Introduction

The Ikhwān al-Ṣafā᾽ and the Knowledge of Logic in the Tenth Century

In the tenth century, the Ikhwān al-Ṣafā᾽ (the Brethren of Purity) produced one of the first surveys on logic in Arabic. It concludes the first section of their encyclopaedia, devoted to the propaedeutical sciences.

The treatises on logic form a major part of this section. The first five treatises expound the disciplines constituting the Latin quadrivium of arithmetic, geometry, astrology, and music,[1] and the logical treatises take the place of the academic disciplines known in the Latin world as the trivium: grammar, rhetoric, and dialectics. Grammar is not approached as a discipline, even though it is the basis of verbal communication, but the Ikhwān do appear interested in spoken language in Epistle 10: 'On the Meaning of the *Isagoge*'. There is no place for poetry or for rhetorical devices in the encyclopaedia; dialectics was thought to promote damaging opposition among the learned.[2]

What was the relationship between the Ikhwān al-Ṣafā᾽ and the Arabic tradition of logic? Translators initially focused on Porphyry's *Isagoge*,

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1 Arithmetic, geometry, and music are also approached together in Epistle 6: 'On Proportions'; inserted between the treatises devoted to astronomy and music is 'On Geography': '*ilm al-hay᾽a*' (cosmography) was evidently considered part of astronomy.

2 As has been noted, the Ikhwān's description of the trivium and quadrivium is different from those of other Muslim writers. Cf. Godefroid de Callataÿ, 'Trivium et quadrivium en Islam: des trajectoires contrastées', in *Une lumière venue d'ailleurs. Héritages et ouvertures dans les encyclopédies d'Orient et d'Occident au Moyen Age; Actes du colloque de Louvain-la-Neuve, 19-21 mai 2005*, ed. G. de Callataÿ and B. Van den Abeele (Turnhout: Brepols, 2008), pp. 1–30.

Aristotle's *Categories*, *On Interpretation*, and *Prior Analytics*, Galen's *Introduction to Logic*, and on works by Aristotle's commentators such as Theophrastus, Alexander of Aphrodisias, Themistius, Ammonius, and John Philoponus. The *Posterior Analytics* was introduced only later, after a break with the Syriac tradition in which the study of logic ended at assertory syllogisms.[3] In line with the Alexandrian school and the Syriac tradition, Aristotle's collected logical writings, known as the *Organon* (instrument of reasoning), were completed by his *Rhetoric* and *Poetics*; Porphyry's *Isagoge* was placed at the beginning as an introduction.

Until the end of the tenth century, the most important logicians, apart from the famous philosopher al-Fārābī, were Christians. The Baghdad Peripatetics — Abū Bishr Mattā ibn Yūnus al-Qunnā'ī (d. 940) and al-Fārābī — focused on the doctrines of Aristotle, the 'first master' of logic. The Arabic philosophers produced summaries and commentaries that merged Aristotle with Stoic doctrines, often in an original way.

The Arabs were faced with a basic opposition between Peripatetics and Stoics. Those following the Peripatetic school considered logic a scientific 'tool', which was supported by use of the term *alah* (instrument), like the Greek *organon*, to signify logic,[4] whereas the Stoics considered logic to be a part of philosophy.

Judging by their selection of works by Aristotle, the Ikhwān would seem to be following the tradition that restricted research to the first books of the *Organon* rather than sharing the wider approach of al-Fārābī. This corresponds with the aims of their encyclopaedia and the strong religious inclination that determined even their approach to ancient knowledge. Generally speaking, logic is seen as the soundest method for moving towards truth (that is, towards God), just as the

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3 Abū Naṣr al-Fārābī (d. 950), a contemporary of the Ikhwān, is thought to have introduced the major innovation of embracing all of Aristotle's works on logic, including the *Topics* and *Sophistical Refutations*. His statement that the Syriac restriction was based on a decree by the Synod, however, was later recognized as a forgery: it probably corresponded to the shortened version of the sixth-century Alexandrian *curricula* available to the Syriacs, which had been translated into Arabic in the second half of the eighth century.

4 Logic was also called *al-mīzān* (the balance) because it weighs arguments and proofs, *mi'yār* (the standard) and *miḥakk* (the test).

whole encyclopaedia can only be grounded on the sound (*ṣaḥīḥ*) method for discovering truth.

Al-Fārābī spoke of five types of syllogism: demonstrative, dialectical, sophistical, rhetorical, and poetical, expressing respectively certitude, presumption, falsehood, persuasion, and imagination. The Ikhwān thought that poetry, rhetoric, and, above all, dialectics did not aim to discover truth because they did not advance religious questions and debate. A conspicuous part of ancient logic (namely, the *Topics* and the *Sophistical Refutations*) was hence ignored by the Ikhwān, as it had been at the beginning of the translation movement. Aristotle's *Rhetoric* and *Poetics* are not examined in the encyclopaedia.

The Brethren call logic 'the scale of sciences' through which wise men may discern 'true from false in speeches, right from wrong in opinions, truth from vanity in beliefs, and good from evil in acts'.[5] But logic was for them no longer just a key to unlock knowledge: it was also a path to happiness, the ultimate aim of religion in the sense that the more learned each soul becomes with regard to intelligible objects, the closer it is to the Universal Soul and to celestial pleasures. According to their religious perspective, therefore, the Ikhwān considered logic both as a tool and as truth. Like other Muslim Neoplatonists,[6] they reconciled the Peripatetic and Stoic positions.

In about 932, a debate on the superiority of grammar or logic occurred between the Nestorian logician Abū Bishr Mattā ibn Yūnus and the Muslim grammarian Abū Saʿīd al-Sīrāfī (d. 979), a commentator of Sībawayhi (d. ca. 796).[7] The basic issue was that although languages are each proper to particular peoples, logic may claim to be a universal

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5 See, e.g., Epistle 7, vol. 1, p.268.14–16. Apart from references to the logical treatises here edited, I indicate the volume, page(s), and line(s) of each quotation or reference, using the Ṣādir edition; *Rasāʾil Ikhwān al-Ṣafāʾ*, 4 volumes, ed. Buṭrus al-Bustānī (Beirut: Dār Ṣādir, 1957). Unless otherwise noted, all translations are my own.

6 I use here the term found in Ian R. Netton's book, *Muslim Neoplatonists: An Introduction to the Thought of the Brethren of Purity* (London: Allen and Unwin, 1982).

7 See Gerhard Endress, 'Grammatik und Logik: arabische Philologie und griechische Philosophie im Widerstreit', in *Sprachphilosophie in Antike und Mittelalter*, ed. B. Mojsisch (Amsterdam: Grünert, 1986), pp. 163–299; and

language because it is concerned with intelligible things and ideas, at which level all men are the same.

According to Abū Bishr, in the course of logic intelligible things undergo different states, with the explanatory phrase and proof leading from the known to the unknown. There is, of course, a connection between logic and language. Grammarians need logic, but neither language nor grammar is the objective of the logician, nor can logic be reduced to the grammar of a language spoken by a people.

Al-Sīrāfī stated, on the other hand, that intelligible things are known only through language, with its nouns, verbs, and particles. He criticized logicians for confusing people with their technical terms; and the specificity of a language has greater value than logic, the more so in translations, when logic may no longer explain original significations. If a Greek instituted logic according to the language of his people, how could this logic be imposed upon other people? To promote the study of logic would be to promote the study of the Greek language. And logic did not prevent the Greeks from falling into error and moral evil.

The fact that al-Sīrāfī did not recognize a logic common to all raises some central questions: Can logic suppress differences in opinions and speculation? How could an individual succeed in this? Are there not diverse logically legitimate mentalities that are irreconcilable?

Behind al-Sīrāfī's position was an Arabism that opposed everything Hellenic on the religious basis that God had revealed the Qur'an in 'clear Arabic language'.[8] Logic was seen as an element of foreign civilization, threatening the Arabic language and grammar and even Islam. Only Yaḥyā ibn 'Adī (d. 970), a pupil of Abū Bishr, would succeed in identifying a universal grammar — logic — from the particular grammar that governs each language.

Although the Ikhwān never approach grammar as a discipline,[9] the technique of the universal form of language — logic — is examined. Their initial approach to logic is linguistic: they distinguish linguistic

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Dominique Urvoy, *Histoire de la pensée arabe et islamique* (Paris: Seuil, 2006), pp. 240–244.

8 See R. Arnaldez, 'Manṭiḳ', *EI2*, vol. 6, pp. 442–452, on p. 444.

9 Grammar is counted among the sciences of a lower level; see Epistle 7, vol. 1, 266.17.

and philosophical logic, the first being a premise of the second. Such an approach demonstrates that they were concerned with the discussions amongst their contemporaries, particularly this well-known debate.

Epistle 10

The first treatise (Epistle 10), devoted to Porphyry's *Isagoge*, opens with a general consideration of the nobility of logic, which arises from the fact that amongst creatures logic is unique to man — a living, rational, and mortal being.[10] As this definition places humans close to spiritual beings,[11] to whom other references are found in the logic section of the encyclopaedia, logic is considered the closest human art to the spiritual arts.

