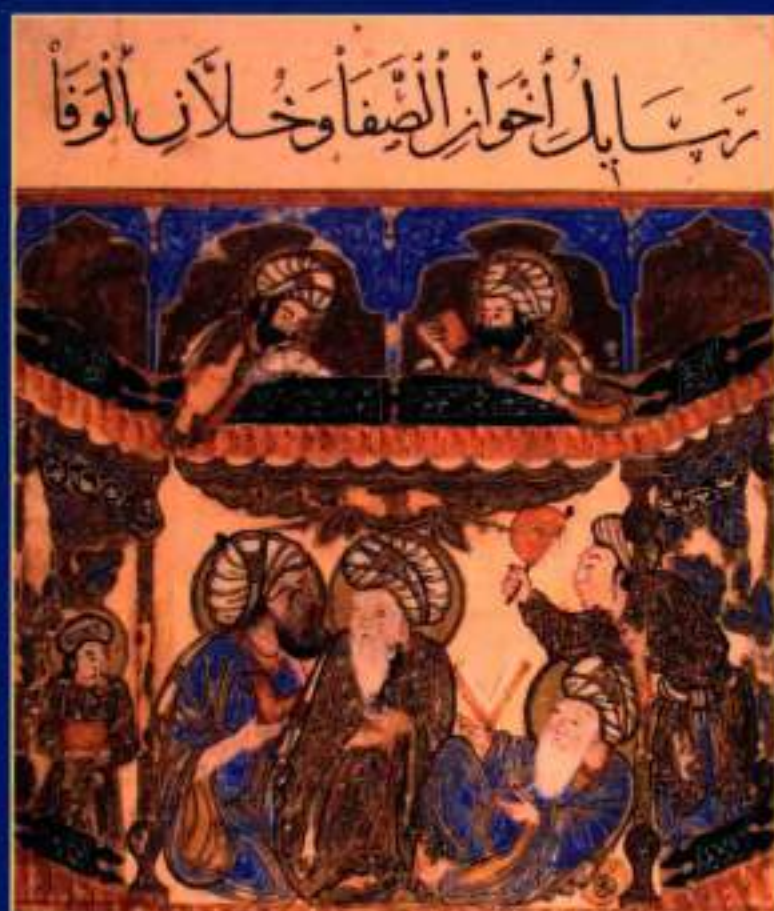


EPISTLES OF THE BRETHREN OF PURITY

On the Natural Sciences

An Arabic Critical Edition and
English Translation of EPISTLES 15–21



Edited and Translated by
Carmela Baffioni

Foreword by
Nader El-Bizri

OXFORD

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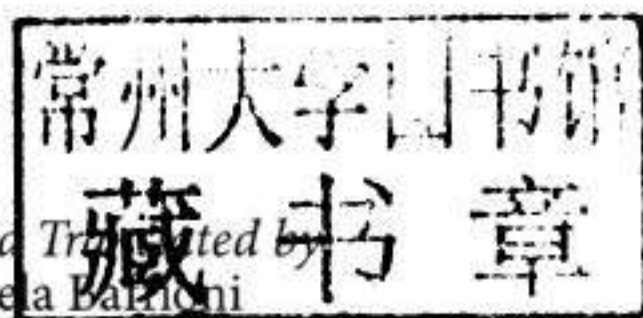
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EPISTLES OF THE BRETHREN OF PURITY



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The Institute of Ismaili Studies was established in 1977 with the object of promoting scholarship and learning on Islam, in historical as well as contemporary contexts, and a better understanding of its relationship with other societies and faiths.

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The *Epistles of the Brethren of Purity* is published by Oxford University Press in association with the Institute of Ismaili Studies, London. This bilingual series consists of a multi-authored Arabic critical edition and annotated English translation of the *Rasā'il Ikhwān al-Ṣafā'* (ca. tenth-century Iraq).

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Ikhwān al-Ṣafā'. *On Music: An Arabic Critical Edition and English Translation of Epistle 5*, ed. and tr. Owen Wright (2010).

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Ikhwān al-Ṣafā'. *On Arithmetic and Geometry: An Arabic Critical Edition and English Translation of Epistles 1 & 2*, ed. and tr. Nader El-Bizri (2012).

Carmela Baffioni is a Senior Research Associate at the Institute of Ismaili Studies. Educated at the University of Rome “La Sapienza”, and a student of Francesco Gabrieli and Alessandro Bausani, she became full Professor of History of Islamic Philosophy at the Università degli Studi di Napoli “L’Orientale” in 1987, where she served until 2012. She is a member of the Accademia dei Lincei, of the Academia Europaea, and of the Académie Internationale d’Histoire des Sciences, and a founder member of the Section of Arabic Studies in the branch of Near Eastern Studies of the Accademia Ambrosiana. Her publications include several monographs on the transmission of Greek thought into Islam; translations of works by the Ikhwān al-Ṣafā’, al-Farābī, and Ibn Rushd (Averroes), as well as al-Shahrastānī; in addition, she has written a monograph on Aristotle’s *Meteorologica* IV (1981), and books on the history of Muslim philosophy. Besides the Ikhwān al-Ṣafā’, her articles focus on al-Kindī, al-Farābī, Yaḥyā ibn ‘Adī, Ibn Sīnā (Avicenna), Ibn Rushd (Averroes), and some Latin elaborations of Arabic heritage. Her scientific interests concern logic, atomism, and embryology. She has translated books from German and Russian, and edited six collective works. Her recent publications include articles on the political views of the Ikhwān al-Ṣafā’, the philosophy of nature of Ḥamīd al-Dīn al-Kirmānī, some items in the *Encyclopedia of Medieval Philosophy* (Dordrecht: Springer, 2011), and the revision and edition of the catalogue of manuscripts of the Ahel Habott Foundation (Chinguetti), in Arabic and French (Milan: Nottetempo, 2006).

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Once again, I have to pay tribute to my husband Gianni, for his love, and for his patience in sharing me with the 'Brethren' over so many past years — and (I hope) for many years in the future. My warmest thanks go also to my daughter, Carlotta, who has been looking with me for the best solutions to some English translations, whilst avoiding comments on content that, I am afraid, do not satisfy budding economists!

I am solely responsible for any inaccuracies this book may contain.

Carmela Baffioni
Rome, 15 April 2013

Foreword

The Brethren of Purity (Ikhwān al-Ṣafā') were the anonymous members of a fourth-/tenth-century¹ esoteric fraternity of lettered urbanites that was principally based in the southern Iraqi city of Basra, while also having a significant active branch in the capital of the 'Abbāsid caliphate, Baghdad. This secretive coterie occupied a prominent station in the history of scientific and philosophical ideas in Islam owing to the wide intellectual reception and dissemination of diverse manuscripts of their famed philosophically oriented compendium, the *Epistles of the Brethren of Purity* (*Rasā'il Ikhwān al-Ṣafā'*). The exact dating of this corpus, the identity of its authors, and their doctrinal affiliation remain unsettled questions that are hitherto shrouded with mystery. Some situate the historic activities of this brotherhood at the eve of the Fāṭimid conquest of Egypt (ca. 358/969), while others identify the organization with an earlier period that is set chronologically around the founding of the Fāṭimid dynasty in North Africa (ca. 297/909).

The most common account regarding the presumed identity of the Ikhwān is usually related on the authority of the famed litterateur Abū Ḥayyān al-Tawḥīdī (ca. 320–414/930–1023), who noted in his *Book of Pleasure and Conviviality* (*Kitāb al-Imtā' wa'l-mu'ānasa*) that these adepts were obscure 'men of letters': Abū Sulaymān Muḥammad b. Ma'shar al-Bustī (nicknamed al-Maqdisī); the *qāḍī* Abū al-Ḥasan 'Alī b. Hārūn al-Zanjānī; Abū Aḥmad al-Mihrajānī (also known as Aḥmad al-Nahrajūrī); and Abū al-Ḥasan al-'Awfī. Abū Ḥayyān also claimed that they were the senior companions of a secretarial officer at the

1 All dates are Common Era, unless otherwise indicated; where two dates appear (separated by a slash), the first date is hijri (AH), followed by CE.

Būyid regional chancellery of Basra, known as Zayd b. Rifā'a, who was reportedly an affiliate of the Brethren's fraternity and a servant of its ministry. Even though this story was reaffirmed by several classical historiographers in Islamic civilization, it is not fully accepted by scholars in terms of its authenticity. Furthermore, some Ismaili missionaries (*du'āt*) historically attributed the compiling of the *Epistles* to the early Ismaili Imams Aḥmad b. 'Abd Allāh (al-Taḳī [al-Mastūr]) or his father, 'Abd Allāh (Wafī Aḥmad), while also suggesting that the *Rasā'il* compendium was secretly disseminated in mosques during the reign of the 'Abbāsid caliph al-Ma'mūn (r. 198–218/813–833).

Encountering 'veracity in every religion', and grasping knowledge as 'pure nourishment for the soul', the Ikhwān associated soteriological hope and the attainment of happiness with the scrupulous development of rational pursuits and intellectual quests. Besides the filial observance of the teachings of the Qur'an and hadith, the Brethren also reverently appealed to the Torah of Judaism and to the Gospels of Christianity. Moreover, they heeded the legacies of the Stoics and of Pythagoras, Hermes Trismegistus, Socrates, Plato, Aristotle, Plotinus, Nicomachus of Gerasa, Euclid, Ptolemy, Galen, Proclus, Porphyry, and Iamblichus.

The Brethren promoted a convivial and earnest 'companionship of virtue'. Their eschatological outlook was articulated by way of an intricate cyclical view of 'sacred' history that is replete with symbolisms and oriented by an uncanny hermeneutic interpretation of the microcosm and macrocosm analogy: believing that the human being is a microcosmos, and that the universe is a 'macroanthropos'. The multiplicity of the voices that were expressed in their *Epistles* reflects a genuine quest for wisdom driven by an impetus that is not reducible to mere eclecticism; indeed, their syncretism grounded their aspiration to establish a spiritual refuge that would transcend the sectarian divisions troubling their era.

In general, fifty-two epistles are enumerated as belonging to the *Rasā'il Ikhwān al-Ṣafā'*, and these are divided into the following four parts: Mathematics, Natural Philosophy, Sciences of the Soul and Intellect, and Theology. The first part consists of fourteen epistles, and it deals with 'the mathematical sciences', treating a variety of topics in arithmetic, geometry, astronomy, geography, and music.

It also includes five epistles on elementary logic, which consist of the following: the *Isagoge*, the *Categories*, the *On Interpretation*, the *Prior Analytics*, and the *Posterior Analytics*. The second part of the corpus groups together seventeen epistles on 'the physical or natural sciences'. It thus treats themes on matter and form, generation and corruption, metallurgy, meteorology, a study of the essence of nature, the classes of plants and animals (the latter being also set as a fable), the composition of the human body and its embryological constitution, a cosmic grasp of the human being as microcosm, and also the investigation of the phonetic and structural properties of languages and their differences. The third part of the compendium comprises ten tracts on 'the psychical and intellectual sciences', setting forth the 'opinions of the Pythagoreans and of the Brethren of Purity', and accounting also for the world as a 'macroanthropos'. In this part, the Brethren also examined the distinction between the intellect and the intelligible, and they offered explications of the symbolic significance of temporal dimensions, epochal cycles, and the mystical expression of the essence of love, together with an investigation of resurrection, causes and effects, definitions and descriptions, and the various types of motion. The fourth and last part of the *Rasā'il* deals with 'the *nomos* or legal and theological sciences' in eleven epistles. These address the differences between the varieties of religious opinions and sects, as well as delineating the 'pathway to God', the virtues of the Ikhwān's fellowship, the characteristics of genuine believers, the nature of the divine *nomos*, the call to God, the actions of spiritualists, of jinn, angels, and recalcitrant demons, the species of politics, the cosmic hierarchy, and, finally, the essence of magic and talismanic incantations. Besides the fifty-two tracts that constitute the *Rasā'il Ikhwān al-Ṣafā'*, this compendium was accompanied by a treatise entitled *al-Risāla al-jāmi'a* (The Comprehensive Epistle), which acted as the *summa summarum* for the whole corpus and was itself supplemented by a further abridged appendage known as the *Risālat jāmi'at al-jāmi'a* (The Condensed Comprehensive Epistle).

In spite of their erudition and resourcefulness, it is doubtful whether the Brethren of Purity can be impartially ranked amongst the authorities of their age in the realms of science and philosophy. Their inquiries

into mathematics, logic, and the natural sciences were recorded in the *Epistles* in a synoptic and diluted fashion, sporadically infused with gnostic, symbolic, and occult directives. Nonetheless, their accounts of religiosity, as well as their syncretic approach, together with their praiseworthy efforts to collate the sciences, and to compose a pioneering 'encyclopaedia', all bear signs of commendable originality.

In terms of the epistemic significance of the *Epistles* and the intellectual calibre of their authors, it must be stated that, despite being supplemented by oral teachings in seminars (*majālis al-‘ilm*), the heuristics embodied in the *Rasā'il* were not representative of the most decisive achievements of their epoch in the domains of mathematics, natural sciences, or philosophical reasoning. Moreover, the sciences were not treated with the same level of expertise across the *Rasā'il*. Consequently, this opus ought to be judged by differential criteria as regards the relative merits of each of its epistles. In fairness, there are signs of conceptual inventiveness, primarily regarding doctrinal positions in theology and reflections on their ethical-political import, along with signs of an intellectual sophistication in the meditations on spirituality and revelation.

The *Rasā'il* corpus is brimming with a wealth of ideas and constitutes a masterpiece of mediaeval literature that presents a populist yet comprehensive adaptation of scientific knowledge. It is perhaps most informative in terms of investigating the transmission of knowledge in Islam, the 'adaptive assimilation' of antique sciences, and the historical evolution of the elements of the *sociology* of learning through the mediaeval forms of the popularization of the sciences and the systemic attempts to canonize them. By influencing a variety of Islamic schools and doctrines, the Brethren's heritage acted as a significant intellectual prompt and catalyst in the development of the history of ideas in Islam. As such, their work rightfully holds the station assigned to it amongst the distinguished Arabic classics and the high literature of Islamic civilization.

The composition of this text displays impressive lexical versatility, which encompasses the technical idioms of mathematics and logic, the heuristics of natural philosophy, and the diction of religious pronouncements and occult invocations, in addition to poetic verses,

didactic parables, and satirical and inspirational fables. Despite the sometimes disproportionate treatment of topics, the occasional hiatus in proofs, irrelevant digressions, or instances of verbosity, the apparent stylistic weaknesses disappear, becoming inconsequential, when a complete impression is formed of the architectonic unity of the text as a whole and of the convergence of its constituent elements as a remarkable *oeuvre des belles lettres*.

