarter of the last century on its nature and structure (For example: [17 I, pp. 137-42] where he cites the historians before him, such as Cantor) according to Pappus' famous passage [29 BK. 7, pp. 1-2] on the one hand, and to the scholium to Euclides' XIII [17 iii, p. 442] on the other hand [13, p. 47, n.1], [32, p. 464], [25, p. 318]. According to both of these passages the modern historiography on the method had been reconstructing its logical structure as follows [16 I, pp. 399-401; 32, p. 464-65; 17 I, pp. 139-41; 27, pp. 198-99]: if we have a mathematical proposition/problem (usually a construction) and we want to discover a proof for it, just to assume that it is proved, then to *deduce* from it a proposition and from this another one up to arriving at a proposition in which it is known that it is true (a theorem or first principle). This is the end of analysis by which we discovered the required proposition(s) for our proof. Consequently, the synthesis starts out from the last true proposition(s); by going back *deductively* following our same steps in analysis until we arrive at the original and the sought proposition/construction to be proved/constructed. In doing so we would have proved the original proposition/construction. This could be depicted logically as follows [25, p. 321], [24, p. 71], [cf. 27, pp. 200-204, 209-22, for a quantified formulation]:

Analysis: p → q → r→ s

Synthesis: s → r→ q→ p

But if the analysis ends up with a false proposition, then the original proposition/construction will be false/impossible [29 BK, 2], [32, p. 465], [17 I, p. 140], [24, p. 73].

This understanding of the method of analysis and synthesis is allegedly supported by its practices in Archimedes' *On the Sphere and the Cylinder II*, Apollonius' *Conics and Cutting-off a Ratio* and the alternatives proofs of Euclide XIII 1-5 [27, pp. 195, 197]. However, this reconstruction rests on two assumptions:

1. That both steps of analysis and synthesis are convertible or reciprocal [32, p. 465], [15, p. 1]. But this is logically imprecise [25, p. 321], [18, pp. 33-34], [24, p. 71]. Anyway, most of the proponents of the modern historiography believed in that; Menn [27, p.199] is an exception. In fact, the order of the steps of analysis and synthesis in the practices of Archimedes' *On the sphere and the Cylinder II* and Apollonius' *Conics and Cutting-off a Ratio* are not the same [1, pp. 138-41].
2. That the steps of analysis are *deductive* from the conclusion to the true/false proposition(s).

But since Cornford's work [13] we have had a new understanding for the method. Cornford rejected the above two assumptions and insisted instead that the steps of analysis are not deductive; what we are doing in the analysis is that we are trying by intuition [*Ibid*., p. 43] to grasp ἅπτειν upwardly a proposition from which the sought proposition/construction implies. He supported his understanding by passages from Aristotle *Met.* 1051a:21-30[1]; *NE, iii, 3* 1112b15-27[2] and Themistius *on Anal. Post. I*., 12[3]. [*Ibid*., pp. 44-45]. Again, we are trying to reach another proposition, if any, from which this last proposition implies, and so on. When we reach a proposition known to be true the analysis is finished, and then we would be ready to start our synthesis from it deductively downward to our sought proposition/construction [*Ibid*., p. 47, n.1]. So the method of discovery or analysis is intuitive while the method of proof or synthesis is deductive. Thus we don't need also the first defective assumption in the classical understanding of the method. According to Cornford, Pappus' report doesn't imply this, he added in his account of the analysis ἑξῆς (succession) which means that its steps are not logical consequences [*Ibid*.]. Cornford connected this understanding of the method and the method itself with Plato's dialectic in *The Republic* 509c-511d [*ibid*., pp. 48-49] which, from his point of view, associates with the method described in *Phaedrus* 265d-266c, i.e. the method of collection συναγωγή and division [ibid., pp. 184-87, 263-68], [cf. 33, p. xliii], [21, p. 300]. Thus, the mathematical analysis reaches upwardly to a hypothesis while the philosophical dialectic reaches to first principles ἀρχαί [Benson, 11, p. 96]. On the other hand, synthesis proves its conclusion downwardly by division διαίρεσις. Thus, Cornford supported Diogenes Laertius [14, III 24] and Proclus [30, 211, pp. 18-23] who claimed that the method of analysis and synthesis went back to Plato (Although Cornford of course concedes that Plato developed it from the mathematical practice of his day [13, p. 44]).

Ian Mueller, in his [28] tried to follow Cornford's footsteps, having added new evidence from Philodemus' history of Platonic school that Plato developed the analysis [*Ibid*., pp. 171-172] he worked on connecting the method of analysis and synthesis with Plato's method of hypothesis in *Meno* 86e4-87b2 on the one hand, and reconstructed it to fit the method of analysis on the other hand. Thus, he considered analysis as arriving at a sufficient and necessary condition διορισμός for our sought proposition/construction [*Ibid*., p. 175 ff.].

Although Stephen Menn [27] accepted that the method of analysis and synthesis went back to Plato, he tried to reconstruct it according to the understanding of modern historiography for it [*Ibid*., p. 212], rejecting its first assumption [*Ibid*., p. 198] and interpreting Aristotle *Post. Anal. I*, 12 78a7-13[4]; SE 16 175a26-28[5]; in addition to *NE, iii,* 3 1112b15-27 and his commentators (criticizing them in reality) to fit his reconstruction [*Ibid*., pp. 204-08].

How could we reconcile these opposite understandings, especially in regard to ancient analysis? Gulley in his [15], and after him Mahoney [25, p. 324] and Knorr [22, p. 355] noticed that there were two different formulations of analysis in Pappus' passage [15, p. 13] one (F1) defined

the analysis "as an upward movement to prior assumptions from which an initial assumption follows" [*Ibid*., p.1] this is [29 BK. 1, pp. 13-14] "ἐν μὲν γὰρ τῇ ἀναλύσει, τὸ ζητούμενον ὡς γεγονός ὑποθέμενοι τὸ ἐξ οὗ [τοῦ] τοῦτο συμβαίνει σκοπούμεθα / That is to say, in analysis we assume what is sought as if it has been achieved, and look for the thing from which it follows." The other formulation (F2) defined the analysis "as a downward movement of deduction from an initial assumption," so it is convertible with the synthesis [15, p. 1], this is [Pappus BK. 2, pp. 27-28] "γένους τὸ ζητούμενον ὡς ὄν ὑποθέμενοι καὶ ὡς ἀληθές, εἶτα διά τῶν ἑξῆς ἀκολούθων / we assume what is sought as a fact and true advancing through its consequences."

Gulley [15, p. 13] tried to show that there were two sources for Pappus. He couldn't define the source for (F2) [*Ibid*.; Knorr in 22, p. 56 defined it as Heron], but he defined the source for (F1) in addition to Plato as Aristotle [*Ibid*., pp. 6-8, Knorr in 22, pp. 356-7 defined it as Pappus' contemplations on the philosophers], while Mahoney [25, pp. 325-26] considered it as an interpolation. Gulley used for supporting his position the same texts which Menn [27, pp. 204-209] considered as an evidence for understanding the analysis as (F2) without reciprocity. And he tried to prove his thesis by evidence from Aristotle's commentators, especially Themistius [15, pp. 9-10], the same Themistius whom Menn considered misunderstood Aristotle's passages, and he instead blaming Themistius blamed Philoponus for his misunderstanding Aristotle [*Ibid*., pp. 11-12].

What Gulley [15], Mahoney [25] and Knorr's [22] suggests is that there were two different formulations of the method of analysis, and let us guess accordingly the following:

1. Both proponents of the modern historiography understanding and their antagonists have had the same historiographical presupposition, i.e. that the ancients had only one and unique understanding of the method of analysis and synthesis. Consequently, both of them tried to grasp this unique meaning. But if we give up that presupposition and instead adopt another one which permits us to claim that there was more than one understanding (two traditions) of the method of analysis and synthesis, the conflict will be resolved, and we shall have a better understanding of the ancient concepts of analysis and synthesis. In fact, this is what the evidence of both camps says. Mahoney [25, p. 319] was inclined to think that there were many techniques of analysis, but this is a strategy for analysis not a theory of it).
2. That the source of both formulations was Aristotle [cf. 2, pp. 99-101], [22, p. 357] concerning Aristotle as a source for Pappus] one of them was adopted by the commentators with its obscurity, and the other by the mathematicians.

What supports the above is that methodology of mathematics of the Arabian mathematicians (which is, in some respect or other, a faithful heir to the Hellenistic tradition) had reflected those two traditions in understanding the methodology of analysis and synthesis.

2. The Second Note: Arabian Mathematicians and the Method

The Arabian mathematicians didn't know the formulation of the method of analysis and synthesis from Pappus, 1-2 [2, p. 16], they instead probably knew it from ps. Euclid *xiii*, 1-5, but surely from al-Nayrīzī's (865-922) commentary on Euclid's *book ii*[6] [6, p. 22]. al-Nayrīzī's passage is so obscure that it states that the analysis is demonstrating the sought problem, which means that it accords to (F1) not (F2) as Knorr believed [22, pp. 354-55]. But from the other hand the practices of analysis and synthesis in al-Nayrīzī's commentary are compatible with (F2). Moreover, there is no mention of convertibility. But from a criticism of the method of analysis and synthesis in Ibn Sinān's (908-946) treatise on the method of analysis and synthesis [10, p. 230] that there is no convertibility between analysis and synthesis while there should be, one could infer that the Arabian mathematicians knew a) ps. Euclid *xiii*, 1-5. And b) found discrepancy between the practice of the method in Archimedes, for example, and its formulation in ps. Euclid *xiii*, 1-5. This led the Arabian mathematician Ibn Sinān to reconcile the practice and theory. In his reconciling one should notice that he tried to gather between (F2) and the practices of analysis in Archimedes' *Sphere and Cylinder BK ii*, i.e. analysis as a deduction and (F1), exploiting the obscurity of al-Nayrīzī's definition. Thus, he reached his new and inventive definition for analysis i.e. the analysis as

searching for the sufficient and necessary conditions for the sought problem (cf. Ibn Sinān text in [10, pp. 230-32] and his classification of the geometrical problems [12, p. 19]).
It seems that al-Sijzī (951-1024) tried to remedy this position by adopting (F1) once and for all in his definition to analysis: "He [The Geometer] assumes the desired aim as if it were already constructed, if the aim is a construction, or he assumes that it is true, if the aim is the investigation of a special property. Then he unravels (analyses) it by means of a succession of preliminaries, or by means of (mutually) linked preliminaries, until he ends up with correct and true preliminaries, or with false preliminaries. If he ends up with true preliminaries, the desired thing can be found as a consequence. If he ends up with false preliminaries, the impossibility of the desired thing follows. This is called: analysis by inversion" [7, p. 12. Cf. J. Hogendijk and M. Bagheri's introduction to the text, also 12, p.17]. However, both Ibn Sinān and al-Sijzī ended up in determination of new logico-mathematical concepts which were not found in Greek mathematics [10, pp. 227-28], which led, in turn, to change in the concept of 'the given' to be the 'known' [2, pp. 25-28], which influenced Ibn al-Haythem epistemology [31].

Thus, we see that there were differences in the definitions of analysis in Arabic mathematics, and this was a *reflection* of its Greek correspondent.

3. The Third Note: Analysis and Synthesis in Arabic Philosophy

The study of method of analysis and synthesis in Arabic and Islamic philosophy didn't attract the attention of the scholars in contrast to its study in the medieval mathematical Arabic corpus by the historians of science. However, this position is nearly the same in relation to the history of the Hellenistic philosophy[7] (with some exceptions) in contrast to Greek mathematics and Plato and Aristotle's philosophy.

However, we could define in principal two traditions in understanding and using the method of analysis and synthesis. The first one goes back to al-Fārābī, and the other to Ibn Sīnā.

In fact, although we could infer that al-Fārābī knew the ps. Euclid *xiii* scholium because he talked about the method of analysis and synthesis in his [3, p. 60] in a way compatible with it, but he influenced the method of analysis and synthesis through Plato's dialectic. Thus, he called it the method of division and synthesis (Tarkīb): "When a universal was taken and joint with opposite matters being predicated non-absolutely on this universal and put between each two [of these predicates] the conjunction 'or', such as our saying that animal is either bipedal or non-bipedal, This action is called division/Qesmah" [5, p. 36]. This understanding of the method stemmed from his reading of the method of collection and division in *Phaedrus*. Thus, he comments on this dialogue by saying: "Then he [Plato] investigated the methods that the man who aims at philosophy should use in his investigation. He mentioned that they are the method of division and the method of bringing together. Then he investigated the method of instruction: how it is conducted by two methods – the method of rhetoric and another method he called dialectic; and how both of these methods can be employed in conversation and in speaking and employed in writing" [4, pp. 26-27]. Therefore, we should ask how did al-Fārābī, as an aspiring philosopher, use this method of analysis and synthesis in its dialectic form in his philosophy? And what was its relationship with his understanding of using this method in mathematics? And in neo-platonic philosophy? Also, was there any difference between this method and dialectics/al-jadal which al-Fārābī put in a second rank to proof/Burhān?

If al-Fārābī had appealed to Plato in his version of Analysis and synthesis, Ibn Sīnā had appealed to his understanding of Aristotle and his commentators, on the one hand, and his experience in geometry, on the other hand. Thus, he understood the method of analysis as (F1), and this is clear in his commentary on *Poster Analytics*, I 12 78a7-13: "if there were a sought thing, and wanted a syllogism for by *analysis by inversion* …"[8] [20, p. 199]. Therefore, "by synthesis they are proceeding step by step from a problem to another without prejudicing of premises which have a middle term, and without leaving these premises unless they have elucidated them by near syllogism from them, also any additions should be limited, and the way should be methodized"[9]

[*Ibid*.]. His understanding of analysis as (F1) ascertained by his explanation of the geometrical problem as follows: "but the geometrical problem, for example, is either from a premise which being true and apparent by the geometrical methods"[10] [*Ibid*., p. 193]. It is clear that Ibn Sīnā, in addition to his being influenced by Aristotle and his commentators, was influenced also by al-Sijzī (note the expression analysis by inversion of both of them). This confirms our suggestion about reflection of the Greek context in the Arabic one.

Here a more important question arises: did Ibn Sīnā program his philosophy on a model of analysis and synthesis as Kant did in his Critique (synthesis) and Prolegomena (analysis)? Ibn Sīnā said in his introduction to al-Šifāʾ: "our aim in this book … is to put in it the gist of elements of the philosophical sciences of the ancients which we verified, and which being structured on the ordered and verified thought"[11] [19, p. 9]. Then he described another book for him: "I have another book other than those two books [al-Šifāʾ & the consequences or al-Lāwāheq], put in it philosophy as it is … It is my book al-Falsafah al-Mashraqyahʾ, but this book [al-Šifāʾ] is more presentable and extremely more helpful with the Peripatetics partners"[12] [*Ibid*., p. 10]. If we could answer this question, we will also solve a long running controversy concerning the book of *'al-Falsafah al-Mashraqya*' since Ibn Ţufayl up to today [cf. Madkour's introduction to 19, pp. 19-23]. But the most important thing is that we will also be able to put our hands on the climax of the method of analysis and synthesis in its ancient Greek and Arabic mathematical and philosophical contexts.

References

1. Acerbi, F. The language of "Given" its forms and its use as a deductive tool in Greek mathematics, *Arch. Hist. Exact Sci*. 65, 2011, pp. 119-153.
2. Acerbi, F. Pappus, Aristote et le ΤΟΠΟΞ ΑΝΑΛΥΟΜΕΝΟΞ, *REG* 124, 2011, pp. 93-113.
3. al-Fārābī. *Iḥṣāa al-ᶜlūm*, edited with Spanish trans. by A. G. Palencia, Madrid: Maestre, second edition, 1953.
4. al-Fārābī. *Philosophy of Plato and Aristotle*, edited and transleted by M. Mahdi, New York: The Free Press of Glencoe.
5. al-Fārābī. *Kitāb al-lfāẓ Al-Musṭaᶜmalah fī al-Manṭiq*, edited by M. Mahdi, Beirut: Dār al-Mashriq, second edition, 1968.
6. al-Nayrīzī. *The Commentary of Al-Nayrīzī. on Books II-IV of Euclid's Elements of Geometry*, transleted by A. Lo Bello, Leiden: Brill, 2009.
7. al-Sijzī. *Al-Sijizī's Treatise on Geometric Problem-Solving*, transleted by J. Hogendijik and M. Bagheri, Tehran: Fatemi, 1996.
8. Aristotle. *Complete Works*, Jonathan Barnes (ed.), Princeton: Princeton University Press, 1991.
9. Aristotle. *Nicomachean Ethics*, ed. & trans. By Roger Crisp, Cambridge: Cambridge University Presss, 2004.
10. Bellosta, H. 'Ibrāhīm Ibn Sinān: on Analysis and Synthesis', In *Arabic Sciences and Philosophy*, vol. 1, 1991, pp. 211-232.
11. Benson, H. H. 'Plato's Method of Dialectic' In Hugh H. Benson (ed.), *A Companion to Plato*, Oxford: Blackwell Publishing Ltd., 2006.
12. Berggren, J. L. & G. Van Brummelen. The Role and Development of Geometric Analysis and Synthesis in Ancient Greecce and Medieval Islam, In P. Suppes, J. M. Moravcik & H. Mendell (eds.), *Ancient & Medieval Traditions in the Exact Sciences*, California: CSLI Publications, 2000.
13. Cornford, F. M. Mathematics and Dialectic in the Republic of Plato VI-VII, *Mind* 41 (161), 1932, pp. 37-52.
14. Diogenes Laeritius. *Lives of Eminent philosophers*, V.I, R. D. Hicks trans., London: Willian Heinmann, 1925.
15. Gulley, N. Greek Geometrical Analysis, In *Phronesis* 3, 1958, pp. 1-14.