The discussion starts with a definition (a topic proper to logic), but the aim is to state that just as language influences souls, logic is also a science that concerns the soul. *Reason* has been said to be the characteristic proper to man, and 'the substance of a particular soul' now becomes the object of logic; immediately afterwards, *speech* is identified as an instance of influences on the soul. Here the Ikhwān seem to develop topics proscribed by Porphyry at the beginning of his work: 'whether genera and species subsist, whether they depend on bare thoughts alone, whether if they actually subsist they are bodies or incorporeal and whether they are separable or are imperceptible items'.[12]

In a passage in Chapter 2 that is puzzling for the student of logic, the Ikhwān say of mental logic[13] that it is studied by 'revelation', hence establishing a comparison between abstraction and religion. The chapter is arranged like an *arbor porphyriana* — after all, Porphyry's work is the subject of the treatise — but its goal is religious, and therefore well beyond logic.

The commentary on Porphyry's *Isagoge* does not begin until Chapter 5. The *Isagoge* discussed the so-called *quinque voces* (five predicables) of

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10 On the Aristotelian definition of 'man', see also *Prior Analytics* I.31.46b15–16; *Posterior Analytics* II.4.91b3–4, II.5.91b39–92a1; and *Topics* IV.2.122b13–14, VI.3.140b32 ff.

11 See note 1 to Epistle 10 below.

12 I refer to Jonathan Barnes' English translation of the *Isagoge*. See Porphyry, *Introduction*, tr. J. Barnes (Oxford: Clarendon Press, 2003).

13 See below, Epistle 10, p. 67.

genus, species, differentia, proprium, and accident, which the Ikhwān refer to as 'the terms used by philosophers'.[14] 'Individual' is added to these in the Ikhwān's treatise.[15]

The Ikhwān explain what individual, species, and genus are, corresponding to Porphyry's explanation of genus (Chapters 2 and 3), species, and individual (Chapters 3–7).

In Chapter 6, the Ikhwān explain proprium, differentia, and accident. More particularly, they distinguish three species of 'qualities': (1) those that, when they vanish, cause the qualified thing to vanish with them; (2) those that, when they vanish, do not cause the qualified to vanish with them because such qualities disappear slowly; and (3) qualities that disappear quickly. The first group are called 'essential differentiae of substance', the second 'propria', and the third 'accidents'. In this way,

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14 If this means that the Ikhwān did not believe the *Isagoge* to be an introduction to the *Categories* alone, it would have been revolutionary at the time.

15 Shams Inati conceives this to be an innovation of the Ikhwān, although he adds that 'the term does not seem to have acquired acceptance in Arabic circles'; 'Logic', in *History of Islamic Philosophy*, ed. Seyyed Hossein Nasr and Oliver Leaman (London–New York: Routledge, 1996), pp. 802–823, on pp. 814–815. Abū Isḥāq al-Kindī, the first 'philosopher of the Arabs' (d. ca. 870), had already used the category of 'individual' extensively in his polemics against the Christian trinity; see, e.g., Peter Adamson, *Al-Kindī* (Oxford: Oxford University Press, 2007), p. 48. This means that he himself may have been in some way responsible for the addition. If this hypothesis is tenable, it demonstrates that logic was also among al-Kindī's interests. In any case, the question calls to mind the relationship between al-Kindī and the Ikhwān al-Ṣafāʾ, already highlighted by T. J. de Boer more than a century ago; see 'Ikhwān al-Ṣafāʾ', *E. J. Brill's First Encyclopaedia of Islam 1913–1936*, ed. M. Th. Houtsma et al., vol. 3 (repr., Leiden: Brill, 1993), pp. 459–460, where he refers to his 'Zu Kindi und seiner Schule', *Archiv für Geschichte der Philosophie*, 13 (1899), p. 177 ff. The text mentioned by De Boer is in reality the Ikhwān's treatise on the *Posterior Analytics*; see Carmela Baffioni, 'Il "Liber introductorius in artem logicae demonstrationis": problemi storici e filologici', *Studi filosofici*, 17 (1994), pp. 69–90. Although the Pure Brethren never mention al-Kindī, there is at least one other interesting point of contact between the authors in the form of the short list of religious (more properly, Muʿtazilī) entries in a manuscript of al-Kindī's *Epistle on Definitions of Things*, which appears in an identical form in the Ikhwān's Epistle 41: 'On Definitions and Descriptions'. Rather than considering the Ikhwān's entries as a copy from al-Kindī, Stern thought that the Muʿtazilī series was mistakenly included in one of the manuscripts containing the Kindī epistle; Samuel M. Stern, 'Notes on al-Kindī's treatise on definitions', *Journal of the Royal Asiatic Society,* 1–2 (1959), pp. 32–43.

the Ikhwān restate Porphyry's explanations of differentia (Chapters 8–12), proprium (Chapter 12),[16] and accident (Chapters 12–13) and echo Aristotle's statements on quality in Chapter 8 of the *Categories*. What Porphyry says in Chapter 20, 'that differences are unaugmentable and undiminishable, whereas accidents admit the more and the less', also echoes Aristotle.[17] The last lines of Chapter 6 are a rough summary of Chapters 13–21 of the *Isagoge*, where Porphyry gives the common and the specific characters of the five predicables.

In Chapter 7, the Ikhwān say that mental concepts are representations of existing things known through 'mental logic' (*al-manṭiq al-fikrī*). These things are explained as the 'forms' that are found in the hypostases of the Ikhwān's ontological system and that are emanated from God into the Active Intellect, from the Intellect into the Universal Soul, from the Universal Soul into Prime Matter, and from this into human souls. Analogies are established between the Universal Soul and human manufacturers, between the Active Intellect and the souls of the learned, and between the Creator and the unit one, '1', that contains in itself all other numbers.

The description of a gnosiological path follows at this point, based on the hypostatic hierarchy of the Ikhwān's system that explains the gradual process of the learner from the lower to the higher degree of ontological realities. The issue is completed by Chapter 8, also on gnosiology. The exhortations to the learner and the numerous quotations from the Qur'an enforce the relation established between rational and revealed knowledge.

Quotations such as these are often found at the end of treatises, but four more chapters follow in Epistle 10. This question is discussed in detail below;[18] here, we may note that the preceding discussion of the knowledge and nature of forms is resumed in Chapter 9. Then the

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16 See also Porphyry, *Isagoge* 16.10–19: 'A property is counterpredicated of that of which it is a property, a genus is not counterpredicated of anything… if properties are removed they do not co-remove the genera; but if genera are removed, they co-remove the species to which the properties belong…'. This will be echoed by the Ikhwān with regard to Aristotle. For other references on propria, see Aristotle, *Topics* I.5.102a18–19, V.1.128b34 ff.

17 Aristotle, *Categories* 8.10b26–11a14.

18 See Appendix A, p. 157 ff.

discourse leaves forms and concepts and returns to words: in Chapter 10, substances and accidents are distinguished and the ten categories are mentioned. When the Ikhwān state that the things preceding in existence are called 'matter' and those following are called 'form', they seem to recall Porphyry's statement that '… a genus is predicated in answer to "What is it?", a difference to "What sort of so-and-so is it?"… there is one genus for each species… but several differences… A genus is like matter, a differentia like shape.'[19] This is also confirmed by their further statement that form is of two species, constitutive and complementary. At this point of Chapter 10 the Atif manuscript contains a passage of epistemic content, which is missing in the other manuscripts.[20]

The themes discussed in Chapter 9 are completed in Chapter 11, which introduces a 'religious' approach to the preceding statements. Still discussing words, the Ikhwān say that man needs linguistic logic as long as his soul is covered in a body. But if man could understand mental concepts without language, he would surely avoid all the labour linked to it. The pure unincarnated souls, the souls of angels, do not need phrases or statements. The Ikhwān portray a mystical picture resembling other descriptions of the attainment of supreme knowledge in Muslim philosophy.[21] The learner is then invited to imitate angels so as to gain salvation and happiness. When he succeeds in this, he will no longer be defined as 'living, rational, and mortal': he will have entered among the 'living, rational, and immortal', for whom *nuṭq* is not 'spoken language' but pure 'reason'.

Chapter 11 contains the conclusion of the epistle but is followed by another chapter — Chapter 12 of the Atif manuscript. Here there is another addition,[22] which resumes the subject (things or 'forms') from Chapter 7, but with some significant differences.[23] The distinction

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19 Porphyry, *Isagoge* 15.4–8.

20 See below, pp. 80–82.

21 For a comparison with Ibn Ṭufayl, see my article 'Metaphors of Light and the "Verse of Light" in the Brethren of Purity', in *In the Age of al-Fārābī: Arabic Philosophy in the Fourth/Tenth Century*, ed. P. Adamson (London–Turin: The Warburg Institute–Nino Aragno Editore, 2008), pp. 163–177, on pp. 176–177.

22 On the possible meaning of the words introducing this addition, on fol. 123b2 of the Atif manuscript, see below, Appendix A, pp. 162–163.

23 See below, p. 163.

between substances and accidents is also reintroduced. Technical discussion of logic is continued in the subsequent treatises, which deal with the first four works of Aristotle's *Organon*.

Epistle 11

Epistle 11 resumes the subject of the previous treatise and introduces Aristotle's *Categories*. Just as in Epistle 10 the *Isagoge* was sometimes discussed through Aristotle, here the Ikhwān use a series of *arbores porphyrianae* to explain categories. Essences are the constitutive forms of matter: they are identified with the first category, substance; the complementary forms, called accidents, are identified with the other categories.