Modern academic literature on the *Rasā'il Ikhwān al-Ṣafā'* is reasonably extensive within the field of Islamic studies, and it continues to grow, covering works dating from the nineteenth century up to the present, with numerous scholars attempting to solve the riddles surrounding this compendium. The academic rediscovery of the *Rasā'il* in modern times emerged through the monumental editorial and translation efforts of the German scholar Friedrich Dieterici between the years 1861 and 1872. Several printed editions aiming to reconstruct the original Arabic have also been established, starting with the *editio princeps* in Calcutta in 1812, which was reprinted in 1846, then a complete edition in Bombay between 1887 and 1889, followed by the Cairo edition of 1928, and the Beirut editions of 1957, 1983, 1995, and their reprints.² Although the scholarly contribution of these Arabic editions of the *Rasā'il* is laudable, as they valuably sustained research on the topic, they are uncritical in character, and they do not reveal their manuscript sources. Consequently, the current printed editions do not provide definitive primary-source documentation for this classical text. Given this state of affairs, the Institute of Ismaili Studies (IIS) in London has undertaken the publication (in association with Oxford University Press) of a multi-authored, multi-volume Arabic critical edition and annotated English translation of the fifty-two epistles.

2 The principal complete editions of this compendium that are available in print consist of the following: *Kitāb Ikhwān al-Ṣafā' wa-Khullān al-Wafā'*, ed. Wilāyat Ḥusayn, 4 vols. (Bombay: Maṭba'at Nukhbat al-Akhhbār, 1305–1306/ca. 1888); *Rasā'il Ikhwān al-Ṣafā'*, ed. Khayr al-Dīn al-Ziriklī, with two separate introductions by Ṭaha Ḥusayn and Aḥmad Zakī Pasha, 4 vols. (Cairo: al-Maṭba'a al-'Arabiyya bi-Miṣr, 1928); *Rasā'il Ikhwān al-Ṣafā'*, ed. with introduction by Buṭrus Bustānī, 4 vols. (Beirut: Dār Ṣādir, 1957); and an additional version, *Rasā'il Ikhwān al-Ṣafā'*, ed. 'Arif Tāmīr, 5 vols. (Beirut: Manshūrāt 'Uwaydāt, 1995).

In preparation for the critical edition, reproductions of nineteen manuscripts were acquired by the IIS, and their particulars can be summarized as follows, with the corresponding Arabic sigla:

Bibliothèque nationale de France, Paris:

MS 2303 (1611 CE): [ر]

MS 2304 (1654 CE): [ز]

MS 6.647–6.648 (AH 695; Yazd): [د]

Bodleian Library, Oxford:

MS Hunt 296 (n.d.): [ج]

MS Laud Or. 255 (n.d.): [ح]

MS Laud Or. 260 (1560 CE): [خ]

MS Marsh 189 (n.d.): [غ]

El Escorial, Madrid:

MS Casiri 895/Derenbourg 900 (1535–1536 CE): [س]

MS Casiri 923/Derenbourg 928 (1458 CE): [ش]

Istanbul collections (mainly the Süleymaniye and associated libraries):

MS Atif Efendi 1681 (1182 CE): [ع]

MS Esad Efendi 3637 (ca. thirteenth century CE): [ن]

MS Esad Efendi 3638 (ca. 1287 CE): [أ]

MS Feyzullah 2130 (AH 704): [ف]

MS Feyzullah 2131 (AH 704): [ق]

MS Köprülü 870 (ca. fifteenth century CE): [ك]

MS Köprülü 871 (1417 CE): [ل]

MS Köprülü 981 (n.d.): [و]

Königliche Bibliothek zu Berlin:

MS 5038 (AH 600/1203 CE): [ب]

The Mahdavi Collection, Tehran:³

MS 7437 (AH 640): [ط]

The reconstruction of the contents of the *Rasā'il* by way of a critical edition is undertaken through manuscript reproductions that are significantly distanced in time from the original, and these have proved to be traceable to a variety of transmission traditions that cannot be articulated with confidence in terms of a definitive *stemma codicum*.⁴ The dexterity of the copyists, their deliberate tampering, or commendable exercise of restraint and relative impartiality, along with their scribal idioms, would have conditioned the drafting of the manuscripts. Such endeavours would also have been influenced by the intellectual impress of the prevalent geopolitical circumstances in which

3 It is worth noting that these acquisitions by the IIS, which consist of the oldest complete manuscripts, along with significant supplementary fragments of an early dating, were each carefully selected from over one hundred extant manuscripts, which are preserved in thirty-nine libraries and collections, noted in alphabetical order by country, as follows: *Egypt*: Dār al-Kutub, Arab League Library (possibly also in the Arab League offices in Tunis); *France*: Bibliothèque nationale de France; *Germany*: Königliche Bibliothek zu Berlin, Herzogliche Bibliothek zu Gotha, Eberhard-Karls-Universität (Tübingen), Leipzig (Bibliotheca Orientalis), München Staatsbibliothek; *Iran*: Muṭahhari Library, Tehran University Central Library, Mahdavi Collection (private); *Ireland*: Chester Beatty Library; *Italy*: Biblioteca Ambrosiana, Biblioteca Vaticana; *Netherlands*: Bibliotheca Universitatis Leidensis; *Russia*: Institut des Langues Orientales (St Petersburg); *Spain*: Biblioteca del Monasterio San Lorenzo de El Escorial; *Turkey*: Süleymaniye, Aya Sofia, Amia Huseyn, Atif Efendi, Esad Efendi, Millet Library, Garullah, Köprülü, Kütüphane-i 'Umûmî Defterî, Manisa (Maghnisa), Rashid Efendi (Qaysari), Topkapı Saray, Yeni Çami, Revan Kishk; *United Kingdom*: Bodleian Library, British Library, British Museum, Cambridge University (Oriental Studies Faculty Library), Institute of Ismaili Studies (including copies from the Hamdani, Zâhid 'Alî, and Fyzee collections), Mingana Collection (Selly Oak Colleges Library, Birmingham), School of Oriental and African Studies (SOAS); *United States*: New York Public Library, Princeton University Library.

4 Within both the English translation and the Arabic edition here, the beginning of each folio of the MS Atif Efendi 1681 [ع] manuscript is indicated, starting at recto folio 141: for example, (fol. 141a) in the English translation, and [١٤١ أ] in the Arabic edition; or, for verso folio 141, (fol. 141b) in the English translation, and [١٤١ ب] in the Arabic edition. The pagination of the second volume of the Beirut (Dār Şādir) printed edition is also noted using square brackets, for example [p. 5] or [٥].

this text was transcribed, in addition to its channels of transmission. By widening the selection of the oldest manuscripts and fragments, based on the period of the copying, the levels of completeness and clarity, and the recommendations of past and present scholars who have consulted these collections, a suitably grounded critical edition will be produced, and a more reliable textual reconstruction will offer us improved access to the contents of the *Rasā'il* beyond what is presently available through the printed editions (i.e., those from Bombay, Cairo, and Beirut). It is ultimately hoped that the collective authorial effort, in establishing the Arabic critical edition of the *Rasā'il* and the first complete annotated English translation, will eventually render service to the academic community and lay a scholarly foundation for further studies dedicated to the Brethren's corpus and its impact on the history of ideas in Islam and beyond.

The present volume is the sixth of the definitive OUP-IIS *Epistles of the Brethren of Purity* series, which was inaugurated in 2008 with the publication of an introductory volume of studies on the Ikhwān al-Ṣafā' and their *Rasā'il*. It comprises the Arabic critical edition and annotated English translation with commentaries of Epistles 15–21 from the second part of the *Rasā'il Ikhwān al-Ṣafā'*, which have been prepared herein by Carmela Baffioni. This volume encompasses the initial seven epistles on the natural sciences, which correspond to an expression of Aristotelian natural philosophy that is mediated by Islamic interpretations of Neoplatonist leitmotifs. A hierarchical representation of the three kingdoms of nature reveals how salvation can be attained through moral comportment that is guided by progressively acquired forms of scientific knowledge. The salvific potentials are also pictured in terms of analogical relations between the Divine Artisan and the human craftsperson, whereby the artworks of artificers are manifestations of their actualized knowledge. The contents of this volume also offer enlightening perspectives from the standpoint of the sociology of knowledge regarding the canonization and popularization of the natural sciences within the Islamic intellectual milieu, and of the tenth-century urban cultures of Mesopotamian and Syrian locales in particular.

The *Epistles of the Brethren of Purity* series, and this present volume,

would not have been feasible without the scholarly contributions of numerous esteemed colleagues who are participating in this challenging textual endeavour to establish the Arabic critical edition and annotated English translation with commentaries of the *Rasā'il*. I am deeply thankful to all of them for their furtherance of the realization of this venture, and I am specifically beholden to Carmela Baffioni for lending us her authority and bringing this volume to publication. I also express my gratitude to the distinguished members of the Editorial and Advisory Boards of the series for their continual academic support, especially to Professors Hermann Landolt, Wilferd Madelung, Ismail K. Poonawala, and Roshdi Rashed. Profound thanks must go as well to my dear colleagues at the Institute of Ismaili Studies, London, and to its Directors and Governors, past and present, for their generous sponsorship of this scholarly project. I would like to record here my indebtedness to Dr Farhad Daftary for his constant support of this institutional initiative. Most special thanks are due to my friend and colleague Ms Tara Woolnough for her meticulous copy-editing work and dedicated editorial care. I also thank Mr Saleh al-Achmar for proofreading the Arabic text.

Nader El-Bizri
(General Editor, *Epistles of the Brethren of Purity*)

Beirut / London, April 2013

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Introduction

In this introduction I shall make a series of key points, the first of which is the centrality of natural sciences in any encyclopaedia of sciences, and in the encyclopaedia of the Ikhwān al-Ṣafā' in particular, where a substantial part is devoted to them. Epistles 15–21, edited and translated in this volume, are the closest to the sciences of nature first introduced to the Muslim world on the basis of Greek works. At the same time, they represent a model through which man can be led closer to the comprehension of divine issues.

As with every other section of the encyclopaedia, these epistles reflect the dichotomy between the scientific contribution and the hermeneutic meaning with which all the treatises of the encyclopaedia are charged by their authors, all the more so because, in the present case, their contents are — or have the appearance of being — strictly technical, scientific, ones.

Stated in other terms, scholars have discussed whether the epistles do have a real scientific value and, consequently, whether the Ikhwān can rightly be counted among the authors of encyclopaedias (provided that, according to their view, authors of encyclopaedias should be scientists themselves), or, on the other hand, whether the eminently religious, and/or soteriological, function attributed by them to the scientific inheritance of the ancients may cause a diminution in the technical value of the recalled doctrines.

Such debates have continued even in most recent studies. The charge of dilettantism has been reiterated against the Ikhwān,¹ and so they

1 See, e.g., J. van Ess: 'The Ikhwān were dilettanti, people who loved philosophy (and perhaps used it for a religious purpose) but never made their living out of it, in

have been deprived of the right of being considered to be authors of an 'encyclopaedia'.² On the opposite side, some scholars insisted on detecting an 'educational' function in these treatises, separate from religious aims.³

As to the religious perspective, scholars have not yet reached any agreement about the ideological commitment of the authors, and in particular about their closeness to Ismailism.⁴

some respect comparable to Abū Ḥayyān al-Tawḥīdī (who knew them but did not think very highly of them). Living in Baṣra, far from the court of Baghdad, [...] they tried to fix the state of the art in all the disciplines an educated layman should be conversant in, like a team working on a "project", continuing in their own way the tradition of the bourgeois "salon" which had been so typical for this town during the time of al-Jāḥiẓ.' 'Encyclopaedic Activities in the Islamic World: A Few Questions, and No Answers', in G. Endress, ed., *Organizing Knowledge. Encyclopaedic Activities in the Pre-eighteenth Century Islamic World* (Leiden–Boston: Brill, 2006), pp. 3–19, at p. 9.

- 2 E.g., Arfa Mokdad claims that the Ikhwān seem to have been unable to arrange with a critical eye knowledge that may be regarded as worthy of recognition; 'The Brethren of Purity (Ikhwān al-Ṣafā') and Their Philosophical Treatises (*Rasā'il*)', in Endress, *Organizing Knowledge*, pp. 155–168, at p. 164. On the other hand, the Ikhwān's interest in salvation 'preclude the *Rasā'il* from being an encyclopaedia in the strict sense'. Unlike encyclopaedias, which generally aim at reaching as many people as possible, and although they often appeal to all the Brethren whichever country they are in, the Ikhwān 'had to be secretive when compiling, distributing and publishing the *Rasā'il*' (p. 165). Neither do they have 'awareness of the historical dimension, except for their advocacy of a return to a former stage of human learning', whereas they arrived at trying to harmonize 'conflicting views, and theories that are difficult to reconcile. The *Rasā'il* therefore lack the rational and critical approach that examines the sciences as a critical process' (p. 167).
- 3 See, e.g., A. L. Tibawi, 'Some Educational Terms in *Rasā'il Ikhwān aṣ-Ṣafā'*', *Islamic Quarterly* 5 (1959), pp. 55–60 (= 24. Int. Cong. Or. 1957, pp. 297–299); and, recently, Abdullah Sahin, 'The Role of Educational Theology in Reconciling Faith and Reason in Islam: Reflections on the Case of Ikhwān al-Ṣafā', *The Muslim World Book Review* 32/4 (2012), pp. 6–16.
- 4 H. A. Davidson relates them 'to one of the Shiite branches of Islam'; *Proofs for Eternity, Creation and the Existence of God in Medieval Islamic and Jewish Philosophy* (New York–Oxford: Oxford University Press, 1987), p. 224. Several scholars have moderately sided with the hypothesis of an Ismaili commitment of the Ikhwān al-Ṣafā' — for instance, H. H. Biesterfeldt, who speaks of 'Shī'i or Ismā'ili leanings'; 'Medieval Arabic Encyclopedias of Science and Philosophy', in S. Harvey, ed., *The Medieval Hebrew Encyclopedias of Science and Philosophy. Proceedings of the Bar-Ilan University Conference*, Amsterdam Studies in Jewish Thought, 7 (Dordrecht–Boston–London: Kluwer, 2000), pp. 77–98, at p. 91.