16. Heath, T. L. *A History of Greek Mathematics*, 2 vols., New York: Dover, 1981; orig. publ. Oxford: Oxford University Press, 1921.
17. Heath, T. L. *The Thirteen Books of The Elements*, 3 vols., 2nd ed., tr. T. H. Heath, New York: Dover, 1956; orig. publ. Cambridge: Cambridge University Press, 1925.
18. Hintikka, J. & U. Remes. *The Method of Analysis*, Dordrecht: D. Reidel, 1974.
19. Ibn Sīnā. *al-Shifāʾ*, *al-Manṭiq, al-Madkhāl*, edited by M. El-Khodeiri, G. Anawati, F. El-Ahwani, Maṭ-baʿa al-amīrīya, 1952.
20.Ibn Sīnā. *al-Shifāʾ*, *al-Manṭiq, al-Burhān*, edited by A. ʿAfīfī, Cairo: al-Maṭ-baʿa al-amīrīya, 1956.
21. Kahn, C. H. *Plato and the Socratic Dialogue*, Cambridge: Cambridge University Press, 1996.
22. Knorr, W. R. *The Ancient Tradition of Geometrical Problems*, New York: Dover, 1993.
23. Lakatos, I. *Mathematics, Science and Epistemology*, Cambridge: Cambridge University Press, 1978.
24. Lakatos, I. The Method of Analysis-Synthesis, In I. Lakatos, *Mathematics, Science and Epistemology*, Cambridge: Cambridge University Press, 1978, pp. 70-103.
25. Mahoney, M. S. Another Look at Greek Geometrical Analysis, *Archive for History of Exact Sciences* 5, 1968-9, pp. 319-48.
26. Makin, S. (trans.). *Aristotle Metaphysics: Book Θ*, Oxford: Clarendon Press, 2006.
27. Menn, S. Plato and the method of Analysis, *Phronesis* 47 (3), 2002, pp. 193-223.
28. Mueller, I. Mathematical method and Philosophical Truth, In Richard Kraut (ed.), *The Cambridge Companion to Plato*, Cambridge: Cambridge University Press, 1980.
29. Pappus. *Book 7 of the Collection*, Part I, edited and translated by A. Jones, New York: Springer Science + Business Media, 1986.
30. Proclus. *A Commentary on the First Book of Euclide's Elements*, translated by G. R. Morrow, Princeton: Princeton University Press, 1992.
31. Rashed, R. La philosophie des mathématiques d'Ibn al-Haytham-II: 'Les Connus', *Mélanges d'Institut Dominicain d' Etudes Orientales du Caire* 21, 1993, pp. 87-275.
32. Robinson, R. Analysis in Greek Geometry, *Mind* 45 (180) 1936, pp.464-473.
33. Stenzel, J. *Plato's Method of Dialectic*, translated by D. J. Allen, New York: Arno Press, 1973.
34. Themistius. *In Aristotelis Analyticorum Posteriorum Paraphrasis*, ed. Wallies M. CAG V/1, Berlin: Reimer, 1900.

Notes

1. And the constructions/diagrammata are discovered in actuality; for they discover them by dividing. If they had been divided, they would have been evident; but as it is they are in there potentially. Why does the triangle have two right angles? Because the angles around one point are equal to two right angles. So, if the line parallel to the side had been drawn up, it would have been clear immediately on seeing it. Why is there universally a right angle in the semi-circle? Because if three lines are equal, the two which are the base and the one dropped straight from the center, it is clear on seeing it to the person who knows that. So that it is evident that the things which are potentially are discovered when they are drawn out into actuality; the explanation is that thinking is the actuality Makin's [26] trans. Note that Cornford [13, p. 44] translates νόησις by intuition not thinking).
2. "Rather they establish an end and then go on to think about how and by what means it is to be achieved. If it appears that there are several means available, they consider by which it will be achieved in the easiest and most noble way; while if it can be attained by only one means, they consider how this will bring it about, and by what further means this means is itself to be brought about, until they arrive at the first cause, the last thing to be found. For the person who deliberates seems to inquire and analyse in the way described as though he were dealing with a geometrical figure (it seems that not all inquiry is deliberation – mathematics, for example – but that all deliberation is inquiry), and the last step in the analysis seems to be the first that comes to be" (Crisp's trans. In [9]).
3. "Assume a true conclusion and then discovering the premises by which it is inferred" (Cornford's trans.).
4. "If it were impossible to prove truth from falsehood, it would be easy to make an analysis; for they would convert from necessity. For let *A* be something that is the case; and if this is the case, then *these* are the case (things which I know to be the case, call them *B*). From these, therefore, I shall prove that the former is the case. (In mathematics things

convert more because they assume nothing accidental— and in this too they differ from argumentations—but only definitions.)" [8]

5. "Sometimes too it happens as with diagrams; for there we can sometimes analyse the figure, but not construct it again" [8, Construct= συνθεῖναι=synthesize].

6. "As for analysis, lo, it is when some question or other is posed to us, and we say, "We suppose that what is sought is true." Then we resolve it to something whose proof is already had. Then, when it has been demonstrated, we say, "That which is sought has been found by analysis." And as for synthesis, that is when one begins with the known things; then one, combines them until the unknown is found, and with that the unknown. as been proven by synthesis." (For other translations to this passage, see: [18, p. 93; 22, p. 376, n.83].

7. Donald Morrison is working on a project for studying the method of analysis and synthesis in Hellenistic philosophy since the nineties of the last century, but he has published only one paper. See his website for more information: http://report.rice.edu/sir/faculty.detail?p=A8709E12164110EA.

8. "...فإذا كان مطلوب وأريد أن يطلب له قياس من جهة التحليل بالعكس".

9. " وبطريق التركيب يتدرجون من مسألة إلى مسألة من غير أن يُخلوا بمقدمات ذات وسط ويتجاوزا عنها إلا بعد إيضاحها بالقياسات القريبةة منها، ويكون التزيد فيها تزيداً محدوداً والطريق منهوجاً".

10. "بل المسألة الهندسية مثلاً إنما هى إما عن مقدمة صحت وبانت بالطرق الهندسية".

11. "فإن غرضنا فى هذا الكتاب...أن نودعه لباب ما تحققناه من الأصول فى العلوم الفلسفية المنسوبة إلى الأقدمين، المبنية على النظر المرتب المحقق".

12. " ولى كتاب غير هذين الكتابين، أوردت فيه الفلسفة على ما هى فى الطبع... . وهو كتابى 'الفلسفة المشرقية'. وأما هذا الكتاب فأكثر بسطاً، وأشد مع الشركاء من المشائين مساعدة".

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 9:1 (2020), pp. 12—18
DOI: 10.2478/sh-2020-0003

The Status of Conditional Syllogism in Syllogistics

Yagoubi Mahmmoud

University of Algiers
23 Street Ali Ramli, Bouzareah, Algeria

e-mail:yyagoubi@hotmail.com

Moussa Fatahine

University of Khemis Miliana
Hay Essalem 200 Lgs-Bp 51
Khemis-Miliana 44013
Algeria

e-mail: m.fatahine@univ-dbkm.dz

Abstract:
The form of the conditional syllogism resembles that of the categorical syllogism, while its subject matter is at least a conditional premise, but its conclusion is always conditional conjunctive or disjunctive. This mixed structure to which we apply the rules of the categorical syllogism, is a structure of which Aristotle did not have an idea, and which the Stoics did not conceive, and which the non-Arabian logicians did not know until in modern times. But what we have to notice here is the putting of a conditional matter in the form of the categorical syllogism, and it is this kind of hybridization, if we dare to say, which generated this mixed structure which appeared for the first time in the history of logic in the treatise on the logic of Ibn Sina and which can be considered a discovery by this author until proof to the contrary, and that the ancient Arabian logicians have taken the habit of exhibiting in their treatises.
Keywords: Ibn Sina, conditional syllogism, categorical syllogism, al-rissala, al-chamssiya, Arabian logicians, structure of conditional syllogism.

We believe that everyone who sufficiently knows the questions of logic and has an exact idea about the structure of the syllogistic conditional would perceive easily that that syllogism has a different structure from the so-called categorical syllogism and hypothetical syllogism.

In fact, the structure of the former always contains a conditional premise (major or minor) according to the special structure of each its five categories, while its conclusion is

always a conjunctive or disjunctive conditional proposition. And the fact of always having a conditional conclusion represents the distinctive trait which differentiates it from the categorical syllogism whose conclusion is always categorical, and from the hypothetical syllogism whose conclusion is also always categorical.

In addition, the mechanism of deduction in the conditional syllogism differs from the one that operates in the two others, because the deduction in the categorical syllogism is done by inclusion of the terms in each other according to the form convenient to its four figures. Concerning the deduction in the hypothetical syllogism, it is done by implication.

Now, the relation utilized from the conditional syllogism is the relation of implication between components of the premises, one of which, either the antecedent or the consequent, is mentioned in the two premises in order to function as a middle term which plays its same rule which it plays in the categorical syllogism, while the other two components take the appearance of the major (grand) term and the minor (petit) term.

Thus, the form of the conditional syllogism resembles that of the categorical one, while its matter is constituted at least of a conditional premise, but its conclusion is always conjunctive or disjunctive conditional.

This mixed structure on which one applies the rules of categorical syllogism is a structure about which Aristotle did not have an idea, and of which the stoics did not conceive, and which the non-Arab logicians did not cognize until modern times.

But what should be noted here is the implementation of a conditional matter disguised in the form of categorical syllogism, and it is this sort of hybridization, if one can call it, which gave rise to that mixed structure that appeared for the first time in the history of logic in Ibn Sīna's treatise on logic (*al-Šhifā'* – Logic-Syllogism, chapters 5-7) [3, p. 381], and which could be considered a discovery by that author until there would be a contrary evidence, and which the ancient Arab logicians used to expose in their treatises.

This curious structure was questioned, and one asked whether the categorical syllogism could not be substituted for the conditional syllogism as long as the latter is governed by the rules of the former, as if there were no difference between saying:

Every animal is mortal
Every man is animal
Therefore, every man is mortal,

and:

Whenever x is animal, it is mortal
and whenever x is man, it is animal
Therefore, whenever x is man, it is mortal

However, the critics of conditional syllogism have found that categorical syllogism is simpler and faster to conclude, and it seemed to them that there is no difference between a categorical conclusion and another which is conditional.

It is certain that the comparison of the two syllogisms aroused controversies between the defenders and detractors who had had no interest in occupation by conditional syllogism which does not settle a conclusion and only suspends a judgment upon another. Thus, conditional syllogism would not be able to settle differences.

What confirms this disagreement between the ancient Arabian logicians of the same period, and attests at the same time that they were freed from the Aristotelian yoke, is what is found mentioned by the logician (ʿOmar Ibn Sahlane al-Sawī, d. 450 A.H.) in his treatise of logic (al-Baṣā'īr al-Naṣīriyya):

> One could retort and say that one does not need these conditional syllogisms because the conditional propositions even those that are not all obvious and those that do not have need syllogism, could be reduced to categorical propositions, and one could say that a conjunctive (C is D) is a consequent of (A is B) and formulate a disjunctive as an alternative, and be content with categorical syllogism in order to demonstrate them. Against this objection we reply that if it were necessary to alleviate, in logic, the pain of multiplying the syllogisms which give the same conclusion so as to satisfy oneself with what replaces them, one should have been satisfied with the first figure that gives the four conclusions, or better with figures which have positive or negative conclusions, because one could reduce positive propositions to negative ones and these to indefinite positive ones. But one was not satisfied with it, and one determined for each conclusion what is right to get, in agreement with the perfection of logical art, and for not making change to the natural state of the propositions. Why then do we prefer here to abbreviate and fix in a single way whose usage is only possible at the cost of changing the propositions away from their natural state, while it is for us to prepare the way for conditional conclusions conditional, whereas categorical syllogisms do not give us such propositions. Now, the most part of geometrical questions are conditional. Thus, the objection turns out to be specious [4, p. 187].

As one can see, the foundation of al-Ssawī's reply is based on a scientific reason which testifies to his knowledge of mathematics. This is what couldn't be contested other than by a person who ignores algebra and geometry even in their practice by the ancient mathematicians. Anyway, this was not a tempest which passed without leaving effects. In fact, the employment of conditional propositions in the form of categorical syllogisms continued but always sustained controversies until the time of al-Šhrīf al-Jūr Jānī (740-816 A.H.) the author of *al-Ta'rīfāt* "who said in his notes on Qoṭb al-Dīn al-Rrāzī's *Commentary on al-Risāla al-Šhamsiyya* the following:

> As there are among categorical propositions those which do not need proof and those which need it, there are also conditional propositions which do not need proof, as when one says: whenever the sun rises it is a day, and those which need it such as one which says: whenever there is a possible being there has to be a necessary one, hence the need to know conditional syllogisms mainly in respect to Euclid's' geometry. And because Aristotle did not deal with this problem in his teachings, some people pretended that one does not need them, given that the knowledge of categorical syllogisms compensates them. Now, this point of view is worthless because there is a notable difference between the two genres of syllogisms [3, p. 231].

Thus, it is very interesting to note in this context that there is in the expression of al-Šharīf Al-Jūr Jānī something which gives the impression that there was a cleavage which split the ancient Arabian logicians into those who hold the legacy of Aristotle in quantity and in quality, and those who had freed themselves from it and treated logical questions according to what the art of thinking allowed and not according to the temperament of Aristotle and his knowledge, because the history of logic proves that Aristotle knew only the logical operations of his time or those which were advanced to him in the Greek language in which he expressed himself and discovered his syllogistics without having invented them from scratch as we take pleasure in asserting all the time.

That because all what he wrote concerning the reflexive forms and the rules of reasoning was accessible to him only by means of a priori, anterior, implicit and innate logic, which he spontaneously was employing as well as his native logic and all other peoples. Anyway, one cannot deny his merits as the first theoretician of reasoning embedded in human nature, and that he determined its rules both normal and specious.
Thus, by our reference to his (first analytics) where h exposed his theory of categorical syllogism, we find his leading form:

If A is affirmed about all B
And B about all G
Necessarily A is affirmed about all G

Which one currently writes under this form:

Every M is T
Every *t* is M
Therefore, every *t* is T

But he did not realize the conjunctive syllogism which was in common usage in his environment and elsewhere:

If *p* then *q*
But *p*
Therefore, *q*

Nor the disjunctive syllogism which was also in common usage in his environment and elsewhere:

Either *p* or *q*
But *p*
Therefore, not *q*

This hypothetical syllogism (conjunctive or disjunctive) discovered by the Stoics became a second form of syllogism which enriched the theory of deduction.

Thus, deduction after Aristotle was being presented under two forms: (1) that of categorical syllogism which consists of three terms that combine two by two into two premises which have in common one of the three terms called the middle term that joins the two premises which give a categorical conclusion. And (2) that of hypothetical syllogism which consists of a conditional proposition (major) and a categorical one (minor) and a categorical conclusion.

And without our being enforcing to try what is beyond our reach by engagement in the labyrinth of psychologism, in order to know the reasons which prevented Aristotle from discovering hypothetical syllogism, and the reasons which diverted the attention of Stoics to find out conditional syllogism to which they were very close, we shall content ourselves with marking the differentiae between the three kinds of syllogism. Categorical syllogism does not include conditional propositions, while hypothetical syllogism includes only one as major and a categorical conclusion.