To explain that essences — and in particular the first category, substance — originated in human minds through inference from existing beings via the senses, the Ikhwān present the first *arbor* in reverse form. In this case, individuals are perceived first, then the immediate species (e.g., humanity), then the farther species (e.g., animal), and finally the genus (e.g., life). With regard to individuals, their first common species (growth) is inferred, contrasted with the first species common to other individuals, which is inanimate;[24] growing and inanimate beings are part of the genus of body. Body is in turn opposed to another substance (namely, soul), according to a well-known statement in Chapter 22 of Epistle 14; only later do the Ikhwān say that body and soul are substances.

In explaining how the category of substance originated in the human mind, the Ikhwān recall Porphyry[25] and also use the Platonic method of διαίρεσις, which they call *taqsīm*. To clarify this, they give a series of *arbores porphyrianae* explaining the categories of quantity, quality, and relation. It should be noted that although Aristotle calls them 'words' (λεγόμενα), the Ikhwān speak of 'existing beings' (*mawjūdāt*) when referring to substances for all genera, of 'substances' (*jawāhir*) for

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24 As the Ikhwān themselves recall in Epistle 12, fol. 129a20 Atif MS and in Epistle 13, fol. 130a18 ff. Atif MS.

25 In *Isagoge* 4.21 ff. Porphyry creates an *arbor* moving from substance and arriving at man.

quantities and qualities, of 'things' (*ashyā'*) for relation, and of names (*asmā'*) for the genera of place, time, position, possession, activity, and passivity.[26]

Chapters 5, 6, and 8 of the *Categories* correspond to these statements. With regard to quantity, the initial division resembles that of Aristotle in that it distinguishes between 'continuous' and 'discrete'; but Aristotle adds 'what has, and what has no relative positions'.[27] The examples of the continuous are the same in Aristotle and the Ikhwān; but while Aristotle names number and speech as examples of the discrete,[28] the Ikhwān speak of number and, curiously,[29] of motion.[30] This absolutely anti-Aristotelian position may be explained by the influence of the theory of *ṭafra* (leap) attributed to the Mu'tazilī theologian Ibrāhīm ibn Sayyār al-Naẓẓām (d. between 835 and 845), stating that it is possible to move over a distance without going through all parts of the distance, by 'leaping' over those parts. This is one of the anti-atomistic theories adduced during the controversies of the Basra Mu'tazilī cosmology[31] and confirms the Ikhwān's general aversion towards atomism.[32]

With regard to quality, the Ikhwān distinguish between corporeal and spiritual qualities, unlike Aristotle, and continue with an *arbor porphyriana*: of the four types of qualities listed by Aristotle, they seem to take into account only the third — passive qualities and affections — echoing their own distinction between 'intrinsic qualities' and 'qualities that disappear'. They also introduce a new mention of propria and differentiae where Aristotle's text concerns dispositions and habits.

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26 See *Categories* 4.1b25 ff.; on relation, 7.8b21; and on quality, 8.8b25.

27 *Categories* 6.4b21–22. Other differences are signalled in the notes to the translation below.

28 *Categories* 6.4b22–23.

29 See my article 'Fragments et témoignages d'auteurs anciens dans les *Rasā'il* des Ikhwān al-Ṣafā'', in *Perspectives arabes et médiévales sur la tradition scientifique et philosophique grecque. Actes du colloque de la SIHSPAI (Societé internationale d'histoire des sciences et de la philosophie arabes et islamiques) Paris, 31 mars-3 avril 1993*, ed. A. Hasnawi, A. Elamrani-Jamal, and M. Aouad, with preface by R. Rashed (Leuven–Paris: Peeters–Paris IMA, 1997), pp. 319–329, on pp. 327–329.

30 Aristotle devotes the whole Chapter 14 of the *Categories* to motion.

31 For further details, see O. N. H. Leaman, 'Ṭafra', *EI2*, vol. 10, p. 83.

32 Cf., e.g., the arguments adduced in Chapter 6 of Epistle 13 or Epistle 28, vol. 3, p. 22.23–24; Epistle 42, vol. 3, pp. 402.18–19, 468.18–19, 535.17–18; Epistle 45, vol. 4, p. 50.18.

Then the Ikhwān speak of relatives, corresponding to Chapter 7 of the *Categories*. Their distinction into 'parallel and non-parallel relations' does not seem to have any correspondence with Aristotle; their distinction 'with regard to their essences in being' (*dhawātuhā fī'l-wujūd*), however, seems to recall the Aristotelian 'ἅμα τῇ φύσει εἶναι' (coming into existence together, 7b15), though the explanation they give is quite different. Their distinction between relatives as 'parallel' and 'non-parallel' is also far removed from Aristotle, who reports that 'συναιρεῖ δὲ ταῦτα ἄλληλα' (each cancels the other, 7b19).

Activity and passivity, dealt with in Chapter 9 of the *Categories*, are treated by the Ikhwān in a different way. Aristotle briefly recalls the other categories in 11b8 ff., as the Ikhwān do, explaining them simply as different compositions of the first four.

The Ikhwān introduce four kinds of opposition, one of which is in speech (*fī'l-qawl*) — affirmation versus negation — and three of which are in the essences (*fī dhawātihā*): between contrary things, in things related each other, and in possession and privation. These correspond to the four kinds of opposition listed by Aristotle in Chapter 10 (11b17–20): correlatives, contraries, privatives to positives, and affirmatives to negatives.

Then the Ikhwān distinguish five kinds of 'precedence', corresponding to Chapter 12 in the *Categories*. The first kind, in time and generation, corresponds to the first in Aristotle. The second, in nature, could be taken as corresponding to the second, which is 'τὸ μὴ ἀντιστρέφον κατὰ τὴν τοῦ εἶναι ἀκολούθησιν' (that which cannot be reversed as to the sequence of their being, 14a30). The third, in nobility, corresponds to Aristotle's fourth, the naturally (τῇ φύσει, 14b5) prior, i.e., whatever is better and more honourable. The fourth, in degree, resembles the third in Aristotle, which is order, but the instances are different. Only the fifth has no precise correspondence in Aristotle.[33]

This is followed by simultaneity, when the Ikhwān distinguish between simultaneity 'in something' (*fī'l-shayʾ*) and 'with something' (*maʿa'l-shayʾ*). The first kind has no correspondence with Chapter 13 of the *Categories*. In the second kind, the first type of simultaneity

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33   See below, p. 97.

corresponds to the first in Aristotle, and the third to the second in Aristotle; the Ikhwān also make mention of related things.

In Chapter 15, Aristotle speaks of many kinds of 'having': (1) habits, dispositions, and qualities such as virtue and knowledge; (2) quantities such as height; (3) clothing such as a cloak or tunic; (4) things that one 'has' on some part of the body, such as a ring on the finger; (5) parts of the body; (6) what is contained in a vessel; (7) property such as a house or field; and (8) to have a wife or a husband (which he thinks a far-fetched meaning). This recalls what the Ikhwān say in Chapter 3, when they mention internal possession in the soul (knowledge, intellect, and dreams, for example) or in the body (good looks, beauty, and glamour) and external possessions such as property.

The final chapter confirms the Porphyrian flavour of the whole, introducing a comparison with a garden and ten 'trees', i.e., the ten categories, that recalls the *arbor porphyriana*. The comparison also has a moral-religious frame. He who knows the ten categories, and hence the intelligible objects comprised in them, is like the lord of the garden when he enjoys it. The learner is invited to search for areas of knowledge because, like gardens, they offer nourishment to the soul. In this way souls will enjoy eternal pleasures after their separation from their bodies. A correspondence with the conclusion of Epistle 10 is so established.

Epistle 12

Epistle 12, the shortest of the logical treatises, consists of a single chapter. After a summary of the earlier material, the Ikhwān introduce an explanation of 'names' and 'verbs', which picks up Chapters 2 and 3 of Aristotle's *On Interpretation*, and add 'particles', which are not mentioned by Aristotle. This addition might be a result of Aristotle's mention in Chapter 1 of combination and division as essential to truth and falsehood.[34] Then propositions that have truth and falsehood and meaningful sentences are recalled; compare 'λόγος' and 'λόγος ἀποφαντικός' in Chapter 4 of the *On Interpretation*, where Aristotle mentions only prayer

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34 Also in Chapter 1 are short allusions to proposition and sentence, to words spoken and written; *On Interpretation* 1.16a4 ff.

among such sentences. According to Chapter 5, affirmation and negation are distinguished in declarative statements ('λόγος ἀποφαντικός', while the Ikhwān speak of *aqāwīl* and *akhbār* in fol. 128b17–20 Atif MS); the Ikhwān now refer to the Stoic conception. We may add that the example provided by the Ikhwān, which recalls the first Stoic 'ἀναπόδεικτος', exactly corresponds with Galen, where we read, 'if it is day, the sun is above the earth'.[35] The word *istithnāʾ*, which I translate as 'exclusion',[36] indicates here a 'strict exclusive disjunction', though the Ikhwān do not seem to realize that it is strictly biconditional.[37]

The evidence and non-evidence of true and false in judgements is then introduced. Truth and falsehood become evident when universal and particular quantifiers are found; they will not be evident without quantifiers, as in the case of indefinite and individual judgements. This resumes Chapters 6 and 7 of the *On Interpretation*; the allusion to 'Zayd' corresponds to the reference to homonymy at the end of Chapter 6.