In the opinion of the present writer, the religious perspective of the Ikhwān affects neither the theoretical value of their philosophy, nor the technical importance of the data they elaborate. That enhances the hypothesis of their commitment in favour of Ismailism — which since the beginning grounded the attainment of salvation not only in religious (exoteric and esoteric) knowledge, but also in philosophical doctrines — or it may even be a consequence of such a commitment.

The Content of the Natural Science Treatises and the Greek Heritage

Epistles 15–21 mirror the succession of the Aristotelian natural science writings as they were arranged in late Greek antiquity. Epistle 15 deals with the main themes of the *Physics* — the constitutive qualities of the Absolute Body. Epistle 16 deals with the universal, simple

And G. Endress: 'I am speaking of the *Book of the Sincere Brethren*[...] written in the sixties or seventies of the 10th century by a man named Abū Sulaymān al-Maqdisī, addressed to, and perhaps written in collaboration with, a group of Ismā'īlī scholars styled as the community of the true faith [...] Going beyond an encyclopædic summary, the book presents knowledge as being the highway to rational illumination: the gnosis of the initiate [...] The Epistles [...] remained influential in the popular philosophy of the occult sciences [...], were spread by the Ismā'īlī Shī'a and were still read by the teachers of the Safavid schools of philosophical *Kalām*. But they were [...] fiercely attacked for their heretical affiliations, and left no trace in the teaching of Avicenna's school [...]; 'The Cycle of Knowledge: Intellectual Traditions and Encyclopædias of the Rational Sciences in Arabic Islamic Hellenism', in Endress, *Organizing Knowledge*, pp. 103–133, at pp. 121–122. Mokdad places them 'in an Isma'īlī environment [...] committed to secrecy [...] and divided into various degrees', referring to Epistle 45: 'On the Mutual Help', *Rasā'il*, vol. 4, p. 57; Mokdad, 'The Brethren of Purity', p. 156. After having recalled Tawhīdī's negative judgement about them (on vol. 2, p. 6 of the text edited by Aḥmad Amīn and Aḥmad al-Zayn [Cairo, 1939–1944]) expressed in *al-Imtā' wa'l-Mu'ānasa*, he concludes: 'The *Rasā'il* were essentially a manual that was used by the missionaries to spread the Ismā'īlī cause and for educational purposes, and to encourage the in-depth study of the sciences, giving students 'an introduction to the sciences...'; 'The Brethren of Purity', p. 168. On the other hand, Biesterfeldt remarks that the reception of the Ikhwān's work 'was always selective, and the general mainstream attitude towards the *Rasā'il* was dutifully deprecatory throughout (many of the lists of books burned in spontaneous or official autos-da-fé in medieval Baghdad or Andalusia contain this title, along with books on logic, the occult sciences and other suspicious matters)'; 'Medieval Arabic Encyclopedias', p. 91.

bodies, namely, spheres, stars, and elements — the same topic as Aristotle's work *On the Heavens*. In Epistle 17, natural bodies are addressed — as in Aristotle's *On Generation and Corruption*. Epistle 18, finally, addresses the atmospheric phenomena — the topic of Aristotle's *Meteorology* I–III. As Book IV of the *Meteorology* considers the formation of τὰ μεταλλευόμενα (fossils and metals), Epistle 19: 'On the Formation of Minerals' is the obvious successor in the series.⁵ Apart from all the questions linked to the authenticity of *Meteorology* IV and, above all, to its real concern for mineralogical issues, however, it is to be taken into account that no genuine work on minerals by Aristotle has reached us.

In contrast, Epistle 20: 'On the Quiddity of Nature' is quite far from the Aristotelian approach to natural sciences. In general, it hints at some Aristotelian topics only cursorily (for instance, it refers to Aristotle's definition of nature as 'the principle and cause of motion and rest'),⁶ and it mostly recalls themes proper to Ismaili doctrines. It also develops an angelology that prefigures the representations of angels given by Avicenna and Shihāb al-Dīn Yaḥyā al-Suhrawardī. We might say, then, that this treatise in some way breaks the flow of the exposition of issues concerned with nature; because of its content and purpose (linking technical and religious aspects of the natural reality), it might have been better placed to open the treatment of natural sciences.

It may also be noted that in Chapter 3 of Epistle 15, after having distinguished the four kinds of matter — matter of art, matter of nature, matter of the whole, and Prime Matter — the Atif ('Āṭif) Efendi 1681

5 The *Physics* and *On Generation and Corruption* were translated by Ishāq ibn Hunayn (d. 910 or 911) — the second translation is now lost — and *On the Heavens* and *Meteorology* by Yaḥyā ibn al-Biṭrīq (d. 830). For further details, see C. D'Ancona, 'Le traduzioni di opere greche', in C. D'Ancona ed., *Storia della filosofia nell'Islam medievale*, 2 vols. (Turin: Einaudi, 2005), vol. 1, pp. 212, 223–225.

6 See, e.g., *Physics* II.1.192b21–22. English translations of this work are from Aristotle, *The Physics, with an English Translation*, tr. P. H. Wicksteed and F. M. Cornford, 2 vols. (London–Cambridge, MA: Heinemann–Harvard University Press, 1960); and also *Physics* III.1.200b12, VIII.3.253b5, VIII.4.254b17; *On the Heavens* I.2.268b16. Quotations from Aristotle are mainly taken from the works that correspond to Epistles 15–18.

manuscript (henceforth, Atif), with regard to the matter of nature, adds to the word *al-ka'ināt* (fol. 141b19), in the margin:

وفي الشرع تلك من الملائكة <...>⁷ ذلك من الروحانيين

Then, to the word *al-falakiyya* (fol. 141b20), Atif adds in the margin:

ومن الشرع تلك من الملائكة <...>⁸ ذلك من الروحانيين⁸

This may also be considered proof of the fact that Epistle 20 should have been the first and introductory of all the treatises constituting the second section.⁹

Epistles 21 and 22 come back to the regular succession of these sciences, as they deal with plants and animals, but again, no work on plants by Aristotle has reached us, and his works about animals¹⁰ are very far in content and, above all, in spirit from the contents and aims of Epistle 22.¹¹

7 I have put in angled brackets the words or phrases of Atif or the other consulted MSS which I was not able to read.

8 See the critical apparatus, p. 8, note 13 and p. 9, note 5.

9 On the concept of nature in the *Iḥwān al-Ṣafā'* see also my article 'Antecedenti greci nel concetto di "natura" degli *Iḥwān al-Ṣafā'*', in M. Barbanti, G. R. Giardina, and P. Manganaro, ed., *ΕΝΩΣΙΣ ΚΑΙ ΦΙΛΙΑ. Unione e amicizia, Omaggio a Francesco Romano* (Catania: CUECM, 2002), pp. 545–556.

10 Apart from the *Parts of Animals* and the *Generation of Animals*, which were translated by Yaḥyā ibn al-Biṭrīq and edited by R. Kruk (Amsterdam–Oxford: North Holland Publishing Company, 1979), and by J. Brugmann and H. J. Drossaart Lulofs (Leiden: Brill, 1971) respectively, the majority of the other zoological works in Arabic by Aristotle were known under the general title of *Kitāb al-ḥayawān*.

11 This treatise was the first one to be edited and translated in the Institute of Ismaili Studies series. See L. E. Goodman and R. McGregor, ed. and tr., *The Case of the Animals versus Man Before the King of the Jinn. An Arabic Critical Edition and English Translation of Epistle 22* (New York–London: OUP–IIS, 2009). Epistle 22 has been translated many times. To the versions mentioned by Goodman and McGregor in their bibliography (see p. 343), we should also add L. E. Goodman, *The Case of Animals versus Man before the King of the Jinn: A Tenth-century Ecological Fable of the Pure Brethren of Basra* (Boston: Twayne Publishers, 1978); É. Tornero Poveda, ed., *La disputa entre los animales y el hombre / Iḥwān al-Ṣafā'* (Madrid: Siruela, 2006); R. Kruk, tr., *De Zuivre Broeders van Basra. De Zaak van de Dieren tegen de Mensen* (Amsterdam: Uitgeverij Bulaaq, 2010). Further particulars of the editions and translations of this treatise can be found in the bibliography below.

From Epistle 23: 'On the Composition of the Body' onwards, the issues dealt with in the second section of the encyclopaedia, titled 'On the Natural Sciences', in several cases go beyond the φυσικά as they are understood today. The only exception is Epistle 24: 'On Sense and Sensibilia', with its twin Epistle 35: 'On Intellect and Intelligibilia' belonging to the third section, which are still close to Aristotelian themes and contents.

This is proof of how wide the idea of 'natural sciences' was for the Ikhwān al-Ṣafā', whose encyclopaedic purpose is clarified by the outline of their project, given in the last chapter of Epistle 15.¹²

At the beginning of the treatise, natural sciences are introduced as a part of 'the art' (*ṣinā'a*)¹³ of the Brethren of Purity, who have composed seven treatises on them. It is interesting to note that the Brethren refer to Epistle 24: 'On Sense and Sensibilia' immediately after having mentioned Epistle 15. In doing so, they evidently have in mind the relation between matter and form, sketched in both these treatises, and grounded on the distinction between constitutive and complementary forms. This mention seems to give a sort of historical legitimacy to the addition provided by the Atif manuscript at the end of Epistle 10: 'On the Meaning of the *Isagoge*'.¹⁴

Before these seven epistles (in the version of the encyclopaedia known today, Epistles 15–22), the Ikhwān say they have composed five other treatises. They name them 'the propaedeutical epistles', and refer to the first, second, third, sixth, and eleventh epistles of the first section. Then the Ikhwān state that ancient philosophers — whom they consider to be their predecessors — already recorded these topics in their books, but their prolixity, and the misunderstandings of their translators, hindered people from grasping their contents and

12 See below, pp. 126–127. It is to be compared with the outline given in Epistle 7: 'On the Theoretical Sciences and their Goal', which, unlike this one, has often attracted the attention of scholars. Cf., e.g., G. de Callatay, 'Ikhwān al-Ṣafā': des arts scientifiques et de leur objectif', *Le Muséon* 116 (2003), pp. 231–258.

13 I think this term stands here for the 'knowledge' of the Brethren, and for their consequent composition of the encyclopaedia.

14 See C. Baffioni, ed. and tr., *On Logic: An Arabic Critical Edition and English Translation of Epistles 10–14* (New York–London: OUP–IIS, 2010), pp. 157–165, and below in this Introduction, note 116.

meanings. For this reason, the Ikhwān have composed these epistles, and have summarized the ancients' discourses in them, so that they may be more easily understood by beginners.

Apart from the question of whether these lines indicate a first draft of the encyclopaedia,¹⁵ this last chapter of Epistle 15 clarifies that the Ikhwān's aim in composing their work was not only theoretical: the basis for all knowledge is knowledge of the self — or of the soul,¹⁶ but it escapes the majority of people of science. The initiate is then invited to search into the prophetic and the philosophical books. In so doing, he will be able to understand divine objects that are the highest goal in the knowledge process. These statements are merely an example of how, for the Ikhwān, the natural hierarchy of beings mirrors the spiritual hierarchy — in the same way that for the Ismailis the different levels of nature are a proof of the degrees of the Ismaili *da'wa* (mission).¹⁷

Divine objects are paralleled to forms abstracted from matter. The human soul is one such form; for this reason, knowledge of it — the highest of sciences — is a necessary condition for rescue from the abyss into which humans fell because of Adam's sin.¹⁸ Note that the Ikhwān speak here of 'the first Adam', to underline his difference from the 'perfect Adam' (*al-insān al-kāmil*), reaching the degree of whom is the ultimate goal of the encyclopaedic knowledge process.¹⁹ The

15 See G. de Callatāy, 'The Classification of Knowledge in the *Rasā'il*', in N. El-Bizri, ed., *The Ikhwān al-Ṣafā' and their Rasā'il* (New York–London: OUP–IIS, 2008), pp. 58–82; and A. Hamdani, 'The Arrangement of the *Rasā'il Ikhwān al-Ṣafā'* and the Problem of Interpolations [with Postscript]', *ibid.*, pp. 83–100.

16 The ambiguity arises from the fact that *nafs* means in Arabic both 'soul' and 'self', so the frequent invitation from the Ikhwān to the knowledge of soul often recalls to the mind the aphorism γνῶθι σεαυτόν, 'know thyself', inscribed in the pronaos of the temple of Apollo at Delphi.

17 The case of the *Rāḥat al-'Aql* ('*The Quietude of the Intellect*') by the eleventh-century Ismaili *dā'i* and thinker Ḥamīd al-Dīn al-Kirmānī is especially clear. See, in the perspective proposed here, F. Cicero, 'La struttura gerarchica della *da'wa* ismā'īlita nella *Rāḥat al-'aql* di Ḥamīd al-Dīn al-Kirmānī', *Studi maghrebini*, 5 (2007), pp. 87–109. See also Abbas Hamdani, 'Evolution of the Organisational Structure of the Fāṭimī *Da'wa*', *Arabian Studies* 3 (1976), pp. 85–114.

18 See p. 128.

19 See G. de Callatāy, *Ikhwān al-Ṣafā'. A Brotherhood of Idealists on the Fringe of Orthodox Islam* (Oxford: Oneworld, 2005), pp. 26–28.

comprehension of the symbols contained in prophetic books is required to live a renewed life thanks to divine (not to natural!) knowledge.

Before going into further detail about the double approach of the Ikhwān to the sciences of nature, a summary of the treatises studied in this book will hopefully make the combination of technical data and spiritual considerations evident, as well as the complex structure of these treatises.

A Summary of Epistles 15–21

Epistle 15

Chapter 1. The concepts that are at the basis of natural sciences — matter, form, movement, time, and place — are introduced. One of the aims of the natural science epistles is to make these concepts closer to the learners' understanding.

Chapter 2. Definition of matter and form. Form, not matter, distinguishes beings from each other.

Chapter 3. The four kinds of matter: (i) the matter of art, (ii) the matter of nature, (iii) the matter of the whole, and (iv) the Prime Matter. The Prime Matter (= ipseity), the Absolute Body (= the Prime Matter with quantity) and a specific body (= the Absolute Body with quality) are compared to the numbers one, two, and three.

Chapter 4. Ipseity, quantity, and quality are called 'simple intelligible forms', each of them being matter for the upper one, and form for the lower one.

Chapter 5. The hierarchy of beings is restated in terms of purity and nobility.