These two kinds of syllogisms are, if one dares to say, the only syllogisms inherited from ancient Greek logic so that – and until a proof of the contrary – one could assert that it

did not exist at ancient Greeks one indication of another form of syllogism other than categorical and hypothetical ones.

Moreover, even al-Fārābī (d. 339 A.H.) did not know other forms as testified from his writings that have reached to us. At anyway, it is not deniable that Ibn Sīna was the first to expose the form of deduction via two conditional premises having in common one of the two components – the antecedent or the consequent – and that would give a conditional conclusion composed of two other components not common at the two premises.

Up to new information, nothing prevents us from considering Ibn Sīna (370-428 A.H.) as the first one to have conceived the deduction by two conditional premises generating conditional conclusion, which deduction became for the ancient Arabian logicians the object of study, elaboration and improvement by which it acquired the form we found in the later logic treatises like Mohamed Ibn Yūsuf Al-Sinūsī's (832-895 A.H.) "Al-Mu Kẖtaṣar fi Al Mantiq." The manuscript book was written by Ibn Arafa and explained by Ibn Yusuf Al-Ssenussi, achieved and published by M-Yagoubi in 2019. We have already exposed this form of deduction in a previous paper to which we ask the reader to refer.

Now it is perfectly legitimate to ask from where did Ibn Sīna get the idea of the constructing conditional connective syllogism? By conceiving the possibility of treating the two members of the conditional proposition, the antecedent and the consequent, as one treats the two terms of a categorical proposition, the subject and the predicate, also the possibility of applying the rules of categorical syllogism on the conditional one, and this in the nineteen conclusive modes of categorical syllogism.

However, although Ibn Sīna is indebted to al-Fārābī for his mastery of the philosophy of Aristotle, it is nonetheless true that nearly a century separates the two philosophers, and it seems to me this period was large enough for jurists to the development of the rules of applying of Islamic law that were generally presented in the form of chains of judgments which perfectly resemble conditional syllogism via their combination in two judgments which have a component in common which acts as a middle term and authorizes a third conditional judgment as a conclusion. This can be illustrated by the following example:

When dawn rises, one call for prayer
And when one call for prayer one must perform the prayer
Therefore, when dawn rises one must perform the prayer

Where we see that the antecedent of the major forms with the consequent of the minor third condition that is the conclusion of this conditional syllogism in good and due form.

It is quite possible that the syllogisms of jurists are the origin of conditional syllogisms of which he made a happy theory.

From all the above, it turns out that there is a genus of syllogism which neither Aristotle nor the Stoics knew and which neither al-Fārābī nor Ibn Rušd mentioned because they were being confined in commenting on the *Organon* of Aristotle, which enforces the idea that it was Ibn Sīna who conceived and developed a syllogism (sui generis) to which he gave the name of conditional connective syllogism.

This innovation due to Ibn Sīna and which one finds only in the ancient treatises of logic written by Arabs since its creator until Yūsuf Al-Sinūsī's, was ignored during the middle ages by the Europeans who had not had the chance to consult the Arabian logicians oeuvres and were bounded by studying the *Organon* of Aristotle into believing that they could come to pass any other work on logic having discovered it in its original language.

Even if we do not need to repeat what we said in a previous paper on the same matter, we need, however, to emphasize that conditional connective syllogism cannot be underestimated by any professional logician, European or Arabian, who has only learnt logic

by European treatises. But the strange thing in the contemporary era is that some Arabian logicians have ignored this genus of syllogism, failing to discover it in the ancient treatises of logic which they never consulted and that may be disdained.

Thereby we will have attracted the attention of all those who are occupied with philosophy and in particular with logic, concerning the existence of a form of deduction that gives honor to the ancient Arabian logicians and primarily to Ibn Sīna, similar to the categorical syllogism that gave honor to Aristotle, and similar to the hypothetical syllogism that gave honor to the Stoics.

Unfortunately, one can not overlook the point of view of some people who underestimated conditional syllogism and did not give it the quality of citation alongside the other kinds of syllogisms, on doubting that Ibn Sīna may was the initiator, without providing argument to support their doubt. Unfortunately, this was the point of view expressed by Dr. Ibrahim Madkour in his presentation of the edition of Ibn Sīna's *al-Šhifā* (Logic-Syllogism) where he said there: "he [Ibn Sīna] dedicated, without doubt, in his book "qiyās" like his predecessors, chapters for conditional syllogisms. These chapters, so abundant, provide little interest. They represent about three sections and occupy more than one hundred and forty pages" [2, p. 14].

We think that such a statement cannot be made by someone who has taken the pain of studying closely these syllogisms by to a scaled logician with undeniable talent like Ibn Sīna. Because these conditional syllogisms which have escaped the notice of western logicians up to our present day attracted the attention of Jean Piaget (1896-1980), this great contemporary European thinker who is distinguished by his studies concerning the formation of logical operations by children and adults, and who studied the foundation of reasoning based on concepts such as the case with categorical syllogism, incidentally made this note in his "Essai de Logique Opératoire":

> But one can also establish his reasoning on the only inter-propositional combination of judgments: $(p \supset q)\ .\ (q \supset r) \rightarrow (p \supset r)$. This is to say: if p then q and if q then r imply if p then r. Such reasoning largely ignored in this general form by classical logic is then of a higher level of formalism than those of syllogistics, as symbolic analysis shows clearly [1, p. 35].

Conclusion

We have mentioned this declaration, not to support our estimate for conditional syllogism, but rather to confirm that European logicians have overlooked this kind of syllogism with which the best formulation of *scientific laws is made*.

Finally, we would like that today's Arabian logicians become aware of the need to make an inventory of all the works of logic which we inherited from our very numerous logician ancestors, to analyze, to verify and to edit them, in the hope of finding in them what has not been found elsewhere.

References

1. Piaget, J. *Essai de logique opératoire*, Paris: Dunod, 1972.
2. Madhkour I. *Kitab El-Borhan, Ibn Siina*, investiged and publiched by Zaid Said, Egypt: The Ministry of Public Knowledge,1964.
3. Razi K.-E. *Tahrir Elkawaiid el mantiquiya fi chorouh Errissala Achamssiya*, vol. 2, Cairo: Matbaa El - Amiriyah, 1905.

4. Sawi I.-S. *El bassaiir Annaciria*, realization and investiged by Mohammed Abdou, Cairo: Religious Culture Library, 2005

Studia Humana
Volume 9:1 (2020), pp. 19—27
DOI: 10.2478/sh-2020-0004

Theory of Syllogisms with Categorical, Conditional and Disjunctive Connectives Developed by Arabian Logicians

Yagoubi Mahmmoud

University of Algiers
23 Street Ali Ramli, Bouzareah, Algeria

e-mail: yyagoubi@hotmail.com

Moussa Fatahine

University of Khemis Miliana
Hay Essalem 200 Lgs-Bp 51
Khemis-Miliana 44013
Algeria

e-mail: m.fatahine@univ-dbkm.dz

Abstract: In this paper, we are trying to summarize the peak of achievement of the Arabian logicians of the fifteenth century by making a classification and sketching in familiar terms the conditional and subjunctive syllogisms in Muḥammad Ibn Yusūf al-SSinūsī's (1426-1490) work, i.e. in his explanation of *Kitāb al-Muḫtaṣar fī al-Manṭiq* of al-Imām Muḥammad Ibn ʿArafa (1316-1401).
Keywords: Syllogism, Ibn Yusūf al-SSinūsī's, categorical syllogism, conditional syllogism, Muḥammad Ibn ʿArafa, conditional connectives, Arabian logicians, Šarḥ al-Muḫtaṣar.

1. Introduction

The ancient Arabian logicians knew and developed a form of deduction of which neither Aristotle nor the Stoics had an idea about [2, p. 06], i.e. the theory of syllogisms with conditional and disjunctive connectives that they subsumed under five categories and had its completion in Muḥammad Ibn Yusūf al-SSinūsī's (1426-1490) work, i.e. in his explanation of *Kitāb al-Muḫtaṣar fī al-Manṭiq* of al-Imām Muḥammad Ibn ʿArafa (1316-1401).

In fact, Muḥammad Ibn ʿArafa summarized in his book *al-Muḫtaṣar* the discoveries of Ibn Sīnā (980-1037) in his *al-Šifā*, and Naǧm al-Dīn al-Ḫaṭīb (1203-1277) in his *al-Risālā al-Šamsīyya*, and Sirağ al-Dīn al-ʾArmāūī (1198-1283) in his *Maṭālieʿ al-ʾAnwār fī al-Manṭiq* [2, p. 6]. This book, i.e. *al-Muḫtaṣar*, was explained by Muhammad Ibn Yūsuf al-SSinūsī in the last book of his work *Šarḥ al-Muḫtaṣar* [3, pp. 380-381]. We will not, in this paper, trace that development exactly,

instead we will organize, classify and reformulate these syllogisms as they are found in al-SSinūsī's work (*Šarḥ*) as the last form we have had from the ancient Arabian logicians concerning syllogism, keeping in mind that we will put these syllogisms in more readable and familiar form.

The syllogisms that we point out below – in this work – could be subsumed under five categories: conditionals, with two disjunctives, categorical-conditional syllogisms, categorical-disjunctive syllogisms and disjunctive-conditional syllogisms. They are displayed one after another in Section 1, 2, 3, 4, 5, respectively.

2. The First Category: Conditionals

The first category of our syllogisms contains syllogisms that have two premises with conditional connectives having as a common component through its figures: (1) the antecedent of the major premise which is the consequent of the minor premise (the first figure), (2) the consequent of the two premises (the second figure), (3) the antecedent of the two premises (the third figure), or (4) the consequent of the major premise which is the antecedent of the minor premise (the fourth figure).

The components of these complex premises (and of course the components of premises of the other categories to come) are treated as if they be terms of the simple premises of categorical syllogisms, while the common propositions, i.e. those antecedent or consequent, play the role of the middle term of categorical syllogisms. Thus; the syllogisms with conditional connectives are governed by the same rules that govern categorical syllogisms. I shall now sketch these syllogisms with conditional connectives, i.e. syllogisms which have two premises with conditional connectives and a conditional conclusion [2, p. 11].

All the syllogisms are defined by their examples, using a metavariable *x* to denote some objects for inferring some properties about them.

First Figure

BARBARA
Whenever *x* is an animal it is mortal, and whenever *x* is human it is an animal, therefore, whenever *x* is human it is mortal.

CELARENT
Not everything if *x* is a mammal it is a fish, and whenever *x* is a dolphin it is a mammal, therefore, not everything if *x* is a dolphin, it is a fish.

DARRII
Whenever *x* is flying it is winged, and it can happen that if *x* is a mammal it is flying, therefore, it can happen that if *x* is a mammal it is winged.

FERIO
Not everything if *x* is a ruminant it is a carnivore, and it can happen that if *x* is a mammal it is a ruminant, therefore, it cannot happen that if *x* is a mammal it is a carnivore.

Second Figure [1, p. 379]

CESARE
Not everything that if *x* is a carnivore it is herbivore and whenever that *x* is a sheep it is herbivore, therefore, not everything that if *x* is a sheep it is a carnivore.

CAMESTRES
Whenever *x* is carnivorous it is a predator, and not everything that if *x* is a sheep it is a predator, therefore, not everything that if *x* is a sheep it is a carnivore.

FESTINO
Not everything that if *x* is a carnivore it is herbivore, it can happen that if *x* is a mammal it is a herbivore, therefore, it cannot happen that if *x* is a mammal it is a carnivore.

BAROCO
Whenever *x* is a carnivore it is a predator, and it cannot happen that if *x* is a mammal it is a predator, therefore, it cannot happen that if *x* is a mammal it is a carnivore.

Third Figure [1, p. 384]

DARAPTI
Whenever *x* is a lion it is a carnivore and whenever *x* is a lion it is a mammal, therefore, it can happen that if *x* is a mammal it is a carnivore.

FELAPTON
Not everything that is *x* is a camel it is a carnivore, and whenever *x* is a camel it is herbivore, therefore, it cannot happen that if *x* is herbivore it is a carnivore.

DATISI
Whenever *x* is a carnivore it is a predator, and it can happen that *x* is a carnivore it is a mammal, therefore, it can happen that *x* is a mammal it is a predator.

DISAMIS
It can happen that if *x* is a mammal it is a carnivore, and whenever that *x* is a mammal it is a vertebrate, therefore, it can happen that if *x* is a vertebrate, it is a carnivore.

FERISON
Not everything that if *x* is a fish it is a mammal, and it can happen that if *x* is a fish it is a predator, therefore, it can happen that if *x* is a predator it is a mammal.

BOCARDO
It cannot happen that if *x* is a mammal it is a carnivore, and whenever *x* is a mammal it is a vertebrate, therefore, it cannot happen that if *x* is vertebrate it is carnivorous.

Fourth Figure [4, pp. 384-388]

BAMALIP
Whenever *x* is a vegetable it is alive, and whenever *x* is alive it feeds, therefore, it can happen that if *x* feeds it is a vegetable.

CAMENES
Whenever *x* is a dolphin it is a mammal, and not everything that if *x* is a mammal it is a fish, therefore, not everything that if *x* is a fish it is a dolphin.

DIMARIS
It can happen that if *x* is a mammal it is flying, and whenever *x* is flying it is winged, therefore, it can happen that if *x* is winged it is a mammal.

FESAPO
Not everything that if *x* is a ruminant it is a fish, and whenever *x* is a fish it is aquatic, therefore, it cannot happen that if *x* is aquatic it is a ruminant.

FRESISON
Not everything that if *x* is a ruminant it is a fish, and it can happen that if *x* is a fish it is a predator, therefore, it cannot happen that if *x* is a predator it is a ruminant.

3. The Second Category: Syllogisms with Two Disjunctives

The acceptable form of the second category (syllogisms with two disjunctives) has a form in which the common component is presented by a non-whole part in the two premises, it is subject to three conditions: (1) its two premises should be affirmative, (2) one of the premises should be universal, (3) the two premises should be exclusive.

Again all the syllogisms are defined by their examples.

First Figure

BARBARA
One always has that either every human being is mortal or no human being is mortal, and one always has that either a philosopher is not a human being or every philosopher is a human being; therefore, one always has that either no philosopher is a human being or every philosopher is mortal or no human being is mortal.

CELARENT
One always has that either no human being is immortal or every human being is immortal, and one always has that either no philosopher is a human being or every philosopher is a human being; therefore, one always has either no philosopher is a human being or no philosopher is immortal or every human being is immortal.

DARII
One always has that either every human being is an animal or no human being is an animal, and one always has that either no rational being is human or some rational beings are human; therefore, one always has that either no rational being is human or some rational beings are animal or no human being is an animal.

FERIO
One always has that either no man is immortal or every man is immortal, and one always has that either no animal is human or some animals are human; therefore, one always has that either no animal is human or it cannot happen that some animals are immortal or every human being is immortal.

Second Figure [1, pp. 388-392]

CESARE
One always has that either no human being is immortal or every human being is immortal, and one always has that either no philosopher is immortal or every philosopher is immortal; therefore, one always has that either no philosopher is immortal or no philosopher is human or every human being is immortal.

CAMESTRES
One always has that either every physician is a human being or no physician is human, and one always has that either every stone is human or no stone is human; therefore, one always has that either every stone is human or no stone is a physician or no physician is human.

FESTINO
One has always that either no human being is immortal or every human being is immortal, and one always has that either no being is immortal or some beings are immortal; therefore, one always has that either no being is immortal or some beings are human or every human being is immortal.

BAROCO
One always has that every philosopher is human or no philosopher is human, and one always has that either every physician is human or some physicians are human; therefore, one always has that either every physician is human or some physicians are not philosophers or no philosopher is human.

Third Figure

DARAPTI
One always has that either every human being is mortal or no human being is mortal, and one always has that either every human being is an animal or every human being is an animal; therefore, one always has that either no human being is an animal or some animals are mortal or no human being is mortal.

FELAPTON
One always has that either no human being is an animal or every human being is an animal, and one always has that either no human being is rational or every human being is rational; therefore, one always has that no human being is rational or some rational beings are not animals or every human being is an animal.

DATISI
One always has that either every philosopher is human or no philosopher is human, and one always has that either no philosopher is immortal or some philosophers are immortal; therefore, one always has that no philosopher is immortal or some immortals are human or no philosopher is human.

DISAMIS
One always has that either some humans are immortal or no human being is immortal, and one always has that either no human being is an animal or every human being is an animal; therefore, one always has that either no human being is an animal or some animals are immortal or no human being is immortal.