From this point, the Ikhwān move further from the *On Interpretation*. Apart from the discussion of the relationship between statements and opinions, which we examine later,[38] there is another allusion to contraries and contradictories, partly echoing Chapter 10 of Aristotle's work. Here the Ikhwān speak of a 'twofold proposition' or judgement, but they differ from Aristotle in their explanation of 'threefold' and 'fourfold' propositions.

In the same way, having again recalled contraries and contradictories and introduced the notions of 'major contraries' and 'minor contraries', the Ikhwān mention 'consequent' and 'inseparable' propositions. They are not found in Aristotle in this form, but result from Aristotle's definition of contradictory opposites, and they introduce a discussion echoing Chapters 8 and 11 of Aristotle's work. The differentiation of propositions into negation and affirmation and into universality and

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35 Galen, *Institutio Logica* 9.1–2, ed. K. Kalbfleisch (Leipzig: Teubner, 1896).

36 See note 12 to the translation below.

37 Galen (9.7–8 Kalbfleisch) says that the Peripatetics (probably Theophrastus and Eudemus) called it 'πρότασιν ὑποθετικὴν κατὰ διαίρεσιν' (hypothetical proposition by disjunction), and the Stoics 'διεζευγμένον ἀξίωμα' (disjunctive proposition). I am indebted to my colleague and friend Professor Mauro Nasti de Vincentis for these references.

38 See below, pp.29–30 of the Introduction.

particularity recalls what is stated in the *On Interpretation* and the *Categories* regarding contraries and contradictories. The Ikhwān echo the discussion of the reciprocal derivations of modal judgements in Chapter 13: that which is necessary precedes that which is possible, and that which is possible precedes that which is impossible. This summarizes *On Interpretation* 22a32–b11.

One might expect the final passage of the treatise to echo what Aristotle says in Chapter 10 on the permutation of names and verbs, but the Ikhwān explicitly speak of the permutation of subject and predicate as if they would introduce the content of the *Prior Analytics* through what could be a wilful misunderstanding of the *On Interpretation*.

Epistle 13

Epistle 13 opens with a definition of the syllogism as reasoning composed of two premises and a conclusion; this is followed by an example belonging to the first figure, which corresponds to the opening of Aristotle's work. The clarification is then given that a syllogism and its conclusion exist when the two premises have a term in common, or are in 'conjunction'. The definitions of the second and third syllogistic figures follow.

The conclusions of syllogisms are not self-evident to intellects, and not all propositions corresponding to the conditions of the syllogism lead to a conclusion. The Ikhwān adduce the examples of two universal negative premises in the second and the third figures that, unlike the first, have no perfect conclusion.

Chapter 2 opens with the statement that all premises belonging to the first figure lead to a conclusion, whether universal or particular, negative or affirmative. But after a new instance of syllogism in this figure, the Ikhwān deduce, (1) a negative, universal, true conclusion from two negative, universal, true premises, (2) an affirmative, particular, true conclusion from two affirmative, particular, true premises, and (3) a negative, particular, true conclusion from two negative, particular, true premises. Instead of confirming their initial assertion, the cases provided exemplify the rule, which is also valid

for the first figure, that no syllogism can arise from two negative and/ or two particular premises.

Without any apparent connection with the foregoing, the Ikhwān add that false conclusions can come from true premises and true conclusions from false premises, and that both the conclusions and premises can be false. But Aristotle's syllogistic would be invalidated if true premises could lead to false conclusions, or false premises to true conclusions. Apart from the case of false premises with a false conclusion, the Ikhwān list the cases of syllogisms with two negative but true premises and two affirmative but false premises in order to introduce the idea of error in syllogisms.

Error arises in two ways — either because of a logician's ignorance or defects in his art that leave him unaware of an error or because of his intention to deceive. The Ikhwān recall Aristotle's recommendations not to employ two negative premises, universal or particular, or two indefinite premises or one particular and one individual premise, and to use true premises with true conclusions only.

In Chapter 3, the Ikhwān again mention a root and branches,[39] this time in relation to the 'measures' — prosody, the astrolabe, the ruler and compass, units of weight, and computation — through which the arts have to be evaluated. These measures become arbiters among men, provided by God like judges and persons of good reputation. The wise logicians invented their scale to guard against variance and contention among the learned — the syllogism, or 'logical demonstration', which is analogous with geometrical and arithmetical demonstrations.

Moving from the general principle that scales are similar to the objects they measure, the Ikhwān say in Chapter 4 that demonstration was invented to judge between truth and falsehood. That is why, in the *Categories*, Aristotle first named the things that give rise to the scale and the things that are to be measured. Subsequently, Aristotle explained in his *On Interpretation* how those things should be composed so that a scale and a measure may derive from them. In the *Prior Analytics*, he explained how the scale was to be used so that no fraud could be found in it. And in the *Posterior Analytics*, he explained the procedure for making sound measurements.

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39 As they did earlier, in Chaper 7 of Epistle 10.

In Chapters 5–7, the Ikhwān resume the discussion of the relationship between consciousness and language. In Chapter 8, the *pars construens* of the treatise begins, again through religious discourse. The Ikhwān say that a logician must first ascertain the soundness of his arguments before he can demonstrate them to others. Just as philosophy ('imitation of God according to human capability') is the highest of human arts after prophecy, so logic is the noblest tool. This is because it helps men to imitate God — who speaks only truth and does only good — by preventing falsehood in speech and belief, error in knowledge, vice in morals, evil in acts, mistakes in deeds, and imperfection in art. The expert logician will, like those versed in 'religious jurisprudence and in philosophical propaedeutics', eventually come face-to-face with God: the religious conclusion of Epistle 13 is provided.

Epistle 14

In Epistle 14, the Ikhwān summarize the themes of the *Categories* and *On Interpretation*, before turning to the subject of this treatise: the demonstrative syllogism, what it is, its species, features and use, and how its conclusions are drawn. To show what philosophers aim to achieve by using it, they begin by listing the four methods of acquiring knowledge: division, analysis, definition, and demonstration.[40] Division was already clarified in Epistle 11; analysis (*taḥlīl*) shows the true nature of individuals ('from what each of them is composed… and in which ones each is dissolved'), definition shows the true nature of species, and demonstration the true nature of genera (or universals). Insofar as analysis studies individuals, it is easier than definition and demonstration.

To explain the method of analysis in Chapter 2, individuals — the sixth *vox* or predicate added to those of Porphyry — are discussed. Their nature is known when the things from which they are composed are known: an individual is conceived as an ensemble of parts

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40 Cf. Umberto Eco, 'Dall'albero al labirinto', in *Dall'albero al labirinto. Studi storici sul segno e l'interpretazione* (Milan: RCS Libri, 2007), pp. 13–105, on p. 15. The author's views might be usefully reconsidered with regard to the encyclopaedia of the Ikhwān al-Ṣafāʾ; see, e.g., *Dall'albero al labirinto*, p. 28.

constituting a unit in physical terms rather than in logical terms as stated, for example, in *Categories* 5.3b10 ff. or in *Topics* II.2.109b16 ff. and III.6.120a35 ff. According to the Ikhwān, individuals are divided into the homœomerous (consisting of parts that are similar) and the anhomœomerous (consisting of dissimilar parts). Composite things are physico-natural, physically manufactured, and psycho-spiritual. This is illustrated by the examples of the human body and a city, whose ultimate components are all connected to the matter and form constituting the Absolute Body, and of a song, whose ultimate components, the notes, are connected to the letters of the alphabet. We may therefore hypothesize that the Ikhwān provided a further parallel between the ultimate realities and the letters of the alphabet.[41]

To clarify the method of definition in Chapter 3, the definition of man provided in Epistle 10 is recalled, followed by those of animal, body, substance, and contrary qualities, which are implied by one another. Here the intention of the Ikhwān appears to be to explain the procedure followed in Epistle 41: 'On Definitions and Descriptions', where only a list of definitions is given without theory or method. We may compare the five definitions adduced here as examples with those given in Epistle 41. There man is defined as 'living, rational, and mortal, a combination of a rational soul and a mortal body' (vol. 3, p. 397.9); animal is defined as 'soul and body joined together' (p. 385.5); and body is defined as 'that which has length, breadth, and deepness' (p. 387.17–18) and as 'a subtle, long, large, and deep substance' (p. 397.10). These definitions are similar to those in Epistle 14, even though other definitions of man and animal are given in Epistle 41, which are unusual for the Ikhwān.[42] Substance is 'that which subsists in itself and receives qualities' (p. 385.10–11), as in Epistle 14, apart from the mention of 'qualities' and not 'contrary qualities'. In Epistle 41, the definition of quality follows: 'accident inherent in a substance not as a part of it' (p. 385.11–12), which coincides with the definition of 'contrary qualities' in Epistle 14. The sense shows that these definitions refer to qualities that can be contrary to others but

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41 See also Epistle 40: 'On Causes and Effects', vol. 3, p. 346.4–6.