Chapter 6. Still within the discourse about hierarchies, the form is said to be that which raises a being in nobility.

Chapter 7. (i) Knowledge and (ii) morals — which play the same role as form in natural beings — are the agents of differentiation among souls.

Chapter 8. The noblest souls are those of prophets, philosophers, and diviners.

Chapter 9. The spiritual side of these considerations.

Chapters 10–11. Definitions of place. Place and void.

Chapters 12–13. Movement. Time.

Chapter 14. The spiritual counterpart of the technical discourse.

Epistle 16

Chapter 1. The subject of the treatise: the heavenly bodies.

Chapter 2. The wise men's saying that 'the world is a macroanthropos'.

Chapter 3. Etymological proof that the heavens are the spheres. There are nine spheres; seven of them are the seven heavens, from the Moon up to Saturn.

Chapter 4. The Earth is a unique globe, motionless in the centre of the world. Comparison of the Earth with the yolk, of the sphere of Air with the albumen, and of the sphere of the Moon with the shell of an egg. All spheres embrace one another up to the all-embracing sphere. The world is composed of eleven globes, two inside the sphere of the Moon — the sphere of the Earth in combination with the sphere of Water, and the sphere of Air in combination with the sphere of Ether — and nine beyond the sphere of the Moon.

Chapters 5–6. There is no void in the world. Outside the world there is neither empty nor full space.

Chapter 7. The Sun is in the middle of the world; five of the eleven globes are beyond the Sun, and five under the Sun, all embracing one another.

Chapter 8. The constellations.

Chapter 9. The measures of the heavenly globes.

Chapter 10. The number of the fixed stars and of the planets.

Chapter 11. The measures of the stars and of their diameters according to what appears to the physical eye.

Chapters 12–14. The relation of the diameters of the stars to the diameter of the Earth. The measures of the masses of the stars and of the Earth. The measures of the fixed stars.

Chapters 15–17. The various rotations of the spheres around the Earth. The different times of their rotations. The rotation of the stars in the sphere of the constellations.

Chapters 18–20. The stars are not moved from the west eastward. Comparison of the rotation of the stars with the rotations performed in the *ṭawāf* around the Ka'ba. Other comparisons.

Chapters 21–22. Retrograde motion, rectilinear motion, and station of the planets. The forty-five movements of the planets.

Chapters 23–24. The two kinds of darkness existing in the world. Eclipses.

Chapters 25–26. The sphere is a fifth nature. False beliefs about this theory.

Chapters 27–28. The heavenly bodies are neither heavy nor light. The heavenly bodies are neither warm nor cold nor humid.

Chapter 29. The meaning of resurrection.

Epistle 17

Chapter 1. The subject of the treatise: the natural bodies.

Chapters 2–5. The natural bodies are of seven genera: the four elements and the begotten beings (animals, plants, and minerals). The elements are composed of matter (= the Absolute Body) and form (that distinguishes them from each other; constitutive and complementary forms). The constitutive and complementary forms of fire and earth.

Chapter 6. The qualities of hyacinth, crystal, and the like, as opposed to those of snow, ice, or salt. Why the heavenly bodies are not subject to generation and corruption, change and transformation.

Chapter 7. The constitutive and complementary forms of water and air.

Chapter 8. The constitutive form of heavenly and terrestrial bodies.

Chapters 9–10. Following Chapter 7, an explanation of the natural places of water and air — intermediate between the all-embracing sphere and the centre of the universe, namely, the Earth. The places that are proper to the various bodies. 'Heavy' and 'light'. The elements embrace each other, and are all circular apart from water; explanation of that.

Chapter 11. The Earth as a unique globe, motionless at the centre of the world. The ocean and the seven seas. Islands, deserts, inhabited sites, mountains, marshes, and rivers. Mountains. Valleys, caverns, and

abysses. Various kinds of soils determined by the influences of stars. Stars as the cause of generation and corruption in the sublunar world. *Chapters 12–13.* The four elements transform into each other. Minerals, plants, and animals coming from their combination. Their roots are vapours and juices combined together. More on vapours and juices. *Chapter 14.* The human body as subject to generation and corruption and its relation to the soul. The corruption of the body cannot be avoided, but it is necessary to attain knowledge of the soul. At the end of the epistle, the subject of Epistle 18 is outlined.

Epistle 18

Chapter 1. The subject of the treatise: atmospheric phenomena.

Chapter 2. What happens in the sublunar world because of the action of nature according to philosophers. Why some of them denied its acts, or even nature itself. Nature as one of the faculties of the Universal Soul.

Chapter 3. The atmospheric phenomena are the first mixture formed by vapour and smoke: air is easily affected and quickly transformed; it will be the first issue dealt with in the treatise.

Chapter 4. The parts of the sphere of the Air: (i) Ether: the highest — extremely hot; (ii) Nasīm: the lowest — balanced in mixture; (iii) Zamharīr: intermediate — extremely cold. Night and day at the northern and southern poles. The inhabited quarters of the Earth and its seven climes.

Chapter 5. The angles formed by the reflection of the rays of the stars on the surface of the Earth, and their capability of warming. An explanation of why the highest point of the globe of Nasīm is 16,000 cubits. (i) The first changes in air: light and dark, and heat and cold; (ii) that which is determined by winds, vapours, and smokes; (iii) the changes determined by seas (occurring in the three parts of the sphere of the Air). The distinction of surfaces into contiguous and intermingling, in reference to the heavens.

Chapter 6. Air is like a still sea. The states of the Moon, its mansions and conjunctions, and their various influences on waters.

Chapter 7. Wind, its causes, its species, and its purposes. The purpose of mountains. Waters inside mountains.

Chapter 8. Clouds, rains, moistness, ice, fog, drizzle, thunders, lightning, and hail; their origin and explanation.

Chapter 9. The Lord's providence regarding thunder and lightning. Why soft bodies only are burnt.

Chapter 10. The halo around the Sun and the Moon, its meaning and explanation.

Chapter 11. The rainbow. Its colours: their meanings and positions.

Chapter 12. The divine providence regarding the distance of clouds from Earth.

Chapter 13. Why rains are more abundant in winter than in summer, and why vapours are more in summer than in winter. The four causes of the sublunar beings. The four causes of clouds and rains. What happens in the six-month-long winter and summer in the northern and southern constellations (in the globe of Nasīm).

Chapters 14–16. The shooting and falling stars (in the globe of Zamharīr): their matter, form, movement. More on shooting stars and on some mistaken theories about them. The position of the fixed stars. More again on shooting stars, the place of their formation, their form, and their movement.

Chapter 17. A spiritual exhortation to the beginner.

Chapter 18. Comets.

Epistle 19

Chapter 1. After having recalled the creation and annihilation of the world by God, the Ikhwān state the subject of the treatise: a part of the existing beings undergoing generation and corruption.

Chapter 2. The five kinds of transformation: (i) the transformation of the four elements (dealt with in Epistle 17); (ii) the transformation of the air (Epistle 18); (iii) the transformation of the mineral substances (Epistle 19); (iv) the transformation of plants; and (v) the transformation of animals. After having recalled the contents of their treatises devoted to astronomy, the Ikhwān explain the four causes of mineral substances.

Chapter 3. Mineral substances differ according to their soils, waters, and climes. Three species of mineral substances according to the times of their formations. The Earth as a unique globe at the centre of the world. Its four quarters, and the four species of places that change into each other in the course of ages. Ages measured by the various rotations of the stars, which also determine climes, the succession of night and day, and seasons.

Chapter 4. Seas and mountains. Their purpose. The origin of wadis and rivers. The transformation of mountains under the influence of the stars, and the consequent change of seas.

Chapter 5. The formation of dry lands in seas.

Chapter 6. The causes of the agitation and expansion of sea-waters, and their consequences. Positions and structure of mountains. The vapours hidden in them. Earthquakes. The formation of quicksilver. The origin of minerals. Sources. Winds and snows on mountains.

Chapter 7. Rivers, their origin and course. Formation of winds, clouds, blizzards, drizzle, dampness, frost, rains, snows, and hail. Rains percolate inside mountains, then flow out from there as wadis and rivers; snows melt on the top of mountains, flow down, and return to seas; vapours, winds, clouds, and rains are once again formed from them.

Chapter 8. Various properties of mountains, seas, open spaces, islands, rivers, and countries. Their different minerals, plants, and animals.

Chapter 9. The species of minerals — all made from coagulation of moistures and waters, and of dampness and vapours. In spite of their variety, they are all composed of earthen, watery, or aerial parts, and of heat, aggregated in different proportions. Numerology applied to minerals. Formation of quicksilver and sulphur. Formation of metals from sulphur and quicksilver. The formation of precious stones and their relation with the planets. The formation of earthen substances in dependence on different soils.

Chapter 10. Fire is a judge among minerals. Why some minerals burn. Why gold melts but does not burn, and hyacinth neither melts nor burns. The qualities of hyacinth. Why copper and lead quickly melt and burn, and why they are heavy and black.

Chapter 11. The properties and natures of minerals; their reciprocal influences. The formation of pearls. The smallest and weakest beings are also the noblest ones, like pearl, silk, and honey. The origin of the caused beings subject to generation and corruption as a proof of the innovation of the world. The mineral species and their properties. Bezoars, theriacs, and poisons. The real agent in these bodies is nature — a faculty of the Universal Soul, called ‘angels’ by religion. Animals, plants, and minerals as its instruments.

Chapter 12. The particular souls — the servants of the Universal Soul — search for reward from God. Diamond and lead; emery; magnet and iron. The Universal Soul acts in these substances, and nature is her acts.

Chapter 13. The four elements are the matter of mineral substances, assembled by God. The goal of mineral substances. Mineral substances as tools for nature (whereas God does not need instruments or tools, space or time, matter or movements). Nature is an angel charged with the organization of the world. Theodicy. More on the link between particular souls and the Universal Soul. Sudden conclusion of the epistle.

Epistle 20

Chapter 1. Nature as a faculty of the Universal Soul, effused in the sublunar bodies. The Universal Soul is the spirit of the world, nature is her act, the four elements her matter, the spheres and stars her tools, and the three kingdoms her products.

Chapter 2. Opposition between the matter of human artisans and the matter of nature. Its products: genera, species, and individuals. The forms of genera and species are stable, whereas individuals are transient.

Chapter 3. The world made of eleven spheres with the Sun in the middle. Unlike all other globes, the forms of the two globes above Saturn and of the two under the sphere of the Moon are not fixed. The planets as intermediaries between divine creatures and the sublunar world. Resurrection will occur once all things reach their goals and perfection.

Chapters 4–8. The influences of stars on elements and generated beings, on their perfection and imperfection. Time, cause, and place of sublunar

events. The structure of the universe; the heavenly individuals as the necessary (efficient) cause of sublunar beings. How the powers of the heavenly individuals join the lower individuals. Various opinions about the action of the stars on the sublunar world.

Chapter 9. The faculties of the stars as helpers of nature. The world as a macroanthropos.

Chapter 10. The spiritual faculties from the seven planets; their functions, properties, and names according to philosophy and religious law. The spiritual faculties of the fixed stars.

Chapter 11. The end of the world.

Epistle 21

Chapter 1. The subject of the treatise: plants. The hierarchical order of the universe. The destiny of humanity since the time preceding its creation till its new birth in the hereafter. Plants as a proof of the existence of a wise Artisan, though the direct agents of plants are the 'natural faculties' called 'angels' by law. Every plant can produce only another plant similar to itself. The four causes of plants. The seven powers that help the 'vegetal soul'. The three kinds of plants. Trees and stalkless plants. When trees are complete and perfect. Proportion and disproportion of the parts of plants.

Chapter 2. The various places where plants grow.

Chapter 3. The times when plants grow. Why God created leaves. The benefits of plants. Diversity of plants. Description of their parts. Relations between these parts. Detailed description of the date, pomegranate, lotus, walnut, almond, fig, grapes; of pear, apricot, peach, and the like; of citron, orange, lemon, and the like; of oak, gallnuts, of the fruit of cypress, and of myrobalan. Plants all have the same matter but differ by forms, genera, and species according to a hierarchical order. The lowest degree of plants is linked to the highest degree of minerals, the highest degree of plants is linked to the lowest degree of animals. Parasitic plants. The lowest and most defective animal: the worm of the cane. Plants have no pain sense. The animal degree adjacent to the human degree. The lowest human degree adjacent to the highest animal degree. The highest human level adjacent to the

angels' level. Causes of the various compositions and aims of plants, according to God's providence and wisdom. Another description of the palm in comparison to the parts of other plants.

The Classical Heritage in Epistles 15–21

Apart from the references given in the notes to translations, I intend to focus here on a number of themes the Ikhwān elaborate from Aristotle and other ancient authors.

Ptolemy (first–second century CE) has been left out from this survey, as astronomy is outside the present writer's expertise.²⁰ Although the Ikhwān al-Ṣafā' explicitly recall Ptolemy only three times in the treatises examined here,²¹ he is their major source in astronomy with regard to the treatises studied in this book, and especially to Epistle 16.²²

Generally speaking, the Brethren owe to Ptolemy the structure of their universe,²³ but it is to be noted that Aristotle, too, dealt extensively

20 Ptolemy's *Almagest* was translated into Arabic by al-Ḥajjāj (eighth/ninth century), and a commentary, now lost, was written by al-Nayrīzī. New data will be provided by J. Thomann in his forthcoming article 'A Commentary on the *Almagest* Attributed to al-Fārābī: a Linguistic Enquiry', paper presented at the 26th UEA Congress, Basel, Sept. 2012, proceedings forthcoming.

21 See Chapter 13 of Epistle 15, p. 124 below; Chapter 22 of Epistle 16, p. 159 below; and Chapter 13 of Epistle 19, p. 232 below.

22 Additionally, the seven climes constituting the inhabited quarter of the Earth mentioned in Chapter 4 of Epistle 18 (and extensively dealt with in Epistle 4: 'On Geography') are also reminiscent of Ptolemaic doctrines.