FERISON
One always has that either no human being is an animal or every human being is an animal, and one always has that either no human being is rational or some human beings are rational; therefore, one always has that either no human being is rational or some rational beings are not animals or every human being is an animal.

BOCARDO
One always has that either some human beings are philosophers or every human being is a philosopher, and one always has that either no human being is immortal or every human being is immortal; therefore, one always has that either no human being is immortal or some immortals are not philosophers or every human being is a philosopher.

Fourth Figure [1, pp. 415-423]

BAMALIP
One always has that either every human being is an animal or no human being is an animal, and one always has that either no animal is mortal or every animal is mortal; therefore, one always has that either no animal is mortal or some mortals are human or no human being is an animal.

CAMENES
One always has that either every human being is an animal or no human being is an animal, and one has always that either every animal is mortal or no animal is mortal; therefore, one always has that either every animal is mortal or no mortal is human or no human being is an animal.

FESAPO
One always has that either no human being is immortal or every human being is immortal, and one always has that either no immortal is an animal or every immortal is an animal; therefore, one always has that either no immortal is an animal or some immortals are not humans or every human being is immortal.

DIMARIS
One always has that either some animals are mortal or no animal is mortal, and one always has that either no mortal is divine or every mortal is divine; therefore, one always has that either no mortal is divine or some divines are animals or no animal is mortal.

FRESISON
One always has that either no carnivore is an herbivore or some carnivore beings are herbivorous, and one always has that either no herbivorous being is a fish or some herbivorous beings are fishes; therefore, one always has that either no herbivorous being is a fish or some fishes are carnivorous or some carnivorous beings are herbivorous.

4. The Third Category: Categorical-Conditional Syllogisms

The third category consists of a categorical proposition and a conditional proposition. Its acceptable form is whenever the categorical proposition is the major premise and a connection is made with the consequent of the conditional premise. For this to be conclusive (1) the conditional should be affirmative, (2) and the conclusion should be conditional its consequent to be the synthesis of (a) the consequent of the conditional of the premise (b) and the major. With this form one can construct its figures which some logicians describe as ‘embarrassed.’

First Figure [1, pp. 393-425]

BARBARA
All organisms are breathing, and whenever that which is nourished is a human being it is an organism; therefore, whenever that which is nourished is a human being it is breathing.

CELARENT
No herbivore is carnivorous, whenever a camel is a ruminant it is herbivore; therefore, whenever a camel is a ruminant it is not a carnivore.

DARII
All birds are winged, whenever an animal is a mammal then some animals are birds; therefore, whenever an animal is a mammal then some animals are winged.

FERIO
No ruminant is carnivorous, whenever an animal is a mammal then some animals are ruminant, and whenever an animal is a mammal then some animals are ruminant; therefore, whenever an animal is a mammal then some animals are not carnivorous.

Second Figure

CESARE
No carnivore is herbivore, whenever a ruminant is a mammal, then it is a herbivore; therefore, whenever a ruminant is a mammal, then no ruminant is a carnivore.

CAMESTRES
Every predator is carnivore, whenever a carnivore is an herbivore, then no herbivore is carnivore; therefore, whenever no carnivore is an herbivore, then no herbivore is a predator.

FESTINO
No carnivore is an herbivore, whenever an animal is a mammal, then some animals are herbivores; therefore, whenever no animal is a mammal, then some animals are not carnivores.

BAROCO
Every predator is a carnivore, whenever an animal is a mammal, then some animals are carnivores; therefore, whenever an animal is a mammal, then some animals are not predators.

Third Figure [1, pp. 415-426]

DARAPTI
Every bat is an animal, whenever a bat is a bird, then it is winged; therefore, whenever a bat is a bird, then some winged animals are mammals.

FELAPTON
No camel is a predator, whenever a camel is a ruminant, then it is an herbivore; therefore, whenever a camel is a ruminant, then some herbivores are not predators.

DATISI
Every predator is a carnivore, whenever a predator is marine, then some predators are sharks; therefore, whenever a predator is marine, then some sharks are carnivores.

DISAMIS
Some camels are two-humped, whenever a camel is a ruminant, then it is a herbivore; therefore, whenever a camel is a ruminant, then some herbivores are two-humped.

FERISON
No fish is a mammal, whenever a fish is a shark, then some fishes are carnivores; therefore, whenever a fish is a shark, then some carnivores are not mammals.

BOCARDO
Some animals are not carnivores, whenever an animal is a mammal, then it is a vertebrate; therefore, whenever an animal is a mammal, then some vertebrates are not carnivores.

Fourth Figure [1, p. 423]

BAMALIP

All plants are organisms, whenever an organism is breathing, then it is nourished; therefore, whenever every organism is breathing, then something that is nourished is a vegetable.

CAMENES
Every dolphin is a mammal, whenever no fish is a mammal, then no mammal is a fish; therefore, whenever no fish is a mammal, then no fish is a dolphin.

DIMARIS
Some mammals are birds, whenever a bird is an animal, then it is winged; therefore, whenever a bird is an animal, then some winged beings are mammals.

FESAPO
No ruminant is a fish, whenever a fish is a shark, then it has gills; therefore, whenever a fish is a shark, then something with gills is not a ruminant.

FRESISON
No ruminant is a fish, whenever a fish is a shark, then some fishes are predators; therefore, whenever a fish is a shark, then some predators are not ruminants.

5. The Fourth Category: Categorical-Disjunctive Syllogisms

The syllogisms of the fourth category consist of a categorical proposition (the major) and a disjunctive proposition (the minor). It is of two kinds:

1) The first kind is one whose number of its categorical propositions is equal to the number of its disjunctive propositions so that each categorical proposition has in common a component from each disjunction. The condition of this syllogism is that it should have a disjunctive or analytical affirmative.

The first form:

All Libyans are Africans; all Tunisians are Africans; all Algerians are Africans; all Moroccans are Africans; all Mauritanians are Africans; each Moroccan is either Libyan or Tunisian or Algerian or Moroccan or Mauritanian; therefore, all these North Africans are Africans.

The second form:

Every animal is sensitive; every vegetable is growing; every mineral is inert; all corpus are an animal or vegetable or mineral; therefore, all corpus are sensitive or growing or inert.

2) The second kind is one whose number of its categoricals are lesser than the number of its disjunctions. The categorical proposition consists of a single component and the disjunctive one consists of two components:

All the unjust are guilty; one always has that either some governors are not unjust, or every governor is unjust; therefore, one always has that either some governors are unfair, or every governor is guilty.

6. The Fifth Category: Disjunctive-Conditional Syllogisms

The acceptable form of the fifth category is one which consists of a disjunctive (the major) and a conditional (the minor), and whose common component is a complete or an incomplete part of the antecedents. The disjunctive major should be either inclusive or exclusive.

The First case with an inclusive premise:

It can happen that the figure is a triangle or square, and whenever the figure has three sides it is a triangle; therefore, it can happen that the figure has three sides or is square.

The second case with an exclusive premise:

One has always either a figure and a polygon, or it is a circle, and whenever a figure is a triangle it is a polygon; therefore, it can happen that either a figure is a triangle or a circle.

7. Conclusion

What we have already exposed did not, to our knowledge, exist, even in part, in any other treatise on logic than the ones left to us by the ancient Arabian logicians since Ibn Sīnā up to al-SSinūsī's. By reflection on the syllogisms above we could say that Arabic logic developed to its peak by amalgamating propositional logic into a predicate one.

We hope that the arguments which I have provided will be convincing enough to show that *the old Arabian logicians were the first to discover* the structure of conditional syllogisms and to realize concisely their importance.

Acknowledgement

This paper was translated and edited from French into English by Hany Moubarez and edited by Moussa Fatahine.

References

1. Muḥammad Ibn ʿArafa. *Kitāb al-Muḫtaşar fī al-Manṭiq*, explained by Muḥammad Ibn Yusūf al-SSinūsī, MS., Tunisian National Library, no. 15811-8161-16327.
2. Muḥammad Ibn ʿArafa. *Kitābal-Muḫtaşar fī al-Manṭiq*, explained by Muḥammad Ibn Yusūf al-SSinūsī, investigated and published by Mahmoud Yagoubi, Cairo: Dār al-ḥadīṯ li al-kitāb, 2019.
3. Mahmmoud, Y. The contribution of ancient Arab logicians in extending the theory of deduction, *Education and Epistemology, International Jornal*, Laboedep, Ensb, v1, n. 02, 2011.
4. Mahmoud, Y. Preface, In Muḥammad Ibn ʿArafa. *Kitāb al-Muḫtaşar fī al-Manṭiq*, explained by Muḥammad Ibn Yusūf al-SSinūsī, MS., Tunisian National Library, no. 15811-8161-16327, Cairo, 2019.

Studia Humana
Volume 9:1 (2020), pp. 28—39
DOI: 10.2478/sh-2020-0005

Perspectives on the Notion of Truth in Arabic Philosophy

Hamdi Mlika

University of Kairouan
Rakada 3100, Kairouan, Tunisia

e-mail: mlika_hamdi@yahoo.fr

Abstract:
In the present paper, I assume that the notion of "truth" in philosophy would not have been clarified and tackled properly, if philosophers did not take into account earlier Arabic Medieval research contributions and build upon previous research findings. In the first place, I embark on the scrutiny of the rich aspect (or nature) of the Arabic Lexicon in terms of the "truth" meaning. In the second place, I take on the assumption that Arabic linguistic traditions imply different kinds of truths, depending on various spheres of human thoughts and actions based on the logical approach to "truth" (from Al-Kindi up to Averroes via Al-Farabi and Avicenna) and the term "al-haqiqha" as transliterated from Arabic, remain central. In conclusion, I take on an approach to "truth" that gives worth to logical perspectives at the very heart of Medieval Arab traditions in the light of what I would label as the "Omni-cultural Universality of Logic and Science".
Keywords: Truth, Arabic philosophy, haqiqha, Omni-cultural universality, Al-Kindi, Al-Farabi, Avicenna, Averroes.

1. Introduction

Do the notions of "Truth" and "Reality" exist in particular cultures while they might not be present in others? It is this question, which belongs to the anthropology of knowledge, that Paul Jorion puts under scrutiny in a book entitled "*Comment la vérité et la realité sont inventées?"* [16, p. 7]. In the four-chapter book, Jorion attempts to demonstrate that both truth and reality have "actually appeared at specific moments in the history of Western culture and are totally absent from the conceptual baggage of some others ...". The term "Truth" dates back to the Fourth Century BC Greece, and "reality" (objective) to 16th Century Europe. One term stems from the other: Since then, the idea of "Truth" imposes itself, to speak the truth is to describe reality as it is [16, p. 7]. Although the author utters a value judgment that can relegate such cultures as China, he does not focus on the case of the Arab culture.

The questions that arise in favor of Paul Jorion's thoughts are as follows: (1) The notion of "Truth" (and its correlating ideas: that of objective reality) being invented in specific historical processes, something that no one dares to dispute – would they be absent from the conceptual schema of Arab language and culture? (2) Are they, on the contrary, present but in a form which is

different from what we find in Western culture, and displaying other features? In any case, the answer to the last two questions presupposes the answer to three other questions which I formulate as follows:
(3) What is the relation of Arab culture and language to the Greek way of thinking with regard to the notion of truth?
(4) Is Arab philosophy the pale image of Greek thought without manifesting the least linguistic specificity or conceptual originality?
(5) And if the notion of truth was found by a happy combination of circumstances represented in Arab thought and language, would it be one or multiple?

These are precisely the questions that I would like to raise in the present paper, which will deal with the very key principle of the *Multi-cultural* universality of truth, thus opposing the Western thesis that sees in the 'Greek miracle' the solution to the question of "Truth".

2. Approaches to the Notion of Truth

I would like to highlight that the notion of "Truth" in Arabic culture and language need to take into account the plurality of systems in which it unfolds and the variety of interpretations that are attached to it. I am inclined to think that the systematic approaches to truth correspond to five in terms of number:
(1) First, the system proper to the demonstrative reason rightly embodied by Averroes (d.1198) and the rationalist philosophers, heirs to Al-Kindi (d. 873) and Peripatetic Arabic philosophy in general (represented above all by the House of wisdom in Baghdad).
(2) Second, the system that stems from the illuminative, mystical and intuitive experience with its distinctive features, rightly incarnated by Sufi Mansur Al-Ḥallağ[1] and other philosophers such as Suhrawardi, Al-Ġazali, and *Avicenna* as well though by poets singing of the drunkenness of love such as *Ibn 'Arabi*.
(3) Third, the system which rather focuses on the literality of the Qur'anic text without sinking into any form of occult or fundamentalist thought, a system that the *Zahirism* of *Ibn Ḥazm* (d.1064), an Andalusian philosopher, expresses with elegance.
(4) Then comes the system of traditions that do not separate the truth apart from the different dialectical, rhetorical and argumentation procedures relating to speech acts; I am thinking here of *Kalam*[2] (rational theology) in general, especially *Mu'aatzilism* and *Ach'aarism*.
(5) In addition to all these Arabic intellectual traditions are the four different doctrines of Islamic law and jurisprudence (*Fiqh*, Muslim law, the reflection of jurists in relation to the *Qur'an*) and the system of the foundations of religion. It should be noted that the word *Ḥaqq* for example and its plural *Ḥuquq* are attached to Islamic law (*Šariia'*) and human rights in the sense of positive law (*Ḥuquq al-insan*).

This general outline is not exhaustive and can be further revised and examined. I am far from claiming to deepen under this schema all the ramifications of the concept of "Truth". I simply sought to "model" the different currents of thought around the theme of truth in Arabic culture, taking into account its key role in global history. Moreover, to insist on the polysemic side of the word truth in Arabic language, I would state that its meaning remains linked to its use in the various discourses and to its status in a given conceptual assemblage. My goal is therefore to put in an order that is at once rational, ethical and pragmatic, the different semantic layers related to this notion, and to see if there is not an interpretative path capable of leading us to think them all as maintaining among them a certain air of family. I therefore put out the question pertaining to the specificity of Arabic contribution, through these multiple uses and classical traditions. I mainly focus on the "*Ḥaqiqha"* term, because I think it encompasses the meaning of other terms that express the truth. I first ask the following question: "What are the features implied by this notion of *Ḥaqiqha*?"

3. Polysemy of the Term *Ḥaqiqha*

To answer this question without limiting myself to the logical sense strongly marked in my point of view, I would say that if we refer for example to Seyyed Hossain Nasr in his book entitled *The Garden of Truth*, we will realize that the term *Ḥaqiqha* means several things at once:[3]
1) Truth is a supreme goal that remains to be achieved. In other words, truth is primarily conceived of as the culmination of a whole cognitive journey and is therefore defined as a horizon of thought and life.
(2) Truth is what bases our actions and justifies them as virtuous and just.
(3) Truth is grasped as being engaged in an idealized process of knowledge that must lead to what we can call deliverance, bliss or salvation.
(4) Ḥaqiqha henceforth signifies a love of the truth. Truth remains without real value if it is not taken in a strong emotional and sentimental impulse.
(5) There comes a fifth aspect of the truth where it is held primarily for one of the expressions of divine essence: *Al-Ḥaqq* is one of the names attributed to God.[4]
(6) Finally, we can say that the notion of *Ḥaqiqha* is inseparable from a whole methodology of procedural verification that we designated by the Arabic term *Taḥqiqh*, or spiritual self-realization that we designated by the Arabic term *Taḥaqquqh* [19, p. 30]. This ratio is proportional to that which we establish between truth and verification. I mean that the truth is essentially inseparable from an immersion process through some essentially ethical and spiritual practices and devices.

It is not wrong to say that expressions other than *Ḥaqiqha* translate the meaning of the word truth into the Arabic language and culture. Indeed, besides *Ḥaqiqha*, we find a series of other expressions that each accounts in its own way for the meaning of the word truth. The question that arises from the outset is: besides the term *Ḥaqiqha*, what are these words that express in Arabic the true and the truth? For my part, and given the richness of the Arabic lexicon, I can quote at least five terms: *Ṣidq, Ḥaqq, Ṣawab, Ṣahih and Ḥaqiqha*. I will try here to develop this polysemy in a sort of interpretation that will put them in agreement. This matching of *Ṣidk* (logically true/true from a logical point of view), *Ḥaqq* (Absolute True), *Ṣawab* (the state of a well-fitting idea, an idea or opinion that aims its object), Ṣ*ahih* (valid in opposite to false (*Fasid)*) and *Ḥaqiqha* (truth) is not always obvious. Note that the two terms of *Ḥaqq* and *Ḥaqiqha* derive from the same verbial root, namely *Ḥaqaqha*, and can indicate two meanings often given for the opposite: *Ḥaqq* and *Ḥaqiqha* may mean the truth in the sense that it is identifiable with revelation to the *Qur'an*, to God himself, but also to the result of the use of human demonstrative reason. Indeed, these two terms can also mean truth in the sense that it is involved in adequate human thought with reality and physical substances. It would not be justified here to speak of two kinds of truths: one rational, while the other is religious. It is indeed the conclusion that Averroes will draw much later when he contests in his famous *Decisive Treatise* the double standard of the truth and will preach its inseparable unity. For him, there is no place for two truths, but rather for two processes, two different routes that lead to one truth.