42 Man: that on which fire prevails (p. 388.11); animal: that on which air prevails (p. 388.10–11).

are above all differentiated from 'substance', and that the Ikhwān speak of contraries in order to follow Aristotle's definition of substance in *Categories* 5.4a10–b4 passim.[43]

Demonstration, the most difficult method of research, is addressed only in Chapter 4: its goal is knowledge of the 'constitutive forms' or substances and of their difference from the 'complementary forms' or accidents — that is, knowledge of substance independent of the other categories. Chapter 5 introduces the syllogism as the method leading to demonstration. This follows from Aristotle's point, 'If… demonstrative knowledge proceeds from necessary first principles…, and essential attributes are necessary to their subjects, … while others have the subjects of which they are predicated inherent in their own essence…, it is evident that the premises from which demonstrative syllogisms are drawn will be of this nature; for every attribute applies either in this or in the accidental sense, and accidental attributes are not necessary' (*Posterior Analytics* I.6.74b5–12, tr. H. Tredennick; cf. Chapter 20 of Epistle 14, which also recalls the *Isagoge*). Syllogisms and demonstrations are needed because the senses do not distinguish substances that are submerged under their qualities; this also echoes the contents of Epistle 10.

The Ikhwān then turn to the question of errors in syllogisms, defined at the beginning of Epistle 13 as 'an aggregation of premises' whose

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43 It is interesting to remark, however, that the famous Ismaili writer Nāṣir-i Khusraw (1004–1074) speaks of 'contrary qualities' when he quotes this passage in his *Kitāb-i Jāmiʿ al-ḥikmatayn*. In this work, Nāṣir answers the questions posed by the tenth-century philosopher and poet Abū'l-Haytham al-Jurjānī in his famous *Qaṣīda*; see *Kitab-e Jamiʿ al-hikmatain: Le livre réunissant les deux sagesses ou Harmonie de la philosophie grecque et de la théosophie ismaélienne*, ed. Henry Corbin and Moh. Moʿin (Tehran–Paris: Institut Franco-Iranien–Librairie d'Amérique et d'Orient Adrien-Maisonneuve, 1953), p. 87.9–10. This is a further indication that Nāṣir was translating from an original of the Ikhwān where he answers the questions posed by al-Jurjānī on 'the nature of form, property, description and definition'. A complete comparison of this chapter and Epistle 41 of the *Rasāʾil Ikhwān al-Ṣafāʾ* can be found in my article, 'Nāṣir-i Khosrow, Translator of the Ikhwān al-Ṣafāʾ?', forthcoming in the Proceedings of the XXIV UEAI Congress (Leipzig, 24–28 September, 2008), ed. V. Klemm et al. A complete comparison of this chapter and Epistle 41 can be found in my article 'Nāṣir-e Khosrow traducteur des Ikhwān al-Ṣafāʾ?', forthcoming in the Italo-Canadian research project 'Leonardo Bruni, la traduction parfaite', ed. L. Simonutti and Ch. LeBlanc.

application 'consists of drawing conclusions from them'; its premises are taken from the first principles (cf. Book I, Chapter 10 of the *Posterior Analytics*), whose origin is in sensation that perceives individuals; the objects of sensation are measured by different scales. This establishes links with Chapters 2–4 and 8 of Epistle 13. The mention of the scientific syllogism as based on premises 'better known than, prior to, and causative of the conclusion' is also found in Chapter 2 of the *Posterior Analytics* (I.2.71b20–23).

Epistle 14 comes to its proper subject when it deals with the various kinds of error in a syllogism; false analogies are the subject of the *Posterior Analytics* from Chapter 5 onwards. The Ikhwān devote several chapters to this, and also consider deceptiveness in syllogisms. The syllogism is introduced in Chapter 6 as the way to go beyond individual and particular knowledge. In Chapter 7, the Ikhwān repeat that error in a syllogism results from the syllogism itself or from the user's ignorance or disloyalty.

Chapter 8 turns to the types of error resulting from the ignorance of the user. Man is naturally inclined to the use of the syllogism, as he is to the use of the senses. Mistaken inferences lead to false reasoning. An inference is sound only when it asserts the cause by direct experience of its effect. If the inference asserts similarities about things of the same genus through direct experience of their effects rather than through the existence of their cause, it may contain both error and correctness. The same can be said when inference asserts effects by direct experience of things belonging to the genus of their cause. In Chapter 9, the Ikhwān state that false analogies can be detected only through attentive study. This topic is continued in Chapters 10 and 11.

In Chapter 12, the Ikhwān recall the themes already addressed in Epistles 10 and 12. Dotted letters and names, names and the sciences and languages arising from their aggregation, and the first principles and the sciences derived from them by demonstrations are linked by similar relationships: as dotted letters are matter for names, and names are matter for sciences and languages, so first principles are matter for demonstrations.

In the next chapter, the Ikhwān consider errors resulting from deceptiveness. Fault and error are avoided when inquiry starts from

the two basic questions regarding the essences and quiddities of things; essence is determined by means of the senses, quiddity through cogitation;[44] it is not possible to know the unknown through the unknown or to deduce a known thing from an unknown one.

Chapter 14 states the necessity of knowing the real nature of the 'first principles' to avoid mistakes. The first principles are determined through induction from things that can be perceived.[45] Research must be assiduous and all senses have to contribute to true knowledge of objects, though each object is knowable by one sense in particular. In the syllogism, essences and quiddities — which are first principles — compose a 'framework' through which unknown things can be known by demonstration.

Men do not differ in 'first principles', but they diverge in things known by means of demonstration and measurements because of the multiplicity of methods and of the kinds of instruments used, as investigated in 'the books of logic and of dialectics'. The Ikhwān then explain these 'first principles' as 'determined by the consecutive induction of sensible things', and the importance of mentioning 'individuals' at the beginning of the treatise is again clarified.

Having quoted (in Chapters 15–20) some Aristotelian rules ranging from Chapter 3 of Book I to Chapter 16 of Book II of the *Posterior Analytics*,[46] Chapter 21 returns to the 'roots' — the first principles derived through senses. There are two kinds of demonstration: geometrical and logical, both of which lead to conclusions from two premises or more. Examples are given from Euclid's geometry and 'the master logician'.[47]

From Chapter 22 onwards, the Ikhwān speak of matters other than logic. Chapter 27 comes to a religious conclusion, corresponding with

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44 In *Posterior Analytics* I.27.87a31 ff., Aristotle says that the more exact and prior science is that which explains the fact (ὅτι) and the reason why (διότι), not the science of the fact by itself.

45 Knowledge of things demonstrable cannot be acquired by perception, unless the term 'perception' (τὸ αἰσθάνεσθαι) is applied to the possession of scientific knowledge through demonstration; see *Posterior Analytics* I.31.88a9 ff.

46 These rules are found in Chapters 3, 4, 6, 11, 24, and 30 of Book I and in Chapters 12 and 16 of Book II.

47 Geometrical demonstrations are to be practised before logical demonstrations because they are simpler.

that of Epistle 10: through knowledge, a human becomes potentially an angel. In Chapter 28, the Ikhwān describe the procedures of learned and mature people, who draw analogies on the basis of matters experienced through their actions and states, of learned people subtle in speculation and engaged in dialectics, who use rules based on syllogisms only, and of those versed in geometrical or logical demonstrations, who consider the first principles as bases for their syllogisms. The religious conclusion reappears in Chapters 29 and 30.

How Faithful Were the Ikhwān to their Originals?

Comparison with the Greek original shows that the Ikhwān mainly refer to Chapters 2–13 of the *Isagoge*. Although the second part of the work is summarized in a few lines, the Ikhwān appear quite faithful to Porphyry; for example, when they recall the definition of man at the end of Chapter 2, they demonstrate a correct understanding of the sense intended by Porphyry when, in Chapter 12, he indicates man's 'proprium'.

In other cases, the Ikhwān combine Porphyrian and Aristotelian ideas, as in their discussion of proprium, differentia, and accident, though some of their definitions, such as that of 'species', differ from those of Porphyry.[48] In distinguishing between qualities in Chapter 6, they also echo Chapter 8 of the *Categories*; the four species of propria listed by the Ikhwān are also taken from this chapter.

The Ikhwān must have had at their disposal a translation of the *Isagoge*, or perhaps a summary of it;[49] comparison with the Greek original of Aristotle's *Categories* shows that the Ikhwān summarize extensively from the whole work,[50] apart perhaps from Chapters 2 and 3. But, although the explanations of the first four categories correspond to those given by Aristotle, the contents of the *Categories* is much condensed; in Chapter 2, for example, the Ikhwān do not state that quantity has either more or less (6.6a18) or that contrariety belongs to quality (8.10b12). Aristotle's fourfold division of qualities into habits

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48 See note 17 to the translation of Epistle 10 below.

49 The work was translated into Arabic by Abū 'Uthmān al-Dimashqī (fl. 900).

50 See the references given in the notes to the translation below.

and dispositions, natural capacities, passive qualities and affections (e.g., sweetness and bitterness, sourness, coldness and warmth, whiteness and blackness), and forms and figures (8.8b27–10a11) is almost completely ignored. The Ikhwān's treatment of relatives in its entirety is quite different from Aristotle's, as is their approach to activity and passivity immediately afterwards.