23 However, in many cases the Ikhwān provide completely different data. E.g., with regard to the values of the diameter and the thickness of each heavenly globe in Chapter 9 of Epistle 16, the Ikhwān's values curiously diverge from the traditional Ptolemaic measures, commonly accepted in the mediaeval world, both Muslim and Western; see A. Bausani, *L'enciclopedia dei Fratelli della Purità, Riassunto, con Introduzione e breve commento, dei 52 Trattati o Epistole degli Ikhwān al-Ṣafā'* (Naples: Istituto Universitario Orientale, 1978), p. 102. Bausani also indicates different values from those given in Atif with reference to the relation of the diameters of the stars to the diameter of the Earth (p. 103). For the distance Sun–Earth, he hypothesizes a contamination of Ptolemy's conception with the values proposed by Hipparchus (d. 127 [?] BCE), which they may have known from Theon of Alexandria (Thāwūn al-Iskandarānī, d. ca. 405 CE); the calculation methods of Ptolemy and the Ikhwān are described in note 1, pp. 103–110. Another contamination is hypothesized by Bausani — this time, with Eudoxus of Cnidus (d. 355 or 347 BCE) and Aristotle — for the different times of the revolutions of the spheres (Chapter 16; see pp. 110–111). Similar

with the form and disposition of the universe, and that the Ikhwān must have been acquainted with his doctrines. For instance, the work *On the Heavens* discusses the disposition of the heavenly spheres, one inside the other (II.4.287a2ff.), and the disposition of water, air, and fire around the Earth in this order (II.4.287a32–b4); the movement of the stars (II.8); the Earth as spherical, and at rest in the centre of the universe (II.14.296b35–297a6). Finally, the quickest motion is said to be the motion of the heavens (II.4.287a23–26) — namely, of the all-embracing sphere in the Ikhwān's system borrowed from Ptolemy. In Epistle 16, the Ikhwān repeatedly speak about the differences of the movements of the stars in fastness and slowness, develop the comparison with the *ṭawāf* around the Ka'ba to explain them,²⁴ refer

discrepancies can be noted in Epistle 4: 'On Geography'. I have had occasion to compare the data provided by the Ikhwān with those provided by Bausani, P. Gautier Dalché, 'Epistola Fratrum Sincerorum in Cosmographia: une traduction latine inédite de la quatrième Risāla des Ihwān al-Ṣafā', *Revue d'histoire des textes* 18 (1988), pp. 137–167, and E. S. Kennedy and M. H. Kennedy, *Geographical Coordinates of Localities from Islamic Sources* (Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität, 1987). The translation studied by Gautier Dalché is preserved in a fourteenth-century manuscript of the Biblioteca Comunale, Palermo (2 Qq D 121). It is one of the few Arab geographical works known to the Latin world (which, unlike the Muslim world, did not hold geography in high esteem — see p. 139); it can be dated between the beginning of the thirteenth and the first half of the fourteenth century, and may be attributed to the school of Michael Scot (d. ca. 1232). Gautier Dalché (pp. 147–148) inclines to locate the astrological considerations contained in it at the time of Manfred, while the astronomical data are related to Abū Ja'far al-Khwārizmī (d. ca. 820) and al-Farghānī (ninth century; his full name is uncertain), who based themselves on materials of the time of al-Ma'mūn; further resemblances to Abū Ma'shar al-Balkhī (d. ca. 780) are observed, and to the tenth-century astronomer al-Qummī (pp. 148–149). About the data provided in this treatise, E. S. and M. H. Kennedy remark that, 'Most of the coordinates are so corrupt as to be useless; the place names are of some interest'; p. xxii. Among the sources they consider, the Ikhwān's treatise is rather ancient. Apart from Ptolemy, they are preceded only by Māshā'allāh (= Abū Ma'shar al-Balkhī), al-Khwārizmī, Muḥammad b. Jābir al-Battānī (d. ca. 900), and perhaps (depending on the unsettled chronology of the *Rasā'il*) Suhrāb (d. ca. 930), and Muḥammad al-Ḥasan al-Ḥamdānī (d. 945); see p. xxxviii.

24 See pp. 154–156.

to Ptolemy,²⁵ and in Chapter 15 demonstrate sharing, at least in part, his theories.²⁶

Aristotle

The Ikhwān recall many Aristotelian tenets in their natural science treatises, as can be seen in the notes to translations. Here, the main lines of their discussions are recalled for more general considerations.

Matter and form are the first basic notions discussed in the *Physics* to be described in Chapters 2–4 of Epistle 15.²⁷

After several pages discussing spiritual topics, the themes proper to the *Physics* are addressed again from Chapter 10 onwards, where the doctrines of the learned concerning place are addressed.²⁸ In Chapter 11,²⁹ the Ikhwān, also on the basis of Aristotelian doctrines, confute the ideas (i) of the void as a place deprived of a body, (ii) of the void as self-subsistent, (iii) of the existence of infinity outside the world, and (iv) of the infinite divisibility of matter: such notions are all the result of a mistaken use of abstraction. The Ikhwān are here denying — in agreement with Aristotle — the infinite division of matter in actuality, but it is noteworthy that they are usually against atomism.³⁰

On the other hand, these doctrines are rooted in a poor knowledge of the nature and faculties of the soul. It should be noted that soul is described in the first part of the chapter in a way that recalls souls that foretell the future or even prophesy, and that may be somewhat reminiscent of Aristotle³¹ and other ancient authors.³²

25 See p. 159.

26 See p. 149 and note 65.

27 On some aspects of these descriptions see the Introduction, pp. 39–40 below.

28 See p. 118, notes 23–28.

29 See for these arguments pp. 118–119.

30 See, e.g., Epistle 28: 'On the Limits of Human Knowledge', *Rasā'il*, vol. 3, p. 22.23–24; Epistle 42: 'On Opinions and Religions', *Rasā'il*, vol. 3, p. 468.18–19; Epistle 45: 'On Mutual Help', *Rasā'il*, vol. 4, p. 50.18. Apart from the references to the natural science treatises here edited, I indicate the volume, page(s), and line(s) of each quotation or reference, using the Šādir edition; *Rasā'il Ikhwān al-Šafā'*, 4 vols., ed. Buṭrus al-Bustānī (Beirut: Dār Šādir, 1957).

31 See, e.g., Aristotle, *On Dreams*, Chapter 1, and *On Divination in Sleep*.

32 See also below, pp. 20–21, with regard to Pythagoras.

Void is denied again in Chapter 5 of Epistle 16, which considers how spheres and elements are separated from each other by an imaginary interval only. The Ikhwān also add that, as no part of the universe is either luminous or obscure, and as light and darkness are qualities of a body, it is impossible for void to exist, but rather only space/place, with bodies and in bodies, must exist. It is also false to believe that void is the condition for motion. This would be so if all bodies were hard and impenetrable, but bodies actually move one inside the other, like fish in water and birds in air.

In Chapter 6 of Epistle 16, the Ikhwān deny that beyond the all-embracing sphere there is either another body or an infinite empty space: an empty space cannot exist because it would be a place deprived of matter, and space is an accident that subsists only in a body and with a body. The theory preaching the existence of an empty space comes by false imagination; but what is proposed by imagination needs to be proven through sensible, or demonstrative, or rational evidence, and this hypothesis is not supported by any of them.

Coming back to Epistle 15, Chapters 12 and 13 deal with movement and time, also in terms quite close to Aristotle. The Ikhwān list and explain the six kinds of motion indicated by Aristotle, focusing on locomotion, and the relation between rectilinear and circular motion in particular. Circular motion does not imply any kind of locomotion, as the centre around which it should happen is imaginary, and it does not affect the definition and properties of motion.³³

Later, the Ikhwān pose a series of rhetorical questions about what happens in the case of rectilinear movements such as, for instance, the movement of a part of a body that does not translate from one place to another. Does that part move without occupying different places, or should one say that if a part of a body is moved, the whole body is moved, too, because parts and whole are the same? This question hints at Aristotelian doctrines, but the up and down movements of the elements within the universe, which is moved according to a circular motion, probably underpin this discussion. The contrast

33 See also *Physics* VIII.9.

between circular and rectilinear motions helps in demonstrating that the heaven is a sphere.³⁴

Another explicit reference to Aristotle is the mention of the four causes in Epistles 18, 19, and 21, according to the following scheme:

Causes	Epistle 18, Ch. 13 (of atmospheric phenomena)	Epistle 19, Ch. 2 (of minerals)	Epistle 21, Ch. 1 (of plants)
Material =	the two ascending vapours	quicksilver and sulphur	the four elements
Efficient =	the cold of the air	nature	the Universal Soul
Formal =	the junction and compactness of the two vapours	the rotation of the spheres and the movements of the stars around the four elements	heavenly causes
Final =	rains, so that earth may get moistened, plants grow, and animals be nourished by them	benefits attained by humans and animals	food for animals

Pythagoreanism

In Chapter 8 of Epistle 15, the Ikhwān declare that the prophets' task is to guide humanity, and rescue souls drowning 'in the sea of matter and in the prison of nature'.³⁵ This statement focuses on a dualism characteristic of the Ikhwān. Two visions of existence coexist in them, probably (and at least in part) because of the strong influence of Pythagoreanism on them. The influence of Pythagoreanism is also demonstrated by their numerology, and by moral exhortations to get free from the body, which sometimes they consider to be 'the tomb of the soul'.³⁶

³⁴ See, e.g., *On the Heavens* II.4.287a11–18.

³⁵ See p. 114.

³⁶ The Ikhwān even state that clearly, in Epistle 41: 'On Definitions and Descriptions', *Rasā'il*, vol. 3, p. 398.4–5. The idea that a soul is able to attain full knowledge of the heavenly world already during physical life, if it succeeds in reaching a state similar to disincarnation, is also attributed to Pythagoras. See on this issue

Plato

At the end of Chapter 8 in Epistle 15 we find one of the basic statements of the encyclopaedia, 'Philosophy is the imitation of God according to human capability', which elaborates a saying of the *Theaetetus*.³⁷

Another Platonic opinion is introduced beside Aristotle's definition in Chapter 13 of Epistle 15 with reference to time, defined as 'the number of the movements of the sphere'; differently stated, in that it is measured by the movements of the sphere, time is the alternation of night and day.³⁸ Unlike what was claimed in Ptolemy's *Almagest*, the Ikhwān think that the eternal succession of night and day in the form of time is produced in the human soul just as the idea of number is formed in the soul from the repetition of the one.

Thus, a mixture of Platonic doctrines and Aristotelian restatements is found in the Ikhwān, also strongly evident with their presentation of the world in Chapter 2 of Epistle 16. Here the Ikhwān seem to follow the method of 'division',³⁹ which looks very close to the diairetic method established by Plato in the *Sophist*, but they attribute it to Aristotle.⁴⁰ Starting from substances and accidents, and from forms and matter, and supported by their other treatises in which their single statements are widely demonstrated, the Ikhwān conclude that the body of the world — in that it is the most perfect — has a spherical shape, that the movements of its spheres are all circular, that the lights of its stars are all essential apart from moonlight, and that its globes are all translucent apart from the Earth.⁴¹

In Chapter 25 of Epistle 16, the Ikhwān speak about the wise men's theory that the all-embracing sphere is a 'fifth nature' (the heavenly bodies are not subject to any of the six kinds of natural motion), once

my article "'Detti aurei" di Pitagora in trasmissione araba', in V. Placella and S. Martelli, ed., *I moderni ausili all'ecdotica* (Naples: Edizioni Scientifiche Italiane, 1994), pp. 107–131.

37 On this saying, see p. 115, note 12.

38 See p. 124.

39 See pp. 136–137.

40 See Epistle 11: 'On the Meaning of the *Categories*', Chapter 2, and the beginning of Epistle 14: 'On the *Posterior Analytics*', translated in Baffioni, *On Logic*, pp. 92 and 127ff.

41 See p. 137.

again inspired by Plato.⁴² In Chapter 26, the Ikhwān clarify that such a definition — that takes into account only circular motion, and the eternity and stability of the heavenly bodies — does not imply the fifth nature is opposed to natural bodies in all qualities.⁴³ Aristotle also maintained the eternity of the universe (see, e.g., *On the Heavens* II.1.283b26ff.).

Finally, it is worth recalling the Platonic origins of the doctrine of man as a microcosmos (a small world),⁴⁴ with its counterpart, the doctrine of the world as a macroanthropos (a big human being). These doctrines are often referred to in the natural science treatises, as throughout the encyclopaedia. In Epistle 16, Chapter 2, the heavenly bodies are introduced through a restatement of the ancients' theory of the world as a macroanthropos: all the parts of the universe (spheres, heavens, elements, and generated beings) are considered to be a unique body endowed with a soul whose powers are diffused in it. So, the form and composition of the world are its 'anatomy'. Later, the Ikhwān explain its quality, the nature of its soul, and then the movements and influences of each sphere on the one below it. In that it is a body, the world is grasped by humans through the senses, which are also able to perceive its accidents.⁴⁵

This doctrine is recalled again in Chapter 9 of Epistle 20, where the Ikhwān mention the treatises in which they have already addressed the issue of the composition of the body of the world. Remarkably, they cite Epistles 18, 17, 34, 3, and 16, in this order that is different from the present arrangement. Epistle 20, for its part, aims to explain the effusion of the powers of the soul of nature in the sublunar bodies.⁴⁶ In it, the following comparisons are established:

⁴² See p. 163 and note 107.

⁴³ See p. 163.

⁴⁴ This doctrine had a broad diffusion in Islamic thought, as a study by Inka Nokso-Koivisto (University of Helsinki) — the main part of which is dedicated to the Ikhwān al-Ṣafā' — will soon demonstrate: *The Human Being as a Microcosm in Islamic Thought* [provisional title], forthcoming (2014) in the 'Studia Orientalia Series' of the Finnish Oriental Society, Helsinki.

⁴⁵ See pp. 135–137.

⁴⁶ See pp. 287–289.

The body of the world	A human body
spheres, heavens, stars, elements	the organs of a human body
the Universal Soul moves the heavenly world, in various ways	the human soul moves a human body, in various ways
the sphere is divided into two halves (northern and southern)	a human body is divided into two halves (right and left)
there are twelve constellations in the sphere	there are twelve orifices in a human body
there are seven stars in the sphere	there are seven powers in a human body
from the Universal Soul her powers spread in all the parts of the world	each of these powers has a peculiar organ through which they are effused into all the parts of a body (both <i>jasad</i> , often indicating the body of a higher being, and <i>badan</i> , the human body)
from excesses in the influences of stars or from defects in the acts of their powers, ominous events and corruption occur in the world of generation — these are studied by experts in astrology	from excesses and defects in the acts of these powers, confusion and ominous events occur in a body — these are studied by physicians

Hippocrates

The Ikhwān conclude Chapter 9 of Epistle 20⁴⁷ with a comparison between a well-known saying by Hippocrates (ὁ βίος βραχύς, ἡ δὲ τέχνη μακρή), which summarizes the first of his *Aphorisms*⁴⁸ — and a saying by the Persian wise man Buzurjumihr ibn al-Bukhtikān.⁴⁹ This saying is reported in Persian — one of the numerous pieces of evidence indicating a link of the Brethren with Persian culture.