Since, therefore, writes Averroes in the *Decisive Treatise*, this revelation is the truth, and it calls to practice the rational examination which ensures the knowledge of the truth, then we Muslims know with certainty that the examination of Being by demonstration will entail no contradiction with the teachings brought by the revealed text: for the truth cannot be contrary to the truth, but agrees with it and testifies in its favor [5, p. 119].

If we focus on the term "truth" (*Ḥaqiqha*) in so far as it refers to a concept whose universality is *omni-cultural*[5], we will find that its fate remains decisive at the very heart of Arabic culture.

Indeed, the approach of truth in this culture, with its specific anthropological colors, must help us to move towards a model which, while being particular and linked to its own history, can fit with the characteristics considered universal. One can fall into a double misunderstanding of the plural traditions that weave the central core of Arabic culture: whether they are seen as a mere extension of what has been accomplished by the Greeks, or whether they are interpreted as having

nothing to do with an Islamic thought that essentially relates to religion. I think that the approach of the notion of truth in the context of Arabic culture and philosophy will undoubtedly make us avoid falling into such a mistake.

The word *Ḥaqiqha* is a noun derived from the root of the verb *Ḥaqaqha*. In his famous encyclopedic dictionary of the Arabic language, *Lisân Al-'Arab*, Ibn Manẓur (d. 1311) gives us the multiple etymological roots of the word in question [18, Volume X, pp. 49-58]. I will therefore use this interdisciplinary lexicological approach to identify the distinctive features of this concept and emphasize its polysemy. I must note that Ibn Manẓur uses in his linguistic dictionary several sources to clarify the different meanings of the terms of the Arabic language. These sources are based on oral or written Arabic traditions, the Qur'ran, prophetic narratives (*Ḥadith* and *Sirha*), poetry, historical narratives, quotations from eminent '*Ulama*, etc. *Ibn Manẓur* opposes the truth in language to everything that comes from a figurative use of words. The concept of truth is thus immediately defined as being closely interdependent with the traits of rightness, certainty, adequacy with the essences of things, stability in judgment, obligation, necessity, and many other traits again. The first words of *Ibn Manẓur* pose the True (*Ḥaqq*) as the opposite of the unjust and the false (*Baṭel*). In its adverbial use, truth means the insistence on the act in question which makes it more certain. The word *Ḥaqq* also refers to the message of the prophet and to what he has brought more substantial, that is to say the *Qur'an*. It is in this context that the *surahs* (chapters) of the *Qur'an* abound in verses that incite believers not to dress truth with lies and to defeat truth with falsehood. In other words, the true obliges and imposes. The true speech is a stable, invariant, obligatory, binding, decided, sliced, inescapable and imposing act. In this sense, the true is necessary and functions both as a right (*Ḥaqq*) and a duty (*Wağeb*): one must manifest the truth and make no concession to it. Thus, the suffering of the disbelievers in hell is true, which means that it was decided by God and proves to be in this sense inevitable. A speech is qualified as true when it imposes itself on the greatest number, and in this sense this speech is confirmed as not tolerating any doubt. The verb *Ḥaqaqqha* applied to a speech or a fragment of language means to believe in its truth in the sense of the word *Sidq* (true in the logical sense) and to hold it as true. In this sense, to reach the truth of a thing is to obtain a certainty about it. This meaning is clear in the following saying that one attributes to the Prophet: None reaches the truth of faith (that is to say, its purity and its quintessence) if one does not stop blaming their brother for a defect which is rather in him. The truth of a person is what the person in question must protect, defend and prevent others from appropriating.

4. Arabic Philosophies of Truth

It is widely acknowledged that the truth among classical Arabic philosophers manifests itself as a logical concept par excellence. But it must not be clearly distinguished from any mystical posture, or from any realistic position in the physical sense. He remains present in all these areas. The logical perspective, however, remains open to the possibility of expanding through a questioning of the classical metaphysical principles that guide it. As an example, I can quote the criticism of Al-Suhrawardi (d. 1191) of the notion of definition in Aristotle on strictly illuminative bases. The mystical posture of logic basically means that logic remains revisable as to its principles, and therefore is likely to take on new extensions. It is in this sense that we must understand the questioning of the law of non-contradiction in the work of Graham Priest where the Australian logician tries to valorize the true contradictory propositions to better open the logic on the Buddhist spiritual experience [20].[6]

To return to the context of Arabic culture, the two striking examples in this sense are Al-Ġhazali (d. 1111) and Avicenna (d. 1037). For these two eminent Arabic philosophers and logicians, it is not permissible to oppose logic and illuminative access to the truth. The first will extract the logical norms (in total agreement with the logic of Aristotle) of the Qur'an itself, while the second will operate in its treatise on *The Logic of the Easterners* a quite exceptional turning point from a simple logical approach inductive and deductive to an illuminative system that fuses

intuitive knowledge and deduction. It should be noted at the outset that classical Arabic logic remains inseparable from a psychological and metaphysical theory of the faculties of the soul and a semantic and semiotic theory adjusted to the Arabic language. However, this logical sense must not exclude any interaction with other meanings and uses of the truth. In addition to its logical scope, which is emphasized by philosophers, there is its position within the so-called rhetorical, dialectical, pragmatic and conversational disciplines of grammarians.

In addition to the philosophical understanding of Logic as a foundation, we see a new language approach in the heart of Arab culture, particularly represented by Abd al-Qahir Al-Ğurğani (d. 1078), Abu Ya'qub Al-Sakkaki (d. 1229), and many other theorists of Arabic language and literature.

Clearly, the philosophical conception is related to a theory essentially based on truth as adequacy or correspondence to the state of the world. It is indeed the true-false duality that is sometimes criticized via the role that the beliefs that accompany the assertions of truth are invited to play in the determination of the true judgment. Indeed, we find in certain Arab rhetorical traditions the intention to transgress true-false dualism to leave more room for a third option between truth and falsity. Such a trend has also emerged in the field of Islamic law and jurisprudence or *Fiqh* (Islamic law). This third possibility between the case of the true and the false suggests the possibility for judgments to be neither true nor false. Without doubt, the polysemy of these terms of true and truth is related to the variety of approaches, to the multiplicity of traditions and systems of knowledge and interpretation.

To return to what I said at the beginning of this chapter, the question of truth is seldom dealt with in terms of an analytical approach. There is a tendency to consider the question of truth as a metaphysical subject par excellence, often treated through a traditional philosophical methodology using a largely synthetic style. Indeed, this question has often been addressed in strictly ideological, descriptive and historical terms. Among those who have (rarely) addressed this question in the context of classical Arab intellectual traditions, and who have relied on the kind of analysis we find in the history of science[7] and in analytic philosophy, we find Ali Benmakhlouf, who spoke about it in an article published in Arabic titled "Reasoning and Truth in the Medieval Arab Philosophical Tradition" [8].[8]

I will therefore deal with this question in the philosophical tradition in the Arabic language which has developed following the movement of translation of Greek philosophical works through the Persian and Syriac languages, without dealing directly and profoundly with the other traditions that make up the all of the Arab-Islamic heritage, from *Fiqh* to *Kalam*.

In its general sense, the question of truth has occupied an important place in Arab culture. Now, in spite of its expressly interdisciplinary character, I will limit myself to the philosophical style with which this question has arisen. This style was rightly incarnated in the 9th century by Al-Kindi (d. 874), a style that will be reinforced by other eminent thinkers such as Al-Farabi (d. 950) in the 10th and especially the philosopher of Cordova Averroes (d. 1198). Indeed, since Al-Kindi, considered as the father of the Arab philosophy, a first philosophical approach to the truth begins to emerge, characterized above all by its explicit references to Greek philosophical sources (and more particularly to the two great systems formed by the theses of Plato and Aristotle).

In the image of Greek philosophy, Arab philosophy has sought to draw its limits, often from within its own discourse, by confronting them with the other components of culture and society: mythological thought, theological discourse (*kalamist*), the religious discourse, the discourse of the economic and political power in place, etc. Many people mistakenly believe that it is possible for us to discern in traditional Arab culture a kind of pure *logos*, a core of intact rationality. I think this is a very difficult, if not impossible, business.

A quick review of classical Arabic philosophy[9] (with logic as its inseparable core) and its particular epistemological status within the history of medieval philosophy and the history of science[10] (since the Arabs allowed Logic to detach from Aristotle and the Stoics to develop as a universal science closely related to semiotics and semantics, will lead us to the following urgent

question: In what sense can this return to Arab Logic help us to develop, from within the cultural heritage of the Arab world, a distinctive approach to the concept of truth?
I will analyze four examples from classical Arab philosophy and see how we could use them to develop such an approach to truth. This approach is proving to be very helpful in responding to the extremist discourse that often goes against openness to others, pluralism, humanism, intercultural dialogue, and especially against a rationality that we posit from the outset as logical.

4.1. Al-Kindi or How Did We Become the Heirs of All Who Sought the Truth

For the father of Arabic philosophy, Al-Kindi, the first philosophy or Metaphysics stands out from other disciplines by the nobility of its subject, i.e., the knowledge of the first truth which is the cause of all other truths. Therefore, the most perfect and noble philosopher would be the man who would fully master this kind of knowledge. However, such a common treasure of humanity could not have been born without solidarity, through the long centuries of history, philosophers from many cultures and speaking different languages. No language or culture should claim to possess all the truth and therefore all this common treasure. Truth is the business in the making of the very partial and minimal contributions of every culture, language, and nation. It is in this sense that Al-Kindi writes in his *Epistle on the first philosophy:*

> The truth requires that we do not reproach anyone who is even one of the causes of even small and meager benefits to us; how shall we treat those who are responsible for many causes, of large, real and serious benefits to us? Though deficient in some of the truth, they have been our kindred and associates in that they benefited us by the fruits of their thought, which have become our approaches and instruments, leading to much knowledge of that the real nature of which they fell short of obtaining. We should be grateful particularly since it has been clear to us and to the distinguished philosophers before us who are not our co-linguists, that no man by the diligence of his quest has attained the truth, i.e., that which the truth deserves, nor have the philosophers as a whole comprehended it. Rather, each of them either has not attained something any truth or has attained something small in relation to what truth deserves. When, though, the little which each one of them who has acquired the truth is collected, something of great worth is assembled from this. It is proper that our gratitude be great to those who have contributed even a little of the truth, let alone to those who have contributed much truth, since they have shared with us the fruits of their thought and facilitated for us the true (yet) hidden inquiries, in that they benefited us by those premises which facilitated our approaches to the truth. If they had not lived, these true principles with which we have been educated towards the conclusions of our hidden inquiries would not have been assembled for us, even with intense research throughout our time. But indeed this has been assembled only in preceding past ages, age after age, until this our time, accompanied by intensive research, necessary perseverance and love of toil in that. In the time of one man−even if his life span is extended, his research intensive, his speculation subtle and he is fond of perseverance − it is not possible to assemble as much as has been assembled, by similar efforts, − of intense research, subtle speculation and fondness for perseverance − over a period of time many times as long [3, p. 57].

Al-Kindi undoubtedly draws here the foundations of the universality of philosophy and science which rest above all on the omni-culturality of knowledge and its transmission. And one of the direct consequences of this posture is inevitably manifested in the strength and objectivity with which truth must be imposed on all men without concessions. It is in these terms that Al-Kindi expresses himself:

> We ought not to be ashamed of appreciating the truth and of acquiring it wherever it comes from, even if it comes from races distant and nations different from us. For the seeker of truth nothing takes precedence over the truth, and there is no disparagement of the truth, nor belittling either of him who speaks it or of him who conveys it. (The status of) no one is diminished by the truth; rather does the truth ennoble all [3, p. 58].

4.2. Al-Farabi and the Universality of Logic

I would like to quote a very interesting passage from *The Catalogue of the Sciences* (*Ihsa' al 'Ulum*) by Abu Nasr Al-Farabi. It is instructive to stress that for him, linguistic skills and logical ones go hand in hand, even if he does not confuse them. If the consideration of language (what the terms mean for a given linguistic community) is interesting philosophically, the logic however differs from the linguistic perspective by its aim to access a universal intelligibility: Logic is moved by a different intentionality than language. The relationship between Logic and Grammar is neither identity nor opposition: Al-Farabi associates the two in his philosophical enterprise to better dissociate them. Both are indispensable. Both of them respect their own principles and assume distinct tasks. But in principle, the Logic is superior.[11]

From Al-Farabi's point of view, the universality of logic takes away the universality of particular languages. The community of linguistic structures (between different languages) is only misleading. The important thing is to be aware of it and to interpret this distance between the two aspects, without apprehending it as an absolute or impassable limit. In fact, the terms of language are only the repository signs of an intelligibility that goes beyond the simple verbal form or behavior socially anchored. Here settles a positive interaction between the two. Linguistics and grammar do not arise as the study of what is common between cultures and nations, but what exists in a given language and in the value system of a given culture. If it is foolish to speak of a universality of linguistic structures (of a kind of semantic and grammatical community between languages), it is nevertheless necessary to go through grammar (i.e., here by studying the meanings of terms in a particular language) to arrive at logic. It would therefore be absurd to speak of universality in the scientific sense for logic without defining it in terms of omni-culturality. We could even use the Wittgensteinian notion of language games to shed light on this complex situation.

The relation of logic to intellect and intelligibles is of the same type as the relation of grammar to language and utterances. All the laws that grammar gives us on the utterances have their analogues in logic for the intelligible ones. (...) As for the objects of logic and on which are the laws, they are the intelligibles as the terms signify them, and the terms in so far as they signify the intelligibles. For we cannot establish the truth of a judgment for ourselves only by reflecting and establishing in ourselves things and intelligibles whose own aim is to establish the truth of this judgment. And we establish the truth for others only by speaking to it with the help of affirmation whose own aim is to establish the truth of this judgment. (...) Logic has in common with grammar the fact of giving the laws of terms, and it differs from it in that grammar gives laws proper to a nation whereas logic gives general common laws for all terms of all nations; for in terms there are modes in which all nations participate, such as their division into singles and compounds, the division of the simple into noun, verb and particle, the fact that some are regular and others irregular, and other similar things. (...) The grammar in each language considers only that which is peculiar to this nation; for what is common to this language and to others, it studies it not as a common but from the point of view of where it is in their particular language. This is the difference between the study of terms by grammarians and logicians: grammar gives laws which concern the terms of a given nation; it considers what is common to this nation and to others from the point of view where it is present in that language of which grammar is made. While logic gives laws of terms only those which are common to the terms of nations; and she considers them from the point of view where they are common. It does not study what is peculiar to the terms of a particular

nation but recommends to the scholars of that language what might be needed for that particular language [1, pp. 53-62].[12]

4.3. Avicenna and the Epistemological Indispensability of Logic

For Avicenna, logic is both necessary for all forms of knowledge and essential for good thinking.

This is the benefit, he wrote in *Kitab Al-Nağat*, of the discipline of logic. Its relation to deliberation is [comparable to] the relation of grammar to speech and of prosody to poetry. However, a sound nature and innate faculty of discernment can perhaps dispense with the study of grammar and prosody. [But] there is nothing in human nature that, in using deliberation, can dispense with in preparing this instrument beforehand [7, pp. 4-5].

Avicenna gives a privileged epistemic status to the logic that makes it the instrument of all knowledge. This is what we call the *epistemological indispensability of logic* or its *omni-scientific status*, a thesis according to which logic is necessary so that all forms of knowledge can reach a certain degree of certainty and coherence.

This thesis is in opposition to another thesis, namely that of Ibn Taymyyia (d. 1328) that we can call the thesis of the *dispensability of logic*, in other words the thesis of its vanity and *uselessness*: what we can do with logic, we can do it without it.