In other cases, the Ikhwān quote precisely from Aristotle's *Categories*, for example when they speak of 'opposition',[51] 'precedence', and 'simultaneity'. Regarding the fifth kind of precedence, the Ikhwān indicate precedence 'in essence', like cause and effect, whereas Aristotle puts stress on the convertibility and non-convertibility of relatives.[52] The Ikhwān's reference to contrary qualities and to Aristotle's definition of accidents as 'that which is within something but not as a part of it'[53] corresponds exactly to the expression, 'ἐν ὑποκειμένῳ δὲ λέγω ὃ ἔν τινι μὴ ὡς μέρος ὑπάρχον ἀδύνατον χωρὶς εἶναι τοῦ ἐν ᾧ ἐστίν', used by Aristotle as a generic reference to categories other than substance in the *Categories* 2.1a24–25. Every discrepancy with regard to simultaneity in Aristotle corresponds in the Ikhwān to a reference to something they have stated earlier.

In Epistle 12, the Ikhwān move further from Aristotle than in the previous treatises; this is because of their allusion to the Stoics and because in this treatise they often seem to misunderstand Aristotle.[54] They do not even mention Aristotle's treatment of the negations of modal affirmations in Chapter 12 of the *On Interpretation*. Above all, there is no discussion or even allusion to the famous question of future contingents in the same chapter. We cannot approach this much-debated question here, but the Ikhwān's silence can probably be explained by their religious motives.[55]

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51 Here the Ikhwān also recall what Aristotle said in Chapter 11 on contraries.

52 See *Categories* 12.14b11 ff.: 'two things, the existence of either of which implies or necessitates that of the other', hence 'the thing which is somehow the cause may… be considered as naturally prior to the other'.

53 Cf. Epistle 14, end of Chapter 3 and Chapter 21.

54 According to Arnaldez, 'On the *De Interpretatione*, the Ikhwān follow Aristotle only approximately. They abridge the work and even mutilate it. On the other hand, they present some original features'; see Arnaldez, 'Manṭiḳ', *EI2*, p. 451.

55 Arnaldez links the question of future contingents to the Ikhwān's original 'analysis of… enunciations of which the truth or falsehood is manifest, and which

Apart from some occasional references to the rest of the work, indicated in the notes to the translation here, the Ikhwān mainly quote from the first six chapters of Book I of the *Prior Analytics*. The aim of Epistle 13 (and of Epistle 14) is to teach the learner how to face deceitful arguments advanced by pseudo-philosophers, as stated in Chapter 2, that is, to make the reader aware that 'one must pay attention to this figure and its premises, and know how to use them in syllogisms and draw conclusions from them'. In Chapter 3, the Ikhwān clearly portray logic as an 'instrument'; this is confirmed in Chapter 8, where they explain how one can preserve speeches from contradiction and become an expert in philosophical logic.

In Epistle 14, the Ikhwān explain the demonstrative syllogism starting from an explanation of 'individuals', probably because they aim to make a clear distinction between demonstration and sensation, even though these two kinds of knowledge are connected. As explained in Chapter 5, the goal of the treatise is again to understand which syllogistic judgements are valid or invalid in order to enable the logician to avoid error. Because linguistic logic is a matter for philosophical logic, they add in Chapter 12 that it is also necessary to know how to avoid error in linguistic logic, studied in the *Prior Analytics*, and in philosophical logic, which is studied in the *Posterior Analytics*.

Epistle 14 is, apart from some exact quotations, also far removed from Aristotle. For instance, the Ikhwān's presentation of 'substance' calls to mind what was said in Epistles 10 and 11. The Ikhwān consider contrary qualities received by substance as 'accidents inherent in substances, not separable [i.e., ready to vanish] from them'. The definition of 'contrary' is added as a corollary of the description of 'substance'. This special

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do not lend themselves to interpretation (*ta'wīl*), as opposed to those which require this', considering it 'an important issue in Ḳur'ānic exegesis'; 'Manṭiḳ', *EI2*, p. 451. A proposition is not subject to interpretation when it is delimited by a quantifier (*sūr*). Propositions without a quantifier are either indefinite or specific; Arnaldez compares the latter case (traced back to *Topics* III.6.120a5 ff.) — a 'typically Muslim passage' — with what Aristotle says of future contingents and with the Prophet's statement, 'I was a prophet when Adam was between the water and the clay' (that is, he was potentially and not actually a prophet). I do not think these considerations refer to Aristotle's chapter on future contingents.

phrasing could refer to *Categories* 8.9a27 ff., where affective qualities, or 'states' contrary to each other, are discussed.

Though they sometimes misrepresent Aristotle, the Ikhwān are more or less faithful to his works. Generally speaking, the Ikhwān al-Ṣafāʾ appear to be familiar with an extensive part of Aristotle's books on logic: they paraphrase with some originality the *Isagoge*, the *Categories*, and the *On Interpretation*. References to the *Prior* and *Posterior Analytics* are more limited.

Contextualizing the Epistles on Logic

We may now return to the position of the Ikhwān with regard to al-Fārābī's wider reading of Aristotle's *Organon*. Notwithstanding my earlier remarks, there is evidence to show that the Ikhwān were at least in part working along the same lines as their great contemporary. Consider, for example, the mention of the 'sophistical topoi' (*al-mawāḍiʿ al-mughālaṭa*) in Chapter 2 of Epistle 13 or the allusion in Chapter 13 of Epistle 14 to error as a result of deceit, which also calls the *Topics* to mind. When the Ikhwān recall Aristotle's laws of syllogisms, they say that this is the subject of the *Posterior Analytics*; one might even wonder whether this assertion does not mean that the Ikhwān supposed that the *Topics* had been written first, as some scholars have suggested, followed by the *Posterior Analytics*, with the *Prior Analytics* written last.[56]

All this confirms that the Ikhwān were open to the whole Aristotelian *Organon*, though the *Posterior Analytics* is the object of an inquiry rather than of a paraphrase. Epistle 14 is the last treatise on logic and also the last of the first section of the encyclopaedia, on the propaedeutical sciences; the Arabic expression here is '*al-ʿulūm al-riyāḍiyya*', that indicates the quadrivium sciences.[57] For this reason, authorities on the

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56 For this chronology, see Aristotle, *Organon*, ed. G. Colli (Milan: Adelphi, 2003), p. 730.

57 So, e.g., according to Freytag, the expressions '*al-ʿilm al-riyāḍī*' and '*ʿilm al-riyāḍāt*' indicate 'Scientia, quae complectitur geometriam, arithmeticam, astronomiam et musicam'; see G. W. Freytag, *Georgii Wilhelmi Freytagii Lexicon arabico-latinum* (1837; repr., Beirut: Librairie du Liban, 1975), vol. 2, p. 210. According to Kazimirski, the term *riyāḍiyyāt* indicates the 'sciences exactes qui demandent l'exercice continuel de l'esprit: ce sont l'arithmétique, la géométrie, l'astronomie et la musique'; see Albert de Biberstein Kazimirski, *Dictionnaire*

Ikhwān al-Ṣafāʾ such as Yves Marquet, Ian R. Netton, or Godefroid de Callataÿ translate the term *riyāḍiyyāt* as 'mathematics' and the adjective *riyāḍiyya* as 'mathematical'.[58]

The Ikhwān speak of *al-riyāḍiyyāt* in the strict mathematical sense in Epistle 7, devoted to the theoretical sciences. Here they distinguish four kinds of philosophical (*falsafiyya*) sciences: the *riyāḍiyyāt*, the logical, the natural, and the metaphysical (or theological), and they indicate the *riyāḍiyyāt* as arithmetic, geometry, astronomy, and music.[59]

In this treatise, however, the philosophical sciences are only the third kind of a wider list of sciences, which opened the chapter. According to the Ikhwān, humans devote themselves to three types of sciences: the *riyāḍiyya*, the *sharʿiyya al-waḍʿiyya* (the religious-juridical sciences), and the *falsafiyya al-ḥaqīqiyya* (the philosophical sciences explaining the true reality). In this case, the *riyāḍiyya* are useful to everyday life — reading and writing, grammar, computation, and poetry, but also various kinds of magic, alchemy, and mechanics, as well as agriculture, commerce, biography, and history[60] — and the term is used in a different sense from 'mathematical'.[61]

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arabe-français contenant toutes les racines de la langue arabe, leurs derivés, tant dans l'idiome vulgaire que l'idiome littéral, ainsi que les dialects d'Alger et de Maroc (1860; repr., Beirut: Albouraq, 2004), s.v. '*ilm al-riyāḍiyyāt*', vol. 1, p. 952. According to Dozy, *riyāḍī* means 'mathématique' and '*al-ʿulūm al-riyāḍiyya*', 'les mathématiques' but also 'pratique, moral'; see Reinhart Dozy, *Supplément aux dictionnaires arabes* (1881; repr., Beirut: Librairie du Liban, 1991), vol. 1, pp. 570–571. According to Traini, *riyāḍa* (-*āt*) means 'matematica'; *riyāḍī*, 'matematico'; and *riyāḍiyyāt*, 'matematica'; see [Renato Traini,] *Vocabolario arabo-italiano* (Rome: Istituto per l'Oriente, 1966), vol. 1, pp. 497, 498.