It may also be interesting to note that [ب], [ح], [خ], [غ], and [ن] entirely omit the name of the wise man, that [ج], [د], [ر], [ز], [ف], [ك], [ل], and Dieterici omit the patronymic ‘ibn al-Bukhtikān’, that the Persian saying is omitted by [ش] and [ك] (which has a blank space instead), and that the quotation is not clear, and/or defective, in [ح],

47 See p. 307.

48 The Ἀφορισμοί were translated into Arabic by Hunayn ibn Ishāq (d. 873) with the title *Kitāb al-fuṣūl*. For further remarks, see Epistle 20, p. 306, note 75.

49 On Buzurjumihr ibn al-Bukhtikān, see Epistle 19, p. 273, note 187.

[خ], and [غ]. Finally, [ش] relates the saying to Zarādasht ibn Diyāsht (زرادشت بن دیاشت), echoing in part the Persian name of Zarathustra.⁵⁰

In spite of the fact that Epistles 15–21 are titled after the most important Aristotelian works about the philosophy of nature, and that they follow the same order as those works, the Ikhwān freely restate several theories of Aristotle, also mingling them with quotations and ideas belonging to other classical sources.

For example, in Epistle 15 the Ikhwān substantially depart from Aristotle when they state that movement is a form placed by the Universal Soul, after shape, in the Absolute Body.⁵¹ As a consequence, rest — in that it is the absence of that form — is for them prior to movement. Movement pervades body, and passes away from it instantaneously, like light (heat, on the contrary, spreads gradually). Some of the acts of the soul in a body happen over the course of time, and others are instantaneous, which demonstrates that soul is beyond time, whereas time — like movement — is joined to body. Just as the Universal Soul gave the Universal Body a spherical form, so she gave it a circular motion.⁵²

Evidently, the Ikhwān maintain here the theological idea that God sets the created world in motion (the same happens in the *kalām* atomistic position, according to which, first God creates atoms by stopping the division of matter at a certain point, and then He sets them in motion).⁵³ The only point in which the Ikhwān are distinguished from theology is that, for them, the function of ‘mover’ is not attributed to God, but to the Universal Soul. Aristotle, on the contrary, knows that some things are in motion, others at rest (*Physics* VIII.3), but ‘all things cannot be motionless’ (VIII.3.254a23). The final outcome was the establishment of an unmovable Prime Mover.⁵⁴

50 According to Michele Bernardini, the patronymic does not exist in Iranian sources; Adriano Rossi reports that an Iranian nominal type at the basis of the Arabic transcription *Diyāsht* cannot be identified in any other Iranian language or phase.

51 See, for these arguments, p. 122. Perhaps this statement is based on what Aristotle said in his work *On the Soul* II.3.414b20–415a6.

52 Both spherical form and circular motion are the most excellent of their kind. See Epistle 15, Chapter 12, and Epistle 16, Chapter 2.

53 Then, motion is not intrinsic and necessary for atoms, as Greek atomists believed.

54 On the Prime Mover see, e.g., *Physics* VIII.5.258b6.

Another example is in Chapters 12–13 of Epistle 17, where the Ikhwān put together ideas on the origin and development of vapours and what results from them, mainly stated in the *Meteorology*: they have devoted single epistles to each of these topics.⁵⁵ However, when they introduce generation as ‘the acquisition of a form in matter’ and its contrary, corruption, as ‘its removal from matter’ — and even as ‘the acquisition of a form nobler than the former’ and ‘the acquisition of a form lower than the former’ respectively, they seem to interpret Aristotle, when in his work *On the Heavens*, he says: ‘the word “generated” is used [...] of something which once was not and later is’, and, inversely, “destructible” [...] if having once existed it either does not exist or need not to exist later’⁵⁶ (I.11.280b14–15, b22–23).⁵⁷ This idea is in some sense maintained by Aristotle, see, e.g., *On Generation and Corruption* II.4.331b2ff.

Taking another perspective, in Chapter 5 of Epistle 15 the Ikhwān say that all three natural kingdoms share the same matter, but immediately afterwards they emphasize the role of quicksilver and sulphur as the roots of minerals, the root of quicksilver and sulphur being the four elements (in the sense that water and earth are in quicksilver, fire and air in sulphur).⁵⁸ This doctrine is neither Aristotelian, nor does it have a Greek origin, but is proper to Islamic alchemy. Since sulphur is liberated in the distillation of many materials, it was believed to be a fundamental part of all minerals. In particular, it was assumed that metals consisted of quicksilver and sulphur.⁵⁹

55 See pp. 180–181.

56 Aristotle, *On the Heavens*, tr. W. K. C. Guthrie (Cambridge, MA–London: Harvard University Press–Heinemann, 1953), pp. 105 and 107.

57 See also *On Generation and Corruption* I.3.318b3–12 and I.4.

58 See p. 113. On quicksilver and sulphur as the roots of minerals, see also P. Carusi, ‘Animalis Herbalis Naturalis. Considerazioni parallele sul De Anima in Arte Alchimiae attribuito ad Avicenna e sul «Miftāḥ al-ḥikma» (opera di un allievo di Apollonio di Tiana)’, in *Le crisi dell’alchimia/The Crises of Alchemy*, Micrologus: Nature, Science and Medieval Societies, 3 (Turnhout: Brepols, 1995), pp. 45–74, at p. 68.

59 See M. Ullmann, ‘Kibrit’, *EI2*, vol. 5, pp. 88–90, at p. 90; cf. M. Ullmann, ‘Al-kimiya’, *ibid.*, pp. 110–115, at p. 113.

On other occasions, the Ikhwān transpose Aristotelian doctrines and those of other ancient authors to the religious frame characteristic of their encyclopaedia.

We have already pointed out the dualism characteristic of the Ikhwān, and we have indicated in the Pythagorean influence a possible origin of it. But religious convictions also play an important role. On the one hand, a contented life in the world is encouraged in their treatises, and wellness both in this world and in the hereafter is considered by them to be the best way of life. This is stated, for instance, in Chapter 12 of Epistle 19.⁶⁰ Speaking about the search of souls for divine reward, the Ikhwān state that God is truly worshipped when people strive for the goodness both of religion and the mundane world.

This is due to the fact that, as Muslims, the Ikhwān acknowledge that the world is the result of divine creation, and then, their judgement on it is positive. Moreover, they think that only life in this world can make a believer worthy of God's reward. Islam rejects a one-sided approach to spirituality (e.g., asceticism), so emphasizing a denial of dualistic options. Life in this world is a preparation for the hereafter.⁶¹

Even though salvation in the next world obviously remains the believer's most important purpose,⁶² still there are in the *Rasā'il* continuous invitations towards asceticism. For instance, in Chapter 11, which concludes Epistle 20, the Brethren are invited to prepare themselves for the final Judgement by renouncing the mundane world.⁶³ Neoplatonism, and its conception of matter as privation, may also have aroused the Ikhwān's dualism.⁶⁴

60 See pp. 273–274.

61 See pp. 274–275.

62 In Chapter 1 of Epistle 21, the Ikhwān describe the destiny of humanity from before their creation till their life in the hereafter. See pp. 317–319.

63 See p. 314.

64 Such a dualism is sketched out in quite an interesting way by Arfa Mokdad, who speaks of the Ikhwān as people 'imbued with a spirit of pessimism' and holding 'a negative view of a specific historical situation, i.e. of their political, social and intellectual community, and of the status of man, undoubtedly stemming from a spiritual concept that sees its material and worldly side as a temporary state, which has to be managed carefully in order to escape from it. Life in this world is important only because it is necessary for perfecting the qualities of the soul through philosophy and law'. On the other hand, the Brethren certainly do have an optimism that believes 'the state of good will follow the state of evil', and

We saw that in Epistle 15 the Ikhwān recall many Aristotelian considerations of the *Physics*, but at the end of Chapter 6 they mention the evidence provided from prophecy: according to prophecy, bodies are all created and, therefore, they possess limits. Such a statement corresponds to the statement of philosophers, according to which bodies are composed of matter and form, and every composed thing possesses a limit. This way, the Ikhwān support an Aristotelian statement with religion. With regard to this, a passage of Epistle 48: 'On the Modality of the Invitation (*da'wa*) to God' is noteworthy:

It has been said that during an assembly [*majlis*] the Prophet, God bless him and give him peace, mentioned Aristotle, and that the Prophet, upon him be peace, said, 'If he had lived in such a way as to know what I have brought, certainly he would have followed me in my religion' (*Rasā'il*, vol. 4, p. 179.6–17).

When in Chapter 27⁶⁵ of Epistle 16 they state that the heavenly bodies are neither heavy nor light because they are inseparable from their proper places (weight and lightness, on the contrary, are the result of a body moving out of its proper place), the Ikhwān are only in part reminiscent of Aristotle.⁶⁶ In addition, they state that such places were assigned to them by the Creator.

For the Ikhwān, the question of motion and rest assumes religious connotations also from another point of view.⁶⁷ In Chapter 28 of Epistle 16, they demonstrate why heavenly bodies are neither warm,

that man can achieve salvation if he does what is required in that respect and seeks to save himself; 'The Brethren of Purity (*Ikhwān al-Ṣafā'*)', in Endress, *Organizing Knowledge*, p. 163. In my opinion, the 'optimism' concerning the advent of good is linked to the political views of the Ikhwān, whereas personal salvation is the result of the knowledge process sketched in the encyclopaedia.

65 For these arguments, see pp. 164–165.

66 Therefore, the Earth in the centre of the world is not heavy, nor is the sphere of water above it heavy, as is the case with the air above the water not being light, and nor is the fire above the air light. However, common language calls bodies tending to the centre of the world 'heavy', and bodies tending to the all-embracing sphere 'light'. The Ikhwān prove their thesis by the example of the jars (see below, pp. 164–165). These considerations are a bit different from what is stated by Aristotle in *Physics* VIII.4.255a2–4 and elaborated in 255b13–17 and in *On the Heavens* I.3.269b20–26.

67 See above, pp. 24–25.

nor cold, nor humid, and indicate the origin of their extreme dryness. An important statement follows, that the order and individuals of the heavenly bodies are preserved as long as their rotation lasts. If the stars stopped from their rotation, rest would generate cold, and cold humidity. Then, an outbreak of diseases and wastage would occur that corrupt their order and produce ruin and annihilation.⁶⁸

The Ikhwān should have known that Aristotle posed the problem of the origin and purposes of motion and rest, e.g., in *Physics* VIII.1.250b11ff.:

Did motion itself ever come into existence, never having been before? And will it in like manner cease to be, so that nothing will move thereafter? Or did it never begin to be and will it never cease to be, so that there always has been and always will be motion, belonging to all things as their deathless and never-failing property and constituting a kind of life for everything that is constituted by nature?

However, unlike Aristotle,⁶⁹ the Ikhwān defend creationism. At the beginning of Epistle 19, the duration of the world is once again linked to circular motion, which is considered to be a ceaseless motion, unless God decides to stop it, thus nullifying the universe. By saying so, however, the Ikhwān go much beyond the scientific Aristotelian heritage in the name of religion, because when God stops that motion, the Great Resurrection will occur.⁷⁰ In Chapter 25 of Epistle 16, the Ikhwān say that God created the heavenly bodies as perfect, because they had to be eternal, until He decides to annihilate them. Divine will is at the origin of their beginning and of their end. In Chapter 3 of Epistle 20, the Ikhwān say that once all things will have reached the utmost of their goals owing to the angelic powers transmitted to them during the rotation of the planets, those powers will return to the all-embracing sphere, and resurrection will occur.⁷¹

These ideas are repeated in Chapter 19 of Epistle 16, during the comparison of the movement of the stars with *tawāf*,⁷² when the

68 See pp. 165–166.

69 See, e.g., *Physics* VIII.9.266a6–9.

70 See pp. 225–227.

71 See pp. 290–291.

72 See below, pp. 154–156.

Ikhwān say that resurrection will happen when all the stars will have been assembled again at the point whence they started their movement; then their rotation will recommence.

The main departure from the ancients is in the Ikhwān's elaboration of the definition of philosophy as the 'imitation of God according to human capability', borrowed from Plato. Originally, in the *Theaetetus* 176b, it was stated that φυγή (flight, which comes to be an escape, too) from the mundane world towards the divine world is the imitation of God according to human capability (κατὰ τὸ δυνατόν), and that such an imitation consists in the acquisition of justice (δίκαιον), holiness (ὁσιον), and wisdom (φρόνησις). They seem to have accomplished the same reasoning, but in the opposite direction to Plato's: God, according to them, should be imitated for His knowledge, arts, and effusion of goodness,⁷³ and this is why philosophy is defined as the 'imitation of God according to the human capability', and transformed into the guiding principle of the initiate towards salvation. The extreme step — by emphasizing asceticism — is their identification of philosophy with death, in some way also echoing the well-known discourse of Socrates in the *Phaedo*.⁷⁴ Of course, this is an esoteric reading of the ancients, whereas the fact that both the words *falsafa* and *ḥikma* are used in their definition⁷⁵ proves the high consideration in which at least some part of those doctrines are held by the Ikhwān.

73 One of the most significant passages is in Epistle 8: 'On the Practical Arts and their Goal', *Rasā'il*, vol. 1, p. 290.1–8.

74 In the *Phaedo*, Socrates states that a philosopher does not care for the body and its passions (9.64a–65a). The highest virtue is proper to him who has succeeded in detaching himself from his body (11.66a–67b). Purification consists in keeping soul separated from body, even during the worldly life (12.67c). After this reasoning, which corresponds with numerous passages of the encyclopaedia, Socrates concludes that the life of a philosopher is preparation, and exercise, towards death (οἱ ὀρθῶς φιλοσοφούντες ἀποθνήσκουσιν μελετῶσι, 12.67e).