Despite this distinctive status of logic in philosophical practice and in the science system, we can see that it has not been the subject of serious study as such. We have either separated logic (by its formalisms) from philosophy and the whole of knowledge to focus on epistemic processes drawn for most of the physicalistic and naturalistic experience of the world, or cut the logic of any possible anchoring in ethics and politics, and the original contribution it could make to the various issues relating to these areas. Rehabilitating its epistemological character and its anchoring in the anthropological and ethical and political, taking into account both classical Arabic traditions and our current thinking: here is the goal that this article assigns.

In this perspective, we may understand how, from the classical age, logic, in its intimacy with the sciences and philosophy, provided (and did not cease to do so) strong arguments against religious fundamentalist discourse.

4.4. Averroes on the Unity of Truth

Averroes takes up the line of thought on the truth already inaugurated by Al-Kindi since the 9th century. For him, it would be foolish to speak of two truths that would contradict one another, a truth based on revelation and another on human reason. From his point of view, one truth cannot be contrary to another truth. But the unity of truth must not exclude what Averroes calls “the hierarchy of human natures in terms of assent” [5, p. 116]. Indeed, the demonstration is not an absolute model of assent for all men, even if this model is unquestionably proven by philosophers and scientists. The *Qur’an*, because of its universal message to all men, takes this hierarchy into account.

5. Conclusion

The study of classical Arab logic from the point of view of its privileged place in the history of natural and formal sciences is not politically innocent. Such an interest is defined above all in terms of a political project that attempts to defeat all forms of withdrawal, extremism, religious fundamentalism, fanaticism, and intolerance. Logic and politics (for Arabs) seem to form an inseparable couple. Such an approach presupposes two ideas beforehand: first, to place logic and the question of its history in the general context of the history of science. Then develop a perspective that focuses on the religious as a discourse. This perspective will take into account the pragmatic turn applied to the case of religious discourse and is apt to unmask the manifest forms of fundamentalism and intolerance in this discourse. Thus, if the difference in beliefs leads to a denial

of all truths, one of the tasks of philosophy may be to arbitrate beliefs by logic and to monitor religious discourse [15].

Many in both the West and the East hold a skeptical position on the history of Arab sciences and the role they are called to play in epistemological and political cultures. This skepticism emanates above all from Arab and Muslim intellectuals themselves and takes many forms. It can be direct or indirect, conscious or unconscious. There is the case of the specialist who is content to teach Copernicus, Galileo and Descartes as they are the protagonists of a true scientific tradition at the origin of all that is modern in the world. This specialist does not care to link this tradition (embryonic scientist, founder of modern science) to classical Arab traditions and adopts a centralized vision of modernity: Galileo is the father of modern science as Descartes is in terms of thought (the famous *cogito ergo sum*).

On the other hand, there is the case of the specialist of the Arabic philosophy which draws within this same philosophy two wakes: that Arabic and Greek, and that Islamic, or to take back a famous distinction, a thinker in Islam and a thinker of Islam. This specialist ends up rejecting the first wake in favor of a thought that is inspired more by theology (*Kalam*), Islamic law and jurisprudence (*Fiqh*) than logical and mathematical sciences as they have could be developed by the Arabs from the 9th century. I would like to take as a simple example of such a perspective in the Islamic tradition of Arabic language, Taqyi Eddyn Ibn Taymyyia. Ibn Taymyyia has written two great works, *Refutation of Logic* and *Response to Logicians* in which he has developed a systematic refutation of the logical procedures in favor of, not the Qur'anic text and the prophetic tradition, but rather of a literal reading of the meaning deployed in these two sacred references.

Ibn Taymyyia[13]is, no doubt, the founder of a form of intellectual Salafism having as its pivot a sort of approach that we can call theological: to summarize it, we can say that it consists in saying that the truths of revelation have no need to be justified logically by reason and by demonstrative thought processes so that they are accepted as absolute and irrevocable truths. Ibn Taymyia has founded a *Theodicea* that proves to be the opposite of a *Logodicea*.[14]

Contrary to what has been done in the field of the history of Arabic sciences, I think that we need to reconsider the place of truth in the logical sense and to promote its role. Indeed, no one can doubt today the important role that logic plays in promoting rational thought that seeks to justify the use of reason to access the truth. If we want today to give a definition of what humanity is, it would probably be the way by which human beings can handle language with predicative, symbolic and relational structure in cultural variations.

I would like to avoid the option which considers that logical reason is not only secondary to absolute truths contained in rigid and static references, but that it is dispensable and often useless, so that it is subject to the principle of *conservativeness*[15] of its own truths. I will call this thesis the *dispensability* or *conservativeness* of the truths of logic and to which I would oppose diametrically my point of view. But I would not like to hypostatize the truth figures at the very heart of this culture and reduce them to the sole channel of logical truth. This culture remains in many ways traversed by skeptic tendencies as strong as the search for truth itself.[16]

Putting logic at the very heart of classical Arabic sciences, with its conception of truth as an adaptation to a reality while taking into account the structure of the symbolic language in use, will no doubt enable us to explain how classical Arabic logicians have succeeded, thanks to their spirit of creativity and criticism based on doubt and applied intelligence, to embody a model of thought (although it is necessary to situate it in its context) which can inspire, as a horizon of life, the takers of decisions in today's Arab societies.

Acknowledgement
A French version of this paper was published in François Rivenc's (eds): *Figures de vérité*, ISTE, London 2019.

References

[1] Al-Farabi. *Ihsa' al-'Ulum* (*The Catalogue of the sciences*), Uthman Amin (ed), Cairo: Dar al-Fikr al-Arabi, 1948.
[2] Alami. A & G. Badoual, *La pensée philosophique dans l'Islam classique, Anthologie thématique*, Casablanca: Afrique Orient, 2012.
[3] Al-Kindi. *Treatise on First Philosophy,* translation with Introduction and Commentary by Alfred L. Ivry, Albany: State University of New York Press, 1974.
[4] Al-Kindi. *Êpitre sur la philosophie première*, In J. Jolivet and R. Rashed (eds.), *Œuvres philosophiques et scientifiques d'Al-Kindi*, *Volume II, Métaphysique et cosmologie*, Leiden, Boston, Köln: Brill, 1998.
[5] Averroes. *Discours décisif*, Paris: Garnier-Flammarion, 1996.
[6] Avicenna. *Al-Nağat*, Commentary by Majed Fakhri, Beyrouth, Dar El Afek El Jedida, 1985.
[7] Avicenna. *Avicenna's Delivrance Logic*, Translation and Notes by Asad Q. Ahmed, introduction by Tony Street, Oxford: Oxford University Press, 2011.
[8] Benmakhlouf, A. « Le raisonnement et la vérité dans la tradition philosophique médiévale arabe », In *La vérité*, collection « Les Mots du Monde − Pour un dialogue inter-culturel », Coordination of Nadia Tazi, Translated to arabic by: Abdelkader Qannini, Casablanca, Editions of The Arabic Cultural Center, 2005, pp. 13-44.
[9] Büttgen Ph., De Libera A., Rashed M. & Rosier-Catash I. *Les Grecs, les Arabes et nous, Enquête sur l'islamophobie savante,* Paris: Fayard, 2009.
[10] *Coran, Essai de traduction de l'arabe annoté et suivi d'une étude exégétique* par Jacques Berque, Paris: Albin Michel, 1995.
[11] Fichant, M. Vérité, foi et raison dans la Théodicée, In *Lectures et interprétations des Essais de Théodicée de G.W. Leibniz*, edited by Paul Rateau, Studia Leibnitiana, Sonderhefte 40, Stuttgart: Franz Steiner Verlag, 2011.
[12] Gouguenheim, S. *Aristote au Mont-St-Michel*: *les racines grecques de l'Europe chrétienne*, Paris: Seuil, 2008.
[13] Hallaq, B. W. *Ibn Taymyyia against logicians*, Oxford: Oxford University Press, 1993.
[14] Hasnawi, A., El-Amrani, J. & Aouad, M. (eds.). *Perspectives arabes et médiévales sur la tradition scientifique et philosophique grecque*, preface by Roshdi Rashed, Leuven-Paris: Peeters, 1997.
[15] Heck, P. L. *Skepticism in Classical Islam, Moments of Confusion,* London: Routledge, 2014.
[16] Jorion, P. *Comment la vérité et la réalité furent inventées*, Paris: Gallimard, 2009.
[17] Langhlade, J. *Du Coran à la philosophie: le langage arabe et la formation du vocabulaire philosophique chez Al-Farabi,* prefaced by Jean Jolivet, Damascus: Ifpo Presses, 1994.
[18] Manẓur, J. *Lisân Al-'Arab*, Jamel Eddin Ibn Manẓur, XV Tomes, Beyrouth: Dar Sader, 1992.
[19] Nasr, S. N. *The Garden of Truth, The vision and Promise of Sufism, Islam's Mystical Tradition,* New York: Harper Collins, 2007.
[20] Priest, G., Beal J. C., & Armour-Garbi B. *The Law of Non-Contradiction, New Philosophical Essays*, Oxford: Clarendon Press, 2004.
[21] Taymmyia, I. T. *Naqd al-Mantiq, (Réfutation de la logique),* M. Ben Abdel Razzaq Hamza (ed.), Cairo: Matba'at al-sunna al-Muhammadyia, 1951.
[22] Taymmyia, I. T. *Al-Radd Ala Al-Mantiqyyin (Réponse aux logiciens)*, A. Samad Sharaf Eddin Al-Kutubi (ed.), Bombey: al-matb'a al Qayyima, 1949.

Notes

1. [19, p. 30]: "The famous tenth-century Sufi Mansur Al-Ḥallağ uttered ana al-Ḥaqq, that is, "I am the Truth" or "I am the Real", and paid for it to in Sufi literature alternatively as Allah or al-Ḥaqq, for God is both absolute Truth and absolute Reality with his life, for many misconstrued the real import of these words. These words have nevertheless echoed like an ever-repeated refrain through the annals of Sufism during the past millennium. What is this Truth of which Al-Ḥallağ spoke, for which he paid with his life, and that all Sufis have sought to attain, considering its

attainment to be the supreme goal of human life? The term Ḥaqq used by Ḥallağ is a Qur'anic term. It means both truth and reality and is in fact a Name of God, who is usually referred".

2. See [17] Chapter 3: Les sciences religieuses, p. 111-155.

3. [19] Part II, "The Centrality of Truth".

4. [19, p.30]: "According to Sufism, the supreme goal of human life is to attain Truth, which is also Reality, the source of all reality, and whose attainment, as also stated by Christ, makes us free, delivering us from the bondage of ignorance. Although deeply involved with love and also on a certain level with action, Sufism is at the highest level a path of knowledge (*ma'rifah* in Arabic and *'irfan* in Persian), a knowledge that is illuminative and unitive, a knowledge whose highest object is the Truth as such, that is, God, and subsequently the knowledge of things in relation to God. There is such a thing as the Truth, and it can be known. This is the first of all certitudes, from which flow all other certitudes of human life. The knowledge of the Truth is like the light of the sun while love is like the' heat that always accompanies that light".

5. By Omni-cultural universality I want to refer to one of the essential features of the objectivity of science. This is what I refer to as the conjunction, within the same movement, of universality and cultural differences. This trait is indeed the consequence of the historicity of the sciences, including those which are logical, formal and mathematical. Indeed, the universality of all science is not absolute, nor is it the expression of a state of subjective consciousness. It exists and manifests itself in a sense inherent in cultures in their human diversity, closely related to the anthropological context where it is directly involved in the functions of language and practice. If we take the case of logical science for example, we would say that logical concepts are universal and necessary because they possess a structure independent of their cultural determinations, a structure that manifests its effects and imposes its rational and objective properties on all logicians, whether Greek or Arab or European. It is the necessary character of such a structure − that we find almost in all cultures − which establishes the objectivity of logical science and testifies to its autonomy.

6. Graham Priest is among the contemporary logicians who have a direct interest in the philosophical question of contradiction (and of course the logical principle of non-contradiction) to demystify the privileged status it had long occupied (and continues to do today) within our rationality. In several writings, he attempts to present the contradiction in a different light and will not hesitate to defend the thesis of acceptability while showing skepticism vis-à-vis any theory that seeks to establish a necessary relation between our rationality and the law of no contradiction. In a collective work [20], G. Priest gave himself the task of exposing, discussing and dismantling the various objections supposed to nullify the positive contribution of the contradiction. From his point of view, these objections are five in number: (1) The contradictions imply everything. (2) The contradictions cannot be true. (3) The contradictions cannot be the object of a rational belief. (4) If the contradictions were acceptable, people could never criticize them rationally. (5) If the contradictions were acceptable, no one could deny anything.

7. I am referring here to [14], a book compiling the proceedings of the symposium (Paris, 31 / 03-03 / 04/1993) of the SIHSPAI (International Society for the History of Science and Islamic and Arab Philosophy) and published with the assistance of the French Ministry of Higher Education and Research and the League of Arab States. It is in this monumental work that I drew the initial intuition underlying all this work.

8. Ali Benmakhlouf's article was translated from French into Arabic by Abdelkader Kennini and published in the collection "Words of the World-For a Dialogue Between Cultures", under the direction of Nadia Tazi and entitled The Truth (Al-Ḥaqiqha). The French version at La Découverte has never been published. The book was actually planned but it never appeared. In any case, I only consulted the Arabic version of this collective volume and from my knowledge the French publisher published only three volumes in 2004, Identity, Male-Female and Experience. On the website of the French publisher, we read the following about this collection: "The collection" The words of the world "is based on a simple idea: to put together in a book a collection of texts that attempt to present the meaning of the same word in different geographical and cultural areas: sub-Saharan Africa, China, United States, Europe, India, Arab world. These philosophical or anthropological terms have acquired a symbolic depth by crystallizing, for a given society, evolutions and striking features. Immersed in the most everyday use, they also found and organize a common language, which also refers to debates in contemporary societies. These books wish to reconnect with a certain intellectual tradition of critical vigilance and openness, while giving themselves the chance of a "distant look" favoring dialogue between cultures. The reader will be able to take the measure of the concordances, the slippages, the disparities covered by each of these 'universal' notions, but also the tensions that are emerging between the diversity of cultural traditions and the work of homogenizing globalization. All titles in the 'Words of the World/Les mots du monde' collection are published in their languages by each of the publishers involved in this collective endeavor: Shanghai Cultural Publisher (China), Arab Cultural Center (Morocco), Other Press (United States), Sage Publications (India), La Découverte (France) ..." As regards the Arabic version of the volume on the truth, the book respects the following geographical order: the truth in the Arab world with the quoted article of Ali Benmakhlouf, the other contributions deal in turn with the truth in Europe, in Africa, in India, in America, and finally in China. The article on the truth in China is titled "On Zhen, On the Truth", and was written by a certain Yung Ju-Rung. There is much to be said about the notion of truth (Zhen) in Chinese culture that leads us to believe that the author's thesis of *How truth and reality were invented* does not hold.

9. This philosophy began with the translation of Greek science and philosophy by Syriac Christians in the late eighth century.

10. It is not a question of adopting a strong ideological position on this level, a kind of ideological or political commitment that is beyond suspicion by the history of Arab (classical) sciences; it is not a question of (1) separating

this activity from that of the history of science in general, (2) nor glorifying the past of the Arab-Islamic civilization and its golden age to implement place an anti-Western nationalist ideology politically exploitable. There are indeed several points of view concerning this discipline-activity with regard to its status and its philosophical and theoretical backgrounds, as there are also several forms of ideological recovery or devaluation of the contribution of the Arabic language in classical scientific traditions ([12] is a very representative example. See also the response [9]).

11. See [17, Chapter V: Farabi's Ideas on the Origin and Formation of Language and Languages, p. 191-214, chapter IV: The formation of the language of science, pp. 215-270, and chapter VII: The formation of the philosophical language, pp. 271-307.]
12. [1], Al-Farabi, *Ihṣa' al-'Ulum* (*Sciences Census/Catalogue of the sciences*), ed. Uthman Amin, Cairo, Dar al-Fikr al-Arabi, 1948, pp. 53-62. This passage is also quoted in [2, p. 55-57] and is based on an unpublished translation to French of Jacques Langhade. In any case, Jacques Langhade is a prominent French-speaking specialist in Al-Farabi and he became known through a series of publications on his work including an excellent book [17] prefaced by Jean Jolivet and titled: *From the Qur'an to philosophy: the Arabic language and the formation of Farabi's philosophical vocabulary*, Damascus, Ifpo Presses, 1994. Other Arabic editions of the book in question exist, and we find at Albouraq a French translation by Amor Cherni published in 2015.
13. [13], HALLAQ B. Wael, *Ibn Taymyyia against logicians,* Oxford University Press, 1993.
14. The term of de *Logodicea* is used by Michel Fichant. See [11], Michel Fichant : «Vérité, foi et raison dans la Théodicée» dans : *Lectures et interprétations des Essais de Théodicée de G.W. Leibniz*, édité par Paul Rateau, Studia Leibnitiana - Sonderhefte 40, Franz Steiner Verlag, Stuttgart, 2011.
15. By this principle I mean that all what we can apply by Logic can be prouvable without it.
16. See the excellent book of Paul L. Heck, *Skepticism in Classical Islam*, [15].

sciendo

studia humana
QUARTERLY JOURNAL

Studia Humana
Volume 9:1 (2020), pp. 40—47
DOI: 10.2478/sh-2020-0006

Reaching the Goal of Alchemy – or: What Happens When You Finally Have Created the Philosophers' Stone?