58 See Yves Marquet, *La philosophie des Iḫwān al-Ṣafāʾ* (Algiers: Société Nationale d'Edition et de Diffusion, 1973), e.g., p. 11; and Ian R. Netton, *Muslim Neoplatonists* e.g., p. 2. More recently, Godefroid de Callataÿ refers to the first section of the encyclopaedia as 'Section Mathématique'; see 'Ikhwân al-Ṣafâ': des arts scientifiques et de leur objectif', *Le Muséon*, 116 (2003), pp. 231–258, e.g., p. 241.

59 *Rasāʾil*, vol. 1, pp. 267.13–268.5

60 *Rasāʾil*, vol. 1, pp. 266.14–267.3

61 Marquet speaks of 'sciences pratiques'; *La philosophie des Iḫwān al-Ṣafāʾ*, p. 295. But de Callataÿ opts for 'propédeutiques ou plutôt disciplinaires'; 'Ikhwân al-Ṣafâ': des arts scientifiques et de leur objectif', p. 234; see also his 'Trivium et quadrivium en Islam', p. 23: 'propédeutiques ou disciplinaires'.

Due to the content of the present volume, it is also noteworthy that here the Ikhwān indicate the five kinds of logical sciences as follows: analytics, rhetoric, topics, *būlūṭīqā* (a mistaken transcription for Aristotle's *Posterior Analytics*, as clarified by the explanation of the term as '*ṣināʿat al-burhān*'), and sophistics. Ancient and modern scientists are counted amongst the authors of books on these topics. Three books are related to Aristotle, namely, the *Categories*, *On Interpretation*, and *Prior Analytics*, as a prelude to the book with which he was mostly concerned — the *Posterior Analytics*. Later, Porphyry is quoted as the author of the *Isagoge*, which was an introduction to 'philosophical logic'. The passage is completed by a short summary of the first five books of the *Organon*, which evidently constitute for the Ikhwān the corpus of philosophical logic.[62]

It should be noted that the first part of the encyclopaedia covers an extensive range of disciplines that are well beyond the 'mathematical' or the quadrivium ones, and that fact encourages me to propose the translation of the term *riyāḍiyya* with reference to the first section of the encyclopaedia as 'propaedeutical' rather than as 'mathematical'. In so doing, I follow Bausani's choice of 'propedeutiche'.[63]

An indirect confirmation of the validity of my proposal comes from Friedrich Dieterici. Not only did he call the volume devoted to the six first epistles — the closest to the quadrivium — *Die Propaedeutik der Araber im zehnten Jahrhundert*,[64] but he even explained that 'Zwar hat die Schüler dieser Aufklärer von Basra ihre Artikel selbst geordnet und zwar in vier Theilen *a.* Propaedeutik, d.h. Mathematik u. Logik الرياضيات والمنطقيات *b.* Physika… *c.* die Weltseele… *d.* Theologika'.[65]

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62 See *Rasāʾil*, vol. 1, pp. 268.6–269.24. This passage seems to confirm what we have stated above on p. 24 of this Introduction.

63 Alessandro Bausani, *L'enciclopedia dei Fratelli della Purità. Riassunto, con Introduzione e breve commento, dei 52 Trattati o Epistole degli* Ikhwān aṣ-Ṣafāʾ (Naples: Istituto Universitario Orientale, 1978).

64 This is the third volume of the collection *Die Philosophie bei den Arabern im X. Jahrhundert n. Chr., Gesamtdarstellung und Quellenwerke* (1865; repr., Hildesheim: Olms, 1969).

65 See *Die Abhandlungen der Ichwân es-Safâ in Auswahl. Zum ersten Mal aus arabischen Handschriften herausgegeben* (1883; repr., Hildesheim: Olms, 1969), pp. 11–12.

On the lexical side, we can add that Freytag provides an entry for the form *riyāḍiyya*, defined as 'Exercitatio, qua animus noster a cupiditatum liberatur dominatione'. As to Kazimirski, he gives for this form the meaning, 'Vie ascétique, vie de mortifications, qui consiste en pratiques ayant pour but de dompter ses passions',[66] related to the second meaning of the verb *rāḍa*, 'to practise, exercise', and, in particular, 'exercer l'ésprit'. In the same way, Freytag reports for the VIII form of the verb *rāḍa*, 'Disciplina subactus, condocefactus, domitus fuit';[67] Dozy, 's'exercer', but also 'Se livrer à des exercises de piété';[68] Traini, 'esercitarsi, addestrarsi, allenarsi',[69] giving for *riyāḍa, -āt* also '*plur.* esercizi spirituali, ritiro (*crist.*)'.

The references to Aristotle are then modified and developed to provide a general conclusion for this section. Apart from the strongly religious character of the treatise,[70] this explains why Epistle 14 goes so far beyond the field of logic, starting with its presentation of individuals from a physical rather than a logical perspective, and then speaking of definition on the basis of a treatise (Epistle 41) that has nothing to do with logic and whose content is extremely varied.[71] There are also in

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66 See note 57 above.

67 G. W. Freytag, *Georgii Wilhelmi Freytagii Lexicon arabico-latinum*, vol. 2, p. 210.

68 Dozy, *Supplément aux dictionnaires arabes*, vol. 1, pp. 569–570.

69 See note 57 above.

70 See the Conclusion below, pp. 32–33.

71 The content of the treatise does seem to follow a certain order, though with many repetitions. A sort of index of contents might be established after the short introduction: (1) examples of composite things; (2) simple things (the bases of reality) — matter, form, substance and quality, quiddity, existent and non-existent, eternal and created, and cause and effect; (3) the bases of knowledge — the scientist and the science; (4) the living and the powerful being, and action; (5) God, His power and work; (6) the heavenly hypostases; (7) will and the human intellect; (8) some logical definitions; (9) the universe and its components — light and dark, day and night, hot, cold, humid and dry; (10) the natural world — colour, smell, sound, the six kinds of movement, space, and time; (11) the sphere, the world, the stars, the body and the diaphanous body, fire, air, water and earth, and the six directions; (12) physical and meteorological phenomena; (13) the three natural kingdoms and man; (14) the supernatural beings; (15) nature and the superlunary spheres; (16) other meteorological phenomena; (17) geological phenomena; (18) the four natures, the four elements, the four mixtures, and the three kingdoms; (19) will, power, choice, ignorance, belief, and imagination; (20) principles of Muslim religion; (21) word and speech, truth

Chapters 10 and 11 examples of false analogies in the field of philosophy and theology. To show that conclusions with more than two premises can be reached, they discuss in Chapters 22 ff. the nature of the soul,[72] the existence of void and plenum inside and outside the world, and the eternity and creation of the world.

The Position of the Ikhwān al-Ṣafāʾ in the 'Logic versus Grammar' Debate

We turn now to the last issue of this introduction: the position that the Ikhwān might have taken in the debate among their contemporaries on logic versus grammar.

In Epistle 10, a key source for this issue, the Ikhwān distinguish between linguistic and philosophical logic. But when they say that the first is a premise of the second, they intend it in a methodological or didactical sense only; this is confirmed later when they say that mental logic is the root, while linguistic logic is its ramification because it comes after mental logic. A spoken and a mental language (*al-nuṭq al-lafẓī, al-nuṭq al-fikrī*) correspond to these; linguistic logic is explained first because it is the easiest issue and closest to the learner's experience.[73]

For the Ikhwān, spoken language consists of sounds expressed through an alphabet. But when they say it is to be studied by linguistic

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and falsehood; (22) life, death, and the hereafter; and (23) conclusion. There are also more chapters: the first considers form and colour, plants and animals (pp. 393.2–394.11), and number (pp. 394.13–396.8) and geometry (pp. 396.9–397.6). A second chapter redefines objects already defined: plants (p. 397.8; cf. pp. 388.9–10, 391.16–17), animals (cf. pp. 388.10–11, 391.17–21), and man (p. 397.9; cf. p. 388.11; these definitions are different from the others); body (p. 397.10; cf. p. 387.17–18) and sound (p. 397.10–11; cf. pp. 387.4, 389.11–12; these definitions are identical to the previous ones). A last addition concerns colours, their characters, aspects (pp. 398.12–399.12), and savours (p. 399.13–17).

72 These lines might also be quotations from Galen's *Quod Animi Mores Corporis Temperamenta Sequantur* (translated into Arabic by Ḥubaysh, in the ninth century) and from his later *De Sententiis Suis* — almost totally lost but translated into Arabic by Thābit ibn Qurra and ʿIsā ibn Yaḥyā (ninth/tenth centuries), where he states he does not know what soul is. See Mauro Zonta, 'La ricerca sulle fonti antiche della letteratura filosofica araba ed ebraica: a proposito di un libro recente', *Athenaeum*, 88 (2000), pp. 597–604, on pp. 599–600.