75 The term *falsafa* occurs in the *Rasā'il* in Epistle 5: 'On Music', vol. 1, p. 225.4; Epistle 8: 'On the Practical Arts and their Goal', vol. 1, p. 290.4–5; Epistle 9: 'On Morals', vol. 1, p. 298.7; Epistle 10: 'On the Meaning of the *Isagoge*', vol. 1, p. 399.13; Epistle 13: 'On the Meaning of the *Analytics*', vol. 1, p. 427.17 and 21; Epistle 15: 'On the Explanation of Matter and Form', vol. 2, p. 10.12–13; Epistle 25: 'On Conception', vol. 2, p. 454.3–4; Epistle 28: 'On the Limits of Human Knowledge', vol. 3, p. 30.5; Epistle 31: 'On the Causes of the Diversity of Languages', vol. 3, p. 93.23–24; *ḥikma* is used in Epistle 40: 'On Causes and

References to the Qur'an and to ḥadīth

It is now necessary to examine the way in which the Ikhwān al-Ṣafā' elaborate the classical Islamic heritage. Their departure from a strictly scientific perspective is remarkable, in spite of the great attention devoted to technical details in comparison to other thinkers, whom they may still have influenced.⁷⁶ The numerous quotations from the Qur'an and ḥadīths that are found in the natural science treatises — as well as in the whole encyclopaedia of the Ikhwān — are noteworthy.

In the epistles examined here, there are about seventy quotations from the Qur'an, and about fifty allusions to it, concerning almost every aspect of the ontological hierarchy proposed by the Ikhwān: God, the supra- and sublunar world, the human being, prophecy, and eschatology.

References to such quotations are given in detail in the notes to the translation of the treatises.⁷⁷ Here, I shall confine myself to remarking that, in general, the verses quoted by the Ikhwān strictly pertain to what the Qur'an means to say, rather than to the issues of natural science

Effects', vol. 3, pp. 371.14–15 and 382.1–2. At p. 345.6–7 the Ikhwān had stated the identity between *falsafa* and *ḥikma*.

76 I mainly refer to Ḥamīd al-Dīn al-Kirmānī (see above, note 17). See my articles 'The Religious Approach to Natural Sciences: the Case of Mineralogy in the Ikhwān al-Ṣafā' and in Ḥamīd al-Dīn al-Kirmānī', in W. Raven and A. Akasoy, ed., *Islamic Thought in the Middle Ages. Studies in Text, Transmission and Translation, in Honour of Hans Daiber* (Leiden: Brill, 2008), pp. 181–194; 'L'influence des Ikhwān al-Ṣafā' sur la minéralogie de Ḥamīd al-Dīn Kirmānī', in G. de Callatay and B. Van den Abeele, ed., *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* (Louvain-la-Neuve: Brepols, 2008), pp. 31–47; 'Mineralogia e alchimia nella *Rāḥat al-'aql* di Ḥamīd al-Dīn al-Kirmānī', in F. Mazzei and P. Carioti, ed., *Oriente, Occidente e dintorni... Scritti in onore di Adolfo Tamburello*, 3 vols. (Naples: Università degli Studi di Napoli "L'Orientale", Dipartimento di Studi Asiatici–Istituto Italiano per l'Africa e l'Oriente, 2010), vol. 1, pp. 89–103; 'Le monde végétal dans la *Rāḥat al-'aql* de Ḥamīd al-Dīn al-Kirmānī et l'influence des Ikhwān al-Ṣafā', in A. Paravicini Bagliani, ed., *Le monde végétal. Médecine, botanique, symbolique* (Tavarnuzze–Impruneta (Firenze): SISMELE–Edizioni del Galluzzo, 2009), pp. 63–75.

77 A detailed exposition of these quotations will be found in my article 'Les citations coraniques dans les *Épîtres* des Ikhwān al-Ṣafā' relatives à la science de la nature', forthcoming in *Mélanges de l'Université Saint Joseph*.

according to the late Greek tradition that traces back to Aristotle. The only exceptions are the verses quoted to confute a number of mistaken opinions about some of the meteorological phenomena dealt with in Epistle 18, and the verses quoted to support the human witness of God.

In order to confute the mistaken opinions about the origin of rain and hail (Epistle 18, Chapter 1), the Ikhwān are obliged to ignore the true meaning of the verses quoted (25:48 and 24:43),⁷⁸ whereas they indicate that meaning with reference to 67:5, quoted to confute the false doctrines about shooting stars (Chapter 15) — namely, the existence of a middle cause that accomplishes certain actions.⁷⁹

As to the human witness of God, Qur'an verses 3:18, 43:86, 7:172 (quoted in Chapter 7 of Epistle 18) have the function of supporting the existence of the wise Artisan who made winds and mountains.⁸⁰

Other quotations confirm some constant topics of the Ikhwān. For example, the 'verse of Light' (24:35) is quoted in Epistle 15 with reference to the purified souls.⁸¹ These are the souls that have received the virtues — namely, the emanation transmitting knowledge — of the Universal Soul (Chapter 9).⁸² This way, the strict relation between moral purity and knowledge is restated — evil/ignorant people are represented according to Qur'an 24:40.

A very interesting case is represented by the second quotation of Qur'an 31:28.⁸³ By this verse, the Ikhwān try to stress the importance of the Universal Soul also with regard to the moral responsibility of individuals. The Ikhwān's position seems to reproduce the scheme used for their theodicy.⁸⁴ Just as God cannot be considered to be responsible for the evil that occurs in the world, because other beings are charged with acting in it, hence determining events in it — be they called nature,

78 See p. 187.

79 See p. 214. The verses quoted with regard to comets, instead, insist rather on their allegorical meaning.

80 See p. 202.

81 See p. 117.

82 See pp. 116–117.

83 See Epistle 19, pp. 279 and 282. I have considered the quotations of this verse in the *Rasā'il* as well as in the *Risālat al-jāmi'a* and the *Risālat jāmi'a al-jāmi'a* in 'The Role of the Divine Imperative (*amr*) in the Ikhwān al-Ṣafā' and Related Works', *Ishraq. Edjagodnik islamskoj filosofii* 4(2013), pp. 46–70.

84 See below in this Introduction, pp. 48–49.

angels, or anything else — so the Universal Soul is the ultimate agent of the acts performed by particular souls (in that they are part — or ‘faculties’, as the Ikhwān say later — of the Universal Soul), but good actions are linked to the souls that will be rescued, and evil actions are linked to the souls that will be damned.

The most important idea implied in the quotation of Qur’an 31:28, however, is that creation is a whole, with parts strictly connected to each other. In that they are faculties of the Universal Soul, no particular soul can exist on its own. In the same way, no natural body can be separated from the body of the world.

Finally, with this quotation, the Ikhwān show another, more radical purpose, namely, to legitimize a hypostasis of Neoplatonic origin in the frame of the moral conception of Islam. The Universal Soul plays a relevant role of intermediary between God and particular souls, both in the onto-cosmological, and in the eschatological doctrines.⁸⁵

I have already tried to show that when the Ikhwān use Qur’anic quotations to back up their views, they create a real *tafsīr* of the Holy Book,⁸⁶ written on the basis of their esoteric thought: the Brethren seem to consider the Qur’an to be the ‘exoteric counterpart’ to their doctrines.

As to the *ḥadīths* quoted in these treatises, a couple of them have been traced by Roberto Tottoli, to whom I am indebted for his help. The following notes are my elaboration of his search in the *Maktaba al-shāmila* (that contains about 5000 works) and in *Ahlulbayt* 2 (about 5000 works, half of which are Shī‘ī).

Neither the saying in Epistle 16 about the denomination of Saturn as ‘the piercing star’, attributed to al-Ḥusayn on the authority of ‘Abd

85 Similarities and discrepancies with the theories of the Ismaili thinkers with regard to the relation between Universal Soul and particular souls are made evident in P. E. Walker, ‘The Universal Soul and the Particular Soul in Ismā‘īlī Neoplatonism’, in P. Morewedge, ed., *Neoplatonism and Islamic Thought* (Albany: State University of New York Press, 1992), pp. 149–166.

86 Cf. ‘Uso e interpretazioni di versetti coranici nell’Ep. 42 degli Ikhwān al-Ṣafā’, in B. Scarcia Amoretti and L. Rostagno, ed., *Yād-nāma in memoria di Alessandro Bausani*, 2 vols. (Rome: Bardi, 1991), vol. 1, pp. 57–70; ‘Ibdā’, Divine Imperative and Prophecy in the *Rasā’il Ikhwān al-ṣafā’*, in O. Ali-de-Unzaga, ed., *Fortresses of the Intellect. Ismaili and other Islamic Studies in Honour of Farhad Daftary* (London–New York: I. B. Tauris–Institute of Ismaili Studies, 2011), pp. 213–226.

Allāh ibn al-‘Abbās,⁸⁷ nor the saying attributed to the Prophet at the end of Epistle 19⁸⁸ were found in the sources consulted.

As to the saying attributed in Epistle 17 to the second well-guided caliph, ‘Umar ibn al-Khattāb,⁸⁹ the Sunnī sources do not mention such attribution, but report a similar tradition, related to various authorities.⁹⁰

The *ḥadīth marfū‘* quoted in Epistles 16 and 19 occurs in a similar form⁹¹ only in al-Muttaqī al-Hindī (d. 1567).⁹² In general, Tottoli remarks that this *ḥadīth* is not found in the authors of the oldest collections or in their immediate successors, whereas it frequently occurs in later *tafsīrs* and in other literary sources, always in the same form quoted by the Ikhwān.⁹³

Finally, the saying attributed to the Prophet at the end of Epistle 19 was found on the website www.islamweb.net/hadith by Ida Zilio-Grandi, whom I thank for her help.⁹⁴

87 See p. 138.

88 See p. 283.

89 إِنَّكُمْ لَمْ تَخْلُقُوا لِلْفَنَاءِ، وَإِنَّمَا تَنْقَلِبُونَ مِنْ دَارٍ إِلَى دَارٍ، كَمَا نَقَلَبُ مِنَ الْأَضْلَابِ إِلَى الْأَرْحَامِ، وَمِنَ الْأَرْحَامِ إِلَى الدُّنْيَا، وَمِنَ الدُّنْيَا إِلَى الْقُبُورِ، وَمِنَ الْقُبُورِ إِلَى الْمُوقِفِ، وَمِنَ الْمُوقِفِ إِلَى الْخُلُودِ فِي الْجَنَّةِ أَوْ النَّارِ.

90 See (i) Ibn al-Mubārak (d. 797), *al-Zuhd wa’l-raqā’iq* (Beirut, n.d.), I, p. 167 no. 486 — as well as an identical version in some later sources, among which is Abū Nu’aym al-Iṣfahānī (d. 1038), *Ḥilyat al-awliyā’*, V, 229; (ii) Abū Shujā’ al-Daylamī (d. 509 H), *al-Firdaws*, V, 297, no. 8327.

91 إِذَا مَاتَ أَحَدُكُمْ فَقَدْ قَامَتْ قِيَامَتُهُ.

92 Muttaqī al-Hindī, *Kanz al-‘ummāl* (Beirut: Mu’assasa al-risāla, 1989), XV, p. 548, n° 42123.

93 Namely, (i) Fakhr al-Dīn al-Rāzī (d. 1209), *Tafsīr*, IX, p. 92 (first version) and XII, p. 198 (second version); (ii) Muḥyī’l-Dīn Ibn al-‘Arabī (d. 1240), *Al-Futūḥāt al-Makkiyya* (Beirut: Dār Ṣādir, n.d.), III, p. 206 (first version) and III, p. 250 (second version); (iii) Abū ‘Abd Allāh al-Qurṭubī (d. 1272), *Tafsīr* (Beirut: Dār Iḥyā’ al-turāth al-‘arabī, 1985), XIX, p. 188, n° 46; (iv) Abū Ḥayyān al-Andalusī (d. 1344), *Tafsīr al-baḥr al-muḥīṭ* (Beirut: Dār al-kutub al-‘ilmiyya, 2001), IV, p. 111; (v) Abū’l-Su’ūd (d. 1574), *Tafsīr* (Beirut: Dār Iḥyā’ al-turāth al-‘arabī, n.d.), III, p. 125; (vi) al-‘Ajlūnī (d. 1749), *Kashf al-Khafā’* (Beirut: Dār al-Kutub al-‘ilmiyya, 1988), II, pp. 279–280, n° 8; (vii) Muḥammad al-Rayshahrī (b. 1946), *Mizān al-ḥikma*, IV, p. 2954 (in the form reported in note 91 above); (viii) al-Zil’ī, *Takhrij al-aḥādīth wa’l-āthār* (Riyadh: Dār Ibn Khazīma, 1414 AH), I, p. 436.

94 Aḥmad ibn Muḥammad al-Zāhirī al-Ḥanafī (d. 696 AH), *Mashyakhat Ibn al-Bukhārī*, XII, n° 727 (from Jundub b. ‘Abd Allāh).

As to the saying in Epistle 16, attributed to al-Ḥusayn, which calls Saturn ‘the piercing star’, Ida Zilio-Grandi hypothesizes it may simply be a *tafsīr* of Qur’an 86:1ff.⁹⁵

The Ikhwān’s comparisons

Another aspect of the Ikhwān’s re-elaboration of ancient heritage is their comparisons. In Epistle 16, Chapter 7, the Sun at the centre of the world⁹⁶ is compared to a king whose seat is in the middle of his reign. Stars are like soldiers, helpers, and subjects; spheres like climes; constellations like countries; grades like towns, and minutes like villages. The image of the world as macrocosm is here mingled with politics. In this representation, the Ikhwān even seem to echo the pattern according to which the capital of the Abbasid empire, Baghdād, was built: ‘Iraq is the center of the world, Baghdad is at the center of Iraq, and the caliph’s residence is at the center of Baghdad’, which is so called ‘the navel of the Earth’, according to one of the most widespread and long standing political metaphors.⁹⁷ It is also noteworthy that the Ikhwān twice mention the foundation of Baghdād in the natural science treatises.⁹⁸

In Chapter 19, the Ikhwān compare the rotations of the stars with the circumambulations performed by pilgrims in the *ṭawāf* around the Ka’ba. They follow here the same conceptual scheme used before:⁹⁹ the Ka’ba found in the middle of the Sacred Precinct, the Sacred Precinct in the middle of Ḥijāz, and the country of Ḥijāz in the middle of the countries of Islam are like the Earth in the middle of the sphere of the air, the sphere of the air in the middle of the sphere of the Moon, and

95 She also indicates references to al-Qurṭubī: <http://altafsir.com/Tafasir.asp?tMadhNo=1&tTafsirNo=5&tSoraNo=86&tAyahNo=1&tDisplay=yes&UserProfile=0&LanguageId=1> ; and al-Qummī al-Nisābūrī, *Gharā’ib al-Qur’ān wa-ghā’ib al-furqān*: <http://altafsir.com/Tafasir.asp?tMadhNo=2&tTafsirNo=22&tSoraNo=86&tAyahNo=1&tDisplay=yes&UserProfile=0&LanguageId=1> — both last accessed 1st July, 2013.