Regula Forster

Tübingen University
Wilhelmstraße 113
D-72074 Tübingen, Germany

e-mail: regula.forster@uni-tuebingen.de

Abstract:
Alchemy is the art of transforming base metals into precious ones, usually silver and/or gold. The most important method conceived to reach this goal was the creation of the elixir, also called the philosophers' stone, which, applied to the prime-matter, would lead to an accelerated process of ripening of metals, eventually ending in gold. How did Arabo-Islamic alchemists suppose that the transmutation worked? What were the conditions the adept had to fulfil in order to succeed? And what did they think would happen when one finally has created the philosophers' stone? Will the economy collapse because gold and silver will lose their validity? Will the alchemist simply lean back and enjoy? Or will the world end, because man has finally attained the knowledge that should be God's only?
Keywords: Islamicate alchemy, philosophers' stone, transmutation, Ibn Arfaʿ Raʾs, eschatology.

1. Introduction

A definition of alchemy and its goals is not easy to give: Alchemy has been treated as a forerunner of chemistry, as the expression of psychological truths, as a Hermetic tradition, and as a natural philosophy, depending on the inclinations of the scholar studying it (cf. [36, pp. 145–146]). An extremely popular definition is the following one [33, p. 238]:

> The ancient study of alchemy is concerned with making the Philosopher's Stone, a legendary substance with astonishing powers. The Stone will transform any metal into pure gold. It also produces the Elixir of Life, which will make the drinker immortal.

Joanne K. Rowling's definition of alchemy, or rather the one on the chocolate frog card, is interesting for several reasons.[1] While the transmutation of base metals into gold is a generally accepted goal in any alchemical tradition, the creation of an elixir of life is not usually seen as a central element of alchemy. In fact, the idea of an elixir of life seems to be of Chinese origin, while Mediaeval Western (i.e. Arabo-Islamic and medieval and early modern European) alchemy only

considered the usage of the elixir as extremely efficient medicine that could also prolong one's life, but not lead to immortality.[2]

In this paper, I will discuss the goals of Arabo-Islamic alchemy and the prerequisites that are necessary for the adept and try to find answers to the question of what will happen to the successful adept of the divine art. By doing so, I shall be contextualising Arabo-Islamic alchemy in its contexts as a natural philosophy (see the recent discussion on the occult sciences and their status, especially by Matthew Melvin-Koushki [30] and Liana Saif [34]).

2. Goals of Alchemy

As Rowling writes quite correctly in her novel, alchemy is the art of transforming base metals into precious ones, usually silver and/or gold. This holds true also for the Arabo-Islamic world [36, 257]. The creation of a panacea or any kind of substance to prolong one's life, however, is not at the core of Arabo-Islamic alchemy. It may be found in the corpus of writings attributed to Jābir b. Ḥayyān (fl. perhaps in the second/eighth century) [22, pp. 303–305] (cf. [18, p. 82]; [19, p. 335]; [35, pp. 428–431]; [36, p. 260]), and also occurs in the compendium of the physician Ibn al-Akfānī (d. 749/1348) [38, §§ 686–687], but it was never considered very important in the Islamicate world.
If we see transmutation as a central element of Arabo-Islamic alchemy, the question remains: how is transmutation to be achieved? Arabo-Islamic alchemical writings describe several methods. The most important or at least most prominent is based on the use of the philosophers' stone[3] or elixir. For this process, the alchemist must first produce the prime matter and render it passive, that is, "black" and free of accidental qualities. To this prime matter, the stone/elixir – which can be animal, vegetable, or mineral – must be applied. It will then function like yeast in dough, leading to a much accelerated "ripening" of metals, and concluding with the production of gold, or, if incompletely processed, silver. The theory behind this procedure is that all metals are sorts (*anwāʿ*) of the same species (*jins*), and therefore they can be transformed into one another. All base metals are subject to a natural process of "ripening" towards becoming silver and gold. Accordingly, the elixir serves only to accelerate this natural ripening process: the alchemist does not create anything out of the ordinary but only expedites the change [5, pp. 104–109]; [36, pp. 257–261].

Alternative methods for achieving transmutation are based on the mercury/sulphur theory [4, pp. 75-79], [18, p. 80], [19, pp. 334-335], [36, pp. 260-261] or the theory of balance (*ʿilm al-mīzān*) [1, pp. 865-867], [4, pp. 94-99], [18, pp. 80-82], [19, p. 335], [36, p. 261]. However, these alternative ideas never gained the prominence of the philosophers' stone, which seems to have become, for many an alchemist, the goal itself, while the transmutation tended to disappear from the picture. As Jābir b. Ḥayyān explains in the second of the three parts of the *Kitāb Usṭuquss al-uss* ("The Book of the Element of Foundation") [21, p. 84]:

قالوا فالحجر هو المنى دون ساير الاشياء التى يتوهم ان العمل فيها ومنها

> They say: The stone is what one wishes for, more than all the other things of which one imagines that the work is about or from.

Accordingly, a considerable amount of ink was spent on writing about the philosophers' stone, rather than on other aspects of alchemy.[4]

While making gold is certainly the central goal of alchemy and alchemists, it is clearly not the only one (cf. [32, pp. 207-210]). An interesting example is the seventh/twelfth century Moroccan scholar Ibn Arfaʿ Raʾs who composed a collection of poems, a *dīwān*, on alchemy entitled *Shudhūr al-dhahab* ("The Splinters of Gold").[5] In the first, short poem of the collection, a *qaṣīda* in the metre *ṭawīl*, he says:[6]

إِذَا ثَلَّثَ المَرِّيخَ بِالزُّهْرَةِ ٱمْرُؤٌ وَقَارَنَ بِالبَدْرِ المُنِيرِ ذُكَاءَ
وَوَاصَلَ سَعْدَ المُشْتَرِي بِعُطَارِدَ إِلَى زُحَلٍ كَيْ يَسْتَفِيدَ ضِيَاءَ

وَأَجْمَدَ أَدْهَانًا وَحَلَّ بِحِكْمَةٍ صُخُورًا أَصَارَتْهَا المِيَاهُ هَبَاءَ
فَذَاكَ الَّذِي إِنْ يُضْحِ أَفْقَرَ مُغْتَدٍ يَرُحْ وَهُوَ أَغْنَى العَالَمِينَ مَسَاءَ

If one triples Mars with Venus,
And unites the sun with the shining full moon
And connects the benefic Jupiter with Mercury
And makes them join Saturn, so that he may gain brightness,
If he makes oils solid and liquefies with wisdom
Rocks that waters have turned into dust,
He will be, even if he was very poor in the morning,
The richest of the worlds in the evening.

The successful alchemist and perhaps the reader of the *dīwān* by Ibn Arfaʿ Raʾs will become rich in the end. Even more so, he or she will become the richest of the worlds: Ibn Arfaʿ Raʾs is not content with this world only, but deliberately speaks of more than one world: *ʿālamīn* is usually explained as meaning the worlds of angels, jinn, and mankind, or simply: the universe of created beings [24, vol. 5, p. 2141]. However, in our context, we might ask: Will the successful adept perhaps also be successful in the world to come? Is attaining the transmutation not rather a sign of being chosen by God? We would then have an argument similar to that of Max Weber: being rich is being chosen.

3. Prerequisites

Interestingly, texts that discuss the goals of alchemy also rather often speak of the prerequisites the alchemist must have to succeed in the "Great Work". Already in Syriac alchemical writings, authors insist that the real alchemist should not act in order to get rich himself, but that he or she should be ready to sacrifice, live according to religious regulations, be truthful and hardworking [25, vol. 1, p. 77]. Furthermore, he or she should be purified in body and soul, which can be reached by sexual chastity and following strict dietary rules, and he or she should not strive for the creation of gold, but rather for the knowledge about the transmutation. Again, like Harry Potter, who had to want to find the stone, but not for using it in order to get it out of the enchanted mirror [33, p. 217], the ancient alchemist had to strive for knowledge and science rather than for gold and silver. If he or she does so, alchemy will come as a gift of grace from God.

In the Jābirian corpus, the intellectual pre-requisites are stressed. In the first part of the *Kitāb Usṭuquss al-uss*, we read, that the successful alchemist will be "of sound opinion and of necessary analogical reasoning, of continuous studying of the true and obvious science" (*dhī l-raʾy al-ṣaḥīḥ wa-l-qiyās al-wājib wa-l-dars al-dāʾim li-l-ʿilm al-ḥaqq al-wāḍiḥ*) [21, p. 71]. If he wants to succeed, he needs, first of all, patience (*ṣabr*), especially to study the sciences, but then, right after patience, Jābir emphasises the importance of books – or rather: his own books. Only by reading them, will the adept ever be able to perform the great work [21, p. 100]. Finally, purity comes into the picture [21, pp. 109-110]:

واعلم أنك إن لم تُطَهِّر النفسَ حتى تصيرَ نورًا لم يتم لك عملٌ فاجهَدْ في تطهيرِكَ لها فى أيام الربيع يخرجُ لك العملُ كاملا

Know: If you do not purify the soul until it becomes a light, no work will become perfect for you. Strive to purify it during the days of spring, and the work will become complete for you.

Alchemy is conditional on a purified soul: It is the adept's soul, rather than his practical abilities, on which the outcome of any alchemical attempt will ultimately depend.

4. Eschatology

If being rich means being rich not only in a monetary, but also – or even more – in a much deeper way, should we not think of alchemy's goal as much more than finding the philosophers' stone and producing gold? And what, then, happens when one finally has created the philosophers' stone?

An otherwise unknown military officer from Upper Egypt, called Ḥasan Aghā Sirdār, who flourished in the late eleventh/seventeenth century, has two answers (cf. [36, pp. 247-248]; [37, pp. 37-61]). In his treatise entitled *Risāla fī l-Ḥajar al-karīm al-makhfī al-ẓāhir* ("Epistle on the precious stone that is both hidden and obvious") he first of all stresses the fact that alchemical knowledge will be granted by God only to the truly pious adept [17, fols. 83r-83v]:

> واذا بلّغك الله معرفةَ الحجر وتدبيرَه وتفصيله ودرجاته فقد بلغتَ القصدَ والمراد وظفرتَ بكنزٍ لا يفني. فيجب عليك عند ذلك شكرُ الله تعالى واخراجُ حقّ الله تعالى منه الزكاة

> If God were to grant you the knowledge of the stone, its preparation, division and grades, then you would have attained the goal and what you desired and gained a treasure that does not perish. In that case, you must thank God (He is exalted) and do what God (He is exalted) has ordered, especially give alms.

Only the truly pious adept will ever be successful as an alchemist. Once he or she has created the stone, he or she will indeed produce heaps of gold and silver – but only in order to help the poor. The military officer's eschatology is at least partly this-worldly: God's gift, alchemy, will remove poverty.

It cannot come as a surprise that the famous philosopher al-Fārābī (d. 339/950) has a rather different answer to offer. He has written a *Maqāla fī wujūb ṣinā'at al-kīmiyā'* ("Treatise on the necessity of the art of alchemy") in which he explains, that the economy would collapse if making gold were the real goal of alchemy [12, pp. 76–77]:

> وعند التفحُّص تبين أنَّ الجمهورَ لو علِموا اعمال هذه الصِناعة لم يتم البتَّةَ اجتماعٌ مدنىٌ ولَعَدَمَ الانتفاعُ بالذهب والفضة ولأُحتيجَ إلى الارتباط بجواهر أُخَر يكون بها المعاملات وقد تبين بين العالم أنَّ التعامُلَ بالذهب والفضة ضرورىٌ لا يوجدُ جوهرٌ يُخلِفهما البتة

> When inquiring, it becomes clear that, if the masses knew how to practice this art, a civilised community would definitely not become perfect because gold and silver would not be used advantageously any longer and because one would have to use other substances (*jawāhir*, also: "metals") for business transactions. In this it is shown for everyone that trade by using gold and silver is necessary. There is absolutely no substance that could replace them.

If alchemy, if the creation of the stone were to become common knowledge, gold and silver would lose their validity as currency and the successful alchemist would not have gained anything. Al-Fārābī goes on to explain that in fact making gold is not the real goal of alchemy. Rather, the adept trains his mind. Philosophical training and true knowledge are, he goes on to explain, the real goal of the adept [12, p. 77]:

> فلذلك لم يفصُحوا فى كتبهم عن شيء من أعمال هذه الصناعة ولا كان غرضُهم فيها تعليمَها ولا إذاعَتَها عند الجمهور وانما ارادوا أنْ يُنَبِّهَ الفِطَنُ إلى العِلمِ اذ مَثَلُ هذه من الامور هو الذى يشتاقُهُ الانسانُ بالطبع أوَّلا فيدعوه النزوعُ الذى يحدُثُ إلى اقتناءِ العلم فذو الفطنة الفائقة ستحصُلُ له المعرفةُ التامة والسعادةُ من حيثُ لا يشعَر ويكون اغتباطُه حينئذ بما ادرك من الفلسفة اعظم من اغتباطِهِ بالحاصلِ له من هذه الصناعة

> Therefore, they do not express anything of the works of this art clearly in their books, and it is not their goal to teach or spread this [art] among the masses by them (i.e. the

books). They only want to awaken the intellects for the science, as the like of this [art] are those things that man desires by nature from the beginning. A created longing calls him to acquire this science. The one, who is of superior intellect, will gain perfect knowledge and happiness, without feeling wherefrom, and his joy about his grasp of philosophy will then be greater than his joy about what he gets from this art.

The accomplished alchemist will rejoice in his knowledge – he or she will reach a perfect degree of knowledge and happiness that is above the simple fact of being rich. Al-Fārābī, we might argue, does in fact have an eschatological worldview: The alchemist's goal is perfect knowledge and happiness, a state of mind that might be as well antediluvian and eschatological. However, al-Fārābī does not say what the perfectly trained philosopher will do once he or she has gained this true training of soul and intellect through his study of alchemy.

In the Harry Potter story, the perfect philosopher, the only known owner of the stone, Nicolas Flamel, aged six hundred and sixty six years, agrees to destroy the stone and to die – or, in Professor Dumbledore's words: to go on to the next great adventure. So, is this what will eventually happen to the successful alchemist: a very long life and eventually a self-chosen death?

The *Risālat al-Ḥakīm Qaydarūs* ("The epistle of the sage Qaydarūs"), a dialogue probably dating to the second half of the third/ninth or the first half of the fourth/tenth century and therewith more or less contemporary with al-Fārābī, provides us with a kind of answer, although it comes as a sort of by-work, in an explanation by the wise alchemist Mītāwus. He says [31, §§ 21–22]:

والدليلُ على صدقنا فيما ذكرناه أن الحكماءَ لما وصلوا إلى هذا العلم رفَضوا الدنيا وزهَدوا فيها ورغِبوا فى الدار اللآخرة. فكيف يحسُدون الناس على ما قد رفَضوه وزهَدوا فيه؟

The proof for our truthfulness in what we have mentioned is that the sages have dismissed this world, after they had reached this knowledge, have renounced it [i.e. the world] and have preferred the hereafter (*al-dār al-ākhira*). Why should they envy the people for something that they have dismissed and renounced?

The alchemical knowledge leads to a complete renunciation of this world and to a desire of the other world, the hereafter. The perfect sage, the real alchemist, will be a perfect ascetic according to this text.

This, in fact, cannot come as a surprise: The close relationship between religion and alchemy has been observed for a long time. As a natural philosophy, alchemy aims at the explanation of the world: alchemy is a "Weltanschauung" that shares concepts of Neo-Platonism and Gnosticism. Seeking gold becomes an equivalent for seeking God. The language and images used by the alchemical authors therefore resemble those of Ṣūfism and vice versa (cf. [4, pp. 21-22], [23], [36, pp. 149, 196-197, 227]). Furthermore, a special affinity seems to exist between the Shīʿa and alchemy (cf. [13], p. 22).