73 It was called '*al-manṭiq al-lughawī*' in Chapter 2 and then '*al-manṭiq al-lafẓī*'; see fols. 119a7 and 121a3 Atif MS respectively.

logic, we realize that it is something other than the languages ruled by grammars, and other than writing, to which Aristotle opposed mental affections as the only ones that are the same for the whole of mankind (*On Interpretation* 1.16a6–7): linguistic logic is, like mental judgement, the same for everybody.[74] Opposite to it is mental language, studied by philosophical logic, that expresses the concepts[75] of the things represented in the soul when data are received through the senses.[76] Mental language is the structure typical of man. Spoken language mirrors a previous, higher reality, and is its material expression;[77] it makes possible the communication of philosophical logic. Truth is proper to minds. Names are allusions to or signs of mental concepts[78] and can be expressed in any language. Language is established by convention so that humans can express to other people the concepts in their souls; in itself, however, it has no relevance.[79]

Aristotle said in *On Interpretation* 14.23a27–b14 that a verbal proposition corresponds to an intellectual judgement and that what concerns judgements also holds good with regard to verbal propositions.[80] This corresponds to what the Ikhwān say in Epistle 12: that a debate has to occur about what is said, not about what is in the mind of the speaker; only God knows what is in a man's mind (fol. 129a16–18 Atif MS). The Ikhwān are referring to the case of non-

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74 At the end of Chapter 1 of Epistle 10, the multiplicity of languages demonstrates that logic is in conformity with all existing beings. The etymology of the word for 'logic' (*manṭiq*) is derived from the verb 'to articulate', found at the beginning of Chapter 2.

75 Cf. Epistle 10, fol. 119a8 Atif MS.

76 Cf. Epistle 10, fols. 121a12, 121b17–18, 122b24 ff. Atif MS.

77 In Chapter 9 of Epistle 10, the Ikhwān recall the evolution from letters to words and from names (that is, meaningful words) to phrases; meanings are compared with spirits, words with bodies.

78 Cf. Epistle 10, fols. 120a8, 121a4–5, 121b17–18, 122b23–25 Atif MS. For Aristotle, words spoken are symbols or signs of affections or impressions of the soul (*On Interpretation* 1.16a3–4); judgements and verbal affirmations and denials are symbols of such mental judgements (14.24b2–3).

79 For the Ikhwān it is a pain that everybody would escape if they could. Cf. Epistle 10, fols. 122b23–123a2 Atif MS.

80 Immediately afterwards, Aristotle says that contrary to true judgements are judgements in which there is error, and that such judgements have to do with generation. This takes us back to sensation as the origin of rational reasoning — another point widely shared by the Ikhwān.

quantified phrases whose truth or falsity depend only on what the speaker thinks and knows; the phrase in itself reveals neither truth nor falsity and is hence not to be trusted. Because a person's opinion cannot be known, the verbal or written expression of it has to be examined and, if necessary, refuted. The scale of logic, the syllogism, measures such speeches, not the opinions themselves (see Chapter 4 of Epistle 13): in other words, differences in pretensions to truth and falsehood in consciousness are clarified in speeches concerning true and false, and values in consciousness are measured by the values proper to speech.

On the other hand, judging is an act proper to the intellect. As Aristotle puts it in the *Posterior Analytics*, the syllogism and demonstration are addressed not to the spoken word but to the discourse in the soul, and though we can always raise objections to the spoken word, we cannot always object to the inward discourse (I.10.76b24–27). This corresponds to what the Ikhwān say in Chapter 5 of Epistle 13: that a man can state something at odds with that what he knows, but he cannot know something at odds with his reason. This means that a contradiction *can be stated* even though intellect refuses it, that lying is possible in speech and that linguistic logic might in some way become independent of philosophical logic.

Spoken language in the sense of linguistic logic is a tool that allows men to check the trustworthiness of minds. Linguistic logic can express concepts that are patently false and concepts the truth and falsehood of which would be patent only if one could penetrate the speaker's mind. In any case, it is independent of grammar. In the debate, the Ikhwān side with logic over grammar.

This explains all the discussions in Epistles 13 and 14 about false reasoning. In Chapter 6 of Epistle 13, the learned engaged in philosophical logic are urged to avoid this by keeping contradiction out of their *speeches*. The condition for fulfilling this goal is to reason properly (Chapter 8) and to know the rules of syllogisms. Nevertheless, their sole aim is to preserve man against an incorrect comprehension of reality: if language can contradict thought, but nothing in contrast with reason can be known, then reason must be subject to logical laws that do not allow it to stray; science sanctions truth, and language *reveals* it.

Conclusion

Logical and moral truth are united in the Ikhwān's treatises, beginning with the definition of logic given in Epistle 7.[81] This union is reinforced in Chapter 13 of Epistle 14, where intellect (*ʿaql*) appears to be identical to the potentiated soul. Here 'soul' has a religious connotation far beyond the ψυχή–διάνοια combination in Aristotle, to which, in the Ikhwān's logical treatises, corresponds the *nafs–ḍamīr* combination. This connotation explains the religious conclusion of these treatises and why logical knowledge was assimilated into revelation at the beginning.

Though the Ikhwān share much with Aristotle, they have many original ideas of their own. In ontological terms, they do not confine themselves to subsuming the origin of knowledge in sensation or the correspondence of truth to reality. For the Ikhwān, the reality conceived and expressed in logic is the object of human intellection and also of the intellection of the ontological hypostases. According to their view, all these receive forms from God.

This mixture of gnosiological relations and ontological representation in Chapter 7 of Epistle 10 clarifies the foregoing comparison of abstraction — the way that forms are known — with revelation. The double Ismaili meaning of 'revelation' is used here. On the one hand, the Ikhwān seem to side with the doctrine that creation is the second revelation of God besides the Holy Book, a word to be studied rather than listened to.[82] In this sense, the heavenly and sublunary entities are different manifestations of God — His 'names' and 'attributes'; that may explain why the Ikhwān use terminology developed in Muslim debates on divine attributes (though it originally belonged to grammar) in representing logic, the 'spoken language', as the scale of truth.[83]

On the other hand, these entities, in that they are divine manifestations, share divine knowledge at different degrees. This

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81 See above, note 5.

82 In Chapter 6 of Epistle 13, while quoting instances of inconsistency among logicians, they mention Muʿtazilīs (see note 27 to Epistle 13 below) and include among the learned devoted to logic a theologian such as Abū'l-Hudhayl (see note 29 to Epistle 13 below). This enhances our understanding of the religious connotation of the Ikhwān al-Ṣafāʾ in that the Muʿtazilīs are often considered close to Shiʿi interests and perspectives. .

83 See notes 11–13 to Epistle 10 below.

explains why the Ikhwān speak in the logical treatises of 'forms' bestowed by God on the heavenly hypostases and human souls, and why they state these differently — in terms of emanation and revelation — in reference to each of them.

The Ikhwān turn to God in Chapter 26 of Epistle 14, moving on from wise men's understanding of the eternal pre-existence of the world. God, the ultimate mover of everything, will also determine the end of the world and the Great Resurrection. This is explained logically: 'because everything in a state of possibility, when an infinite time is postulated for it, certainly comes into actuality; and stopping the sphere from rotating is possible, because that which moves it can also put it at rest, and this is easier for Him, who has the loftiest likeness in the heavens and earth'.[84]

Religion and logic are again mixed together; this is the real reason why the Ikhwān are interested in logic. When someone follows the proper path, as does a body when it develops from a sperm-drop into a philosopher devoted to God, he reaches the limit of human potential next to the degree of angels and will gain the best reward. After death, such a man will become an angel and enjoy eternal pleasure. This stage can be reached only if a man rids himself of all defective states and gains science and knowledge. The Ikhwān therefore repeat that man is naturally inclined to the use of the syllogism, but that in the religious sphere one is expected to go beyond the level of practice in geometrical or logical demonstrations.

This is linked to the esoteric meaning of the mystical picture given in Epistle 10: that the learner should gain the knowledge proper to the heavenly hypostases — angels are only the exoteric name of such hypostases. When the initiate reaches full knowledge, he becomes 'living, rational, and immortal', not like Porphyry's gods but like the heavenly beings of the Ikhwān's ontology, borrowed from Neoplatonism and developed in philosophy and Ismailism, that do not need spoken language. The objects of intellection initially captured through logic are in fact the way towards spiritual beings in a double sense: as the awareness of the existence of another revelation beyond the Holy Book,

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84 Epistle 14, p. 150 below. With regard to the theological reasons for this, the Ikhwān refer to two other treatises of theirs.

i.e., that of the supernal entities, and as participation of the knowledge proper to these entities, i.e., forms abstracted from matter.

This discourse is recalled in Chapter 27 and following of Epistle 14. The Ikhwān repeat that the man who is potentially an angel because of his knowledge, becomes an angel in actuality after death. Here, again, beyond the limits of the exoteric revelation, abstraction from matter takes the form of a philosophical representation of hell — 'the hell of the world of generation and corruption' (Chapter 30) — to which the 'paradise of the world of spirits' is opposed. These are the eternal hypostases which the rescued human souls will ultimately be amongst.

The epistle is closed with a theme that runs through the whole encyclopaedia: '*the best provision* [towards spiritual paradise] *is godfearing*'.[85] These words are an 'anonymous' quotation from the Holy Qur'an, which refers here to pilgrimage. The Ikhwān combine them with an invitation to the learner to search for divine knowledge and angelic morals — the true gain, as attested by the quotation of a hadith. So, they introduce here the spiritual pilgrimage of the wise man, who has finally acquired the basic sciences necessary to his journey.

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85 Qur'an 2:197. Translations are by A. J. Arberry, *The Koran Interpreted* (Oxford: Oxford University Press, 1955).