96 See p. 142. The same disposition is indicated in Epistle 20, Chapter 3.

97 See B. Lewis, *The Political Language of Islam* (Chicago–London: The University of Chicago Press, 1988), p. 23, and for further references see p. 127, note 54.

98 See Epistle 19, p. 280, and Epistle 21, p. 321.

99 See pp. 154–156.

the sphere of the Moon in the middle of the spheres. In spite of that, the 'political' image highlighted above has now been transferred into the field of religious practice. According to the same comparison, those who perform the *ṣalāt* directed from remote regions towards the Ka'ba are like the stars in the spheres and the places of incidence of their rays towards the centre of the Earth. The rotation of the spheres with their stars around the Earth and their varieties are like those who perform the *ṭawāf* around the Ka'ba and the diversity of their paces, though they all have the same direction and the same intention. However, they reach different points of the itinerary according to their pace, covering a longer or shorter distance. The rule that governs the spheres and stars in their movements is the same.

The Ikhwān utilize here an example known to everybody to explain issues difficult to understand,¹⁰⁰ but religious rites become an intrinsic part of the cosmic order.¹⁰¹ It is to be noted, however, that here the approach is different from that of Ḥamīd al-Dīn al-Kirmānī, who in his *Rāḥat al-'Aql* seems to look rather into the cosmic order to find a verification of the *da'wa* hierarchy.

These schemes and concepts are repeated in Chapter 6 of Epistle 20,¹⁰² where the Ikhwān again combine cosmology and religion, comparing the Earth at the centre of the world to the Ka'ba; the spheres rotating around the four elements to those who make their *ṭawāf* around the Ka'ba; the fixed stars to the Muslims directed towards the Ka'ba; the ascension and declination of the planets to the pilgrims going and coming back from the Ka'ba. At Mecca, the Ikhwān add, events of

100 Namely, the general conjunction of the planets, as is clarified by G. de Callatay, *Annus Platonius. A Study of the World Cycles in Greek, Latin and Arabic Sources*, Publications de l'Institut Orientaliste de Louvain, 47 (Louvain-la-Neuve: Université Catholique de Louvain, Institut Orientaliste, 1996), p. 145; here he calls this comparison 'The allegory of the pilgrims', and adds that its origin is not specified, but it is quite clear from its content 'that it belongs to the Muslim world in its own right'.

101 According to de Callatay, *Annus Platonius*, p. 138, the Ikhwān concentrate the essential elements of their astrological teachings in Epistle 36: 'On Revolutions and Cycles'. Comparisons with Ptolemy and Hipparchus (see above, note 23), as well as with other Arabic and Indian sources, are brought forward at pp. 139–145.

102 See p. 295.

different values occur, and they mention exchanges of rarities from various countries, and theological debates; all that, to state that the most important event is the forgiveness obtained from God.

From the irradiation of the stars, their powers are combined with the elements, and give origin to natural beings. When those powers have reached the outmost perfection, they return toward the all-embracing sphere, and this is the cause of the resurrection. Human souls should be ready to leave the world of generation and corruption, just as the pilgrims return to their homeland once they have accomplished their pilgrimage, longing for their homeland.¹⁰³ In this case, the pilgrimage rituals are seen as the model given by God to humans to make them understand whence their souls came, and where they will return. Muslim rites are here utilized to exemplify a doctrine radically foreign to Islam, that of a soul endowed with an autonomous substantiality, and even pre-existing the body in which, at a certain moment of time, it is incarnated. And as pilgrims help each other during the pilgrimage, so a soul cannot attain salvation alone. A religion and a religious school are necessary, the Ikhwān say after having mentioned 'a star and a constellation in conjunction' — so once again linking themselves to astronomic events;¹⁰⁴ but we know that the real help towards salvation is provided by the saved souls, which have already joined the spiritual pleroma.¹⁰⁵ Once again, the idea of a necessary staying in the world before gaining salvation is combined with Neoplatonic, and even Platonic, doctrines.

But alone, only a troublesome life can be lived. A pleasant life is, on the contrary, guaranteed by the help of the inhabitants of a city, of a *sunna* and of a *sharī'a*.¹⁰⁶ Here, the Ikhwān may hint at Islam, at the spiritual city constituted by the saved souls, but also at their own community, as is testified by the mention of the 'Brethren' and 'Friend' that should be of help to the addressee in entering paradise

103 See p. 296.

104 This may be another element in common with Ismailism; see J. L. Kraemer, *Humanism in the Renaissance of Islam. The Cultural Revival during the Buyid Age*, 2nd rev. ed. (Leiden–New York–Cologne: Brill, 1992), p. 160.

105 See p. 296.

106 See p. 296.

and escaping hell. And it is noteworthy that MS [خ] adds to the word *Ikhwān* the adjective *al-ṣafā'*.¹⁰⁷

Having realized that he cannot attain salvation alone, the disciple will reach his *maqām*, and will understand the real meaning of his spiritual pilgrimage, contrary to what happens to those who make their pilgrimage with an inattentive and forgetful heart.

Each human nation has its sacred places and rituals based on what was established by Abraham, the *Ikhwān* say, so linking him to Islam.¹⁰⁸ In Chapter 7,¹⁰⁹ the *Ikhwān* repeat that religions with their traditions and rituals, sacrifices and prayers are allusions and symbols of Abraham's acts when he was building the Ka'ba, placing the Black Stone and the *maqām*, teaching rituals to his progeny, and inviting people to make a pilgrimage to the Ka'ba. When an intelligent person considers pilgrimage and its rituals, he is able to understand what Abraham's aim was in doing all that. He is also able to know — when he is rightly guided — that the angels that encircle the throne praising God are (if my understanding of the Arabic *wa-hiya* is correct) the fixed stars that encircle the ninth sphere from inside, as the pilgrims encircle the Ka'ba in their *ṭawāf* from outside. Finally, he is able to acknowledge that beyond these angels there are other nobler and higher entities (*umūr*), the knowledge of which escapes him, as the believer pilgrim acknowledges that beyond the heavens there is 'the much-frequented House' around which angels make their *ṭawāf*.

Finally, in Chapter 20 of Epistle 16 the *Ikhwān* return to one of their favourite topics: Indian kings and wise men.¹¹⁰ Here, they refer

107 The *Ikhwān* devoted Epistle 45 of their encyclopaedia to 'mutual help'. It was recently translated into French by C. Bonmariage, 'De l'amitié et des frères: l'Épître 45 des *Rasā'il Iḥwān al-Ṣafā'*. Présentation et traduction annotée', *Bulletin d'Études Orientales* 58 (2008–2009), pp. 315–350, 443–444.

108 See p. 301.

109 See pp. 302–304.

110 See pp. 156–157. In Epistle 31: 'On the Causes of the Diversity of Languages', the *Ikhwān* refer to the wisdom of an Indian king to support their ideas about the imamate. See C. Baffioni, 'Temporal and Religious Connotations of the "Regal Policy" in the *Ikhwān al-Ṣafā'*', in E. Gannagé et al., ed., *The Greek Strand in Islamic Political Thought*, Proceedings of the Conference held at the Institute for Advanced Study, Princeton, 16–27 June 2003, monographic issue of *Mélanges de l'Université Saint-Joseph* 57 (2004), pp. 337–365, pp. 341, 365.

to the Indian wise men's comparison of the revolutions of the seven planets with seven soldiers who were ordered by a king to walk around a city, the circumference of which was 60 *farsakh*, all at different paces. Only after 420 days do all the soldiers convene again at the starting point, the first of them having accomplished 7 turns, the second 14, the third 21, the fourth 28, the fifth 35, the sixth 42, and the seventh one 60 turns. The Earth is compared to that city, the seven planets and their rotation to the seven soldiers and their different paces, and the king to the Creator.

With regard to this story, which he titles 'The Indian allegory of the circular city',¹¹¹ G. de Callataÿ says that 'The text contains a certain number of mathematical values which have not been faithfully preserved in the Beirut edition, but the general computation to which these figures belong is so simple that correct values can be supplied in every place.'¹¹² I have chosen to leave the text as it is in Atif, as it would have been difficult to establish a different text on the basis of the consulted MSS that have very different readings from each other.¹¹³ In general, [ن] seems to provide the most suitable readings, in consideration of the following remarks by de Callataÿ:

The Ikhwân have always been very keen on mathematical demonstrations. However laborious it may seem, the following attempt at explaining the present story in mathematical terms comes thus as no surprise in itself. What is more puzzling in this case is that the demonstration they embark on is wrong [...] It was quite an obvious mistake from the start to say that the seventh companion completes 7 parasangs a day. The sequence of values that follows show that the Ikhwân — or the source they used — should have spoken, not of 7 parasangs a day, but of $\frac{1}{7}$ of a revolution a day (whether expressed in parasangs or not), which is far from being the same. Once this value has been corrected, the computation does not cause any further problem. For $\frac{1}{7}$ of 60 parasangs is $8\frac{4}{7}$ parasangs, which means that after 60 days the seventh companion will have completed 8 revolutions and $\frac{4}{7}$ (of a revolution), as stated in the allegory. Then we find, as expected, the values of $17\frac{1}{7}$ (after 120 days), $25\frac{3}{7}$ (after 180

111 de Callataÿ, *Annus Platonicus*, p. 146, allays any doubt over the Indian origin mentioned by the Ikhwân. The tale is translated at p. 147.

112 de Callataÿ, *Annus Platonicus*, pp. 146–147.

113 See the variants noted in the critical apparatus of Epistle 16, Chapter 20.

days), $34\frac{2}{7}$ (after 240 days), $42\frac{6}{7}$ (after 300 days), and $51\frac{3}{7}$ (after 360 days). According to this progression, the first number without fraction is, indeed, 60, which is thus reached after 420 days.

Had the seventh companion completed 7 parasangs a day — as stated twice at the beginning of the fable —, he would have completed, after 420 days, 49 revolutions exactly, thus an integer number less than 60. As a matter of fact, even 60 days would have sufficed, in that case, for all individuals to come back to a perfect conjunction at the door of the city: the seventh individual would have completed 7 revolutions exactly, making the rest of the story completely meaningless. It is true that 420 is the least common multiple of 1, 2, 3, 4, 5, 6, and 7, and this is what the Ikhwān intended to explain. But it was wrong of them to consider the present problem in terms of days where they should have dealt only with parasangs.¹¹⁴

The Ikhwān's philosophy

In spite of their more or less faithful collection of a good number of ancient theories, the natural science treatises develop a series of philosophical themes proper to the Ikhwān.

Epistle 15 is a clear example of the free way in which the Ikhwān elaborate Aristotle's *Physics*. In Chapter 3, the Ikhwān compare Prime Matter without any qualification, namely, ipseity¹¹⁵ to the number one, the Absolute Body — namely, ipseity possessing quantity — to the number two, and particular bodies — namely, the Absolute Body possessing quality — to the number three. Evolution in the process of beings comes to correspond to the procession of numbers, and so is the case for the series of the categories. I have already had occasion to remark on similar comparisons in the addition provided by Atif to Epistle 10: 'On the Meaning of the *Isagoge*' and at the beginning of Epistle 11: 'On the Meaning of the *Categories*'.¹¹⁶ The content of Chapter 3 of Epistle 15, then, further legitimates the Atif addition,

114 de Callatāy, *Annus Platonicus*, pp. 147–149.

115 This may have been inspired by Aristotle, *Metaphysics* V.8.1017b10, where one of the meanings of 'substance' is indicated as the simple bodies.

116 See Baffioni, *On Logic*, pp. 158–159 and 87.

because in Chapter 4 of this epistle the same examples of that addition are repeated.¹¹⁷

Another important analogy is established in Chapter 7, between knowable beings and souls.¹¹⁸ There, the comparison of knowledge and morals with form echoes the relation of form and matter described in Chapter 4,¹¹⁹ and its ground is the Ikhwān's definition of science as the form of that which is known in the soul of the knower, stated in many places of the encyclopaedia.¹²⁰

Comparisons with numbers continue in the natural science treatises. In Chapter 3 of Epistle 17, constitutive forms are compared to the succession of even and odd numbers;¹²¹ in Chapter 8 of Epistle 20, the Ikhwān say that wise men came to recognize the influence of stars on the world of generation and corruption after assiduous research, which showed them that the last beings are related to the first ones just like numbers.¹²²

In Chapter 2 of Epistle 18, the Ikhwān anticipate their idea of nature that will be fully developed in Epistle 20: nature is a faculty of the Universal Soul that permeates sublunar bodies. Natural powers are the same as the angels 'charged with the preservation of the world and of the disposition of creatures', postulated by religion.¹²³ The Brethren discuss in detail other various positions about nature, which they obviously consider to be mistaken.¹²⁴

117 See below, pp. 111–112.

118 See p. 114.

119 See pp. 111–112.

120 See, e.g., Epistle 8: 'On the Practical Arts and their Goal', *Rasā'il*, vol. 1, p. 277.3; Epistle 10: 'On the Meaning of the *Isagoge*', *Rasā'il*, vol. 1, p. 399.4 (= p. 28.4–5, Baffioni), translated in Baffioni, *On Logic*, p. 76; Epistle 41: 'On Definitions and Descriptions', *Rasā'il*, vol. 3, p. 385.22; and Epistle 46: 'On the Quiddity of Faith and the Properties of the True Believers', *Rasā'il*, vol. 4, p. 62.1.

121 See p. 174.

122 See p. 304.

123 See p. 188 and, with regard to Epistle 20, pp. 305–312. In Chapter 3, the Ikhwān explain that, by rising towards their apogees, planets take powers from the angels found in the starry sphere, and transmit them to the elements and the sublunar world while descending towards their perigees. This way, humans receive fortune, mercy, revelation, inspirational help, aid, benefits, and goods, and elements produce mixtures in the depths of the Earth, from which animals and plants emerge.

124 See pp. 188–190.

I shall deal fully with this topic later.¹²⁵ Here, I will refer to the fact that, for the Ikhwān, nature is not a body, as a body cannot act. When they speak of ‘accidents inherent to the body of a being endowed with life and power’, they mention life, power, science, and so on, and say that they are proper to the soul that acts through them in the body. Note that the ‘accidents’ here mentioned by the Ikhwān are considered in *kalām* to be attributes of God. Once again, then, it would seem that the Ikhwān are here reproducing in philosophical