The most explicit reference to the eschatological consequences of finding the stone may be found in the Jābirian corpus of writings and especially in the *Kitāb al-Bayān* ("Book of the Proof") and the *Kitāb al-Usṭuquss al-uss* studied by Pierre Lory (esp. [27] and [28]). Lory, in several of his contributions on the relationship of alchemy and Ṣūfism and alchemy and Shīʿite thought, has offered an explanation of the goal of alchemy and of the eschatology of the adept. In Lory's reading, the transmutation becomes a sign for the fact that the successful alchemist has reached knowledge comparable only to that of the Imām, a knowledge granted by the mercy of God. Knowing how to make the stone means to know all there is to know in the world. The successful alchemist has knowledge equal to that of God – the alchemist will return back to Paradise, where he or she will meet the first Islamic alchemist, Adam (cf. [6, pp. 381, 383–384]). What happens to the world will not be important any longer, as in this reading, what is important is the perfection of the individual, a personal form of eschatology. The imām-cum-alchemist has reached human perfection, and therefore, nothing can touch him anymore.

In his reading of the Jābirian corpus (or at least of its oldest parts), Lory sees the Jābirian authors as *ghulāt*, extremist Shīʿites,[7] who were convinced that the practitioners of alchemy would, by-and-by, become more and more perfect. Lory discerns a connection between the Jābirian writings and the problematic succession of the sixth imām Jaʿfar al-Ṣādiq. Jaʿfar, we should recall, is said to have been the teacher of Jābir in alchemy and is generally considered an important authority on alchemy especially in Shīʿī circles (cf. [11], [36, pp. 195-196]). When he died in 148/765, a succession crisis arose (cf. [10]). His son Ismāʿīl, the designated seventh imām, had died before his father. Some people now thought that Jaʿfar was the last of the imāms, others, that Ismāʿīl was in hiding, yet others thought that the seventh imām was to be seen in Jaʿfar's grandson, Muḥammad b. Ismāʿīl, and finally, many opted for one of Jaʿfar's other sons, especially for Mūsā b. Jaʿfar. When Muḥammad b. Ismāʿīl died shortly after 179/795-796, the authors of the Jābirian corpus (or at least of parts of it) would have created a new idea to solve the succession problem: not a ʿAlid would be the new imām, but the authority of the imām would be transferred to the successful alchemist. Through his alchemical work, the adept would cause the advent of the *qāʾim*, the awaited *mahdī* [26, pp. 63-120], [28].

While the connection of at least parts of the Jābirian corpus with the *ghulāt* seems absolutely convincing, a connection of the Jābirian corpus with the succession of Jaʿfar al-Ṣādiq poses more problems. This connection seems plausible only in the immediate aftermath of Muḥammad b. Ismaʿīl's death, which would make the Jābirian corpus date from the second/eighth century. While this is consistent with the traditional dating of the corpus and perhaps feasible for its oldest parts, it seems likely that the corpus also contains writings going back to a period quite a bit later than this, dating, as Kraus has argued, to the third/ninth and the first half of the fourth/tenth century.[8]

Notwithstanding these problems, in Lory's reading, the alchemical work becomes the divine wisdom as addressed to mankind. Jābir, accordingly, may expect a special reward on the Day of Judgment, as can be seen in the third part of *Kitāb al-Usṭuquss al-uss* [21, pp. 107-108]. The alchemical work therewith becomes an analogon for the life of man: the last stages of the "work" take place "when the hour comes" (*ḥattā taqūm al-sāʿa*) [21, p. 110]. And just like the prime matter will, through many-fold distillations, be purified, the adept will also be purified through birth and re-birth: "Every human being dies and comes back similar to himself continuously, until the Day of Judgment" (*wa-kullu insānin fa-huwa yatalāshā wa-yaʿūdu mithluhū dāʾiman ilā yawmi l-qiyāma*) [21, pp. 99-100].

The alchemical process renewed and reiterated once and again, here is seen as the perfect simile to the life of man. The adept, the accomplished alchemist, is considered the complete, the perfect man, the *insān kāmil* in an Ibn al-ʿArabī-style terminology,[9] or the imām in the terms of the Shīʿa.

5. Conclusion

Most alchemical texts do not mention what will happen to the alchemist once he or she has created the philosophers' stone. This is in clear contrast to the fact that both the prerequisites for success in the alchemical work and the goals of alchemy are frequently mentioned. By looking at different texts however, we can conclude that while making gold or silver might have been the obvious goals of alchemy, in fact, the deeper or real goal was to acquire a divine knowledge of the functioning of the world. The perfect adept, the successful alchemist, would then not have had a real use for all the gold he or she could, in theory, produce. Rather, he or she would have become a God-seeking and God-fearing ascetic. At the least, the alchemist would start to give away all his or her gold to the poor. Privately however, he or she would live the life of an ascetic and a true God-fearer. Therewith, alchemy becomes nothing more and nothing less than a different form of Ṣūfism.[10]

Acknowledgment

I have first presented these ideas at the workshop "Islamic-Eschatology: New Perspectives" (Berlin, Humboldt-Universität, May 2017) and should wish to thank dr. Ghassan El Masri for inviting me

and all the discussants for their comments. The research for this study was mainly carried out in the frame of the project “Between religion and alchemy” funded by the Swiss National Science Foundation. All translations from the Arabic are mine.

References

1. Anawati, G. C. Arabic alchemy, In R. Rashed (ed.), *Encyclopedia of the History of Arabic Science*, London and New York: Routledge, 1996, vol. 3, pp. 853–885.
2. Anthony, S. W. Ghulāt (extremist Shīʿīs), In M. Gaborieau et al. (eds.), *Encyclopaedia of Islam, THREE*, Leiden: Brill, fasc. 2018–2, 2018, pp. 37–46.
3. Arnaldez, R. al-Insān al-Kāmil, In H. A R. Gibb et al. (eds.), *Encyclopaedia of Islam, New Edition*, Leiden: Brill, vol. 3, 1971, pp. 1239–1241.
4. Artun, T. *Hearts of gold and silver: The production of alchemical knowledge in the early modern Ottoman world*, PhD dissertation, Princeton University, 2013.
5. Asatrian, M. Ibn Khaldūn on Magic and the Occult, *Iran and the Caucasus*, vol. 7, 2003, pp. 73–123.
6. Braun, C. “Who Began This Art? From Whence Did It Emerge?”: A Hermetic Frame Story on the Origins of Alchemy in Pseudo-Ibn Waḥshīya’s *The Book of the Ziziphus Tree of the Furthest Boundary*, *al-Qanṭara* 37, 2016, pp. 373–398.
7. Braun, C. and R. Forster. Alchemist und Magier? Ibn Arfaʿ Raʾs (fl. 12. Jh.) im Kontext der arabisch-islamischen Gelehrsamkeit, In J. Eming and V. Wels (eds.), *Der Begriff der Magie in Mittelalter und Früher Neuzeit*, Wiesbaden: Harrassowitz (forthcoming).
8. de Callataÿ, G. and S. Moureau. Again on Maslama Ibn Qāsim al-Qurṭubī, the Ikhwān al-Ṣafāʾ and Ibn Khaldūn: New evidence from two manuscripts of *Rutbat al-ḥakīm*, *al-Qanṭara* 37, 2016, pp. 329–372.
9. Carusi, P. Alchimia islamica e religione: la legittimazione difficile di una scienza della natura, *Oriente Moderno* N. S. 19, 2000, pp. 461–502.
10. Daftary, F. Esmāʿīl b. Jaʿfar al-Ṣādeq, In E. Yarshater (ed.), *Encyclopaedia Iranica*, Costa Mesa: Mazda Publishers, vol. 8, 1998, 625–626.
11. De Smet, D. Jaʿfar al-Sādeq. iv. And Esoteric sciences, In E. Yarshater (ed.), *Encyclopaedia Iranica*, New York: Encyclopaedia Iranica Foundation, vol. 14, 2008, pp. 362–363.
12. al-Fārābī and A. Sayili (ed.). Fârârbî’nin Simyanın Lüzûmu hakkındaki Risâlesi, *Belleten* 15, 1951, pp. 65–79.
13. Forster, R. Alchemy, In M. Gaborieau et al. (eds.), *Encyclopaedia of Islam, THREE*, Leiden: Brill, fasc. 2016-2, 2016, pp. 15–28.
14. Forster, R. Jābir b. Ḥayyān, In M. Gaborieau et al. (eds.), *Encyclopaedia of Islam, THREE*, Leiden: Brill, forthcoming.
15. Forster, R. *Wissensvermittlung im Gespräch. Eine Studie zu klassisch-arabischen Dialogen*, Leiden and Boston: Brill, 2017.
16. Gardiner, N. Esotericist Reading Communities and the Early Circulation of the Sufi Occultist Aḥmad al-Būnī’s Works, *Arabica* 64, 2017, pp. 405–441.
17. Ḥasan Aghā Sirdār. *Risāla fī l-Ḥajar al-karīm al-makhfī al-ẓāhir*, MS Dublin, Chester Beatty Libary, Ar 4025, fols. 80–97.
18. Hill, D.R. *Islamic Science and Engineering*, Edinburgh: Edinburgh University Press, 1993.
19. Hill, D. R. The literature of Arabic alchemy, In M. J. L. Young, J. D. Latham and R. B. Serjeant (eds.), *Religion, Learning and Science in the ʿAbbasid Period*, Cambridge: Cambridge University Press, 1990, pp. 328–341.
20. Ibn Arfaʿ Raʾs and L. Ghazzali (ed.). *Shudhūr al-dhahab*, Beirut: Dār al-kutub al-ʿilmiyya, 2018.
21. Jābir b. Ḥayyān and E.J. Holmyard (ed.). *The Arabic works of Jābir ibn Ḥayyān*, vol. 1, part 1, Paris: Librairie orientaliste Paul Geuthner, 1928.
22. Jābir b. Ḥayyān and P. Kraus (ed.). *Mukhtār rasāʾil,* Paris: Maisonneuve, 1935.

23. Johnson, K. V. Jalāl al-Dīn Rūmī's Use of Alchemical Imagery, *Islamic Culture* 70, 1996, pp. 1–25.
24. Lane, E. W. *An Arabic-English Lexicon*, 8 vols., London: Williams and Norgate, 1863–1893.
25. von Lippmann, E. O. *Entstehung und Ausbreitung der Alchemie*, 3 vols., Berlin: Springer, 1919–1954.
26. Lory, P. *Alchimie et mystique en terre d'Islam*, [Paris]: Verdier, 1989.
27. Lory, P. Aspects de l'ésotérisme chiite dans le Corpus Ǧābirien. Les trois *Livres de l'Elément de fondation*, *al-Qanṭara* 37, 2016, pp. 279–298.
28. Lory, P. Eschatologie alchimique chez Jâbir b. Ḥayyân, *Revue des mondes musulmans et de la Méditerranée*, vols. 91-94, 2000, pp. 73–92.
29. Masāḥ, R. Ibn Naqarāt, In *Dāʾirat ul-maʿārif-i buzurg-i islāmī,* vol. 5, 1993, pp. 57–58.
30. Melvin-Koushki, M. Introduction: De-orienting the Study of Islamicate Occultism, *Arabica* 64, 2017, pp. 287–295.
31. Müller, J. *Zwei arabische Dialoge zur Alchemie. Die Unterredung des Aristoteles mit dem Inder Yūhīn und das Lehrgespräch der Alchemisten Qaydarūs und Mītāwus mit dem König Marqūnus. Edition, Übersetzung, Kommentar*, Berlin: Klaus Schwarz, 2012.
32. Principe, L. M. *The secrets of alchemy*, Chicago: University of Chicago Press, 2013.
33. Rowling, J. K. *Harry Potter and the Philosopher's Stone*, London: Bloomsbury, 1997.
34. Saif, L. From *Ġāyat al-ḥakīm* to *Šams al-maʿārif*: Ways of Knowing and Paths of Power in Medieval Islam, *Arabica* 64, 2017, pp. 297–345.
35. Strohmaier, G. Elixir, alchemy and the metamorphoses of two synonyms, *al-Qanṭara* 37, 2016, pp. 423–434.
36. Ullmann, M. *Die Natur- und Geheimwissenschaften im Islam*, Leiden: Brill, 1972.
37. Ullmann, M. *Katalog der arabischen alchemistischen Handschriften der Chester Beatty Library*, 2 vols., Wiesbaden: Otto Harrassowitz, 1974–1976.
38. Witkam, J. J. *De egyptische arts Ibn al-Akfānī (gest. 749/1348) en zijn indeling van de wetenschappen. Editie van het Kitāb iršād al-qāṣid ilā asnā al-maqāṣid*, Leiden: Ter Lugt Press, 1989.

Notes

1. It should be noted that the book, while published as *Harry Potter and the philosopher's stone* in Great Britain, is entitled *Harry Potter and the sorcerer's stone* in the US-American version. Although this title obscures the alchemical aspect (cf. [32, p. 1]), we could read it as emphasising the connections between alchemy and magic which definitely exist (on these see [7], [9] and [36, p. 145]).
2. [32, p. 5]. On the medical aspects typical for Late Medieval European alchemy see [32, esp. pp. 71–72], with reference to John of Rupescissa, while a connection of the fifteenth century French alchemist Nicolas Flamel with the "elixir of life" as suggested in Rowling's novel seems to be an eighteenth-century invention (cf. [32, p. 227, n. 56]).
3. I prefer the term "philosophers' stone" to the more-commonly used "philosopher's stone" (also used in the Harry Potter series), as it translates nicely the Arabic terms *ḥajar al-falāsifa* ("stone of the philosophers") and *ḥajar al-ḥukamāʾ* ("stone of the sages"). On the Arabic terms of the stone or elixir see [36, pp. 257–258].
4. A work on the preparation of the philosophers' stone, *Kitāb Tadbīr al-ḥajar al-mukarram* ("Book on the preparation of the honoured stone"), has been attributed to the mystic Junayd (d. 298/910, cf. [36, p. 197]). The stone is also at the centre of a pseud-epigraphic dialogue between Aristotle and the Indian sage Yūhīn (perhaps third/ninth or fourth/tenth century; ed. [31, pp. 13–26]; cf. [15, s. index]) and of Agathodaimon's death-bed talk to his pupils, *Risālat al-ḥadhar* ("Epistle of Warning", perhaps third/ninth or fourth/tenth century; cf. [15, s. index]). A later example would be ʿAlī Bek al-Iznīqī's (also known as *al-muʾallif al-jadīd*, "the new author", ninth/fifteenth or tenth/sixteenth century) *Risālat al-Durra al-bayḍāʾ wa-l-yāqūt al-ḥamrāʾ* ("Epistle of the white pearl and the read ruby", cf. [36, p. 244]).
5. Ibn Arfaʿ Raʾs is traditionally identified with a Mālikī scholar called Ibn al-Naqirāt. However, this identification has been questioned tentatively by Masāḥ [29]. Juliane Müller (Zurich) and the present writer are challenging the commonly accepted traditional identification in a forthcoming article on "The Identity, Life, and Works of the Alchemist Ibn Arfaʿ Raʾs" (submitted to *al-Qanṭara*).
6. I cite the text established by Svetlana Dolgusheva (Zurich), who is currently preparing a critical edition of *Shudhūr al-dhahab*, based on MS Istanbul, Istanbul, Topkapı, A. 2572 as "Leithandschrift". The edition by Lahouari Ghazzali [20] who uses manuscripts from Leipzig, Tehran, and the Escorial, gives a slightly different text. – The translation is mine; based on work by all members of the Zurich team (Christopher Braun, Svetlana Dolgusheva, and Juliane Müller).
7. On the *ghulāt*, see for example [2].

8. On the dating of the Jābirian corpus and the research debate around it see [14]. In his presentation on "The Historicity of Jābir ibn Ḥayyān: An overview of the external sources" at the Gotha manuscript workshop "Alchemy in the Islamicate world" (28–29 September 2018), Thijs Delva has argued that the corpus, even its later parts, was known to Maslama b. Qāsim al-Qurṭubī, the author of *Ghāyat al-ḥakīm* ("The goal of the sage") and *Rutbat al-ḥakīm* ("The station of the sage"), already before his return to the Islamicate west. As he returned to al-Andalus in 325/936 (cf. [8, p. 336]), this would be a rather early and so far ignored *terminus ante quem* for the completion of the Jābirian corpus.
9. On the concept of the "perfect man" see [3].
10. This would be in keeping with a kind of Ṣūfī reorientation of the occult sciences that has been argued for by Gardiner [16] and Saif [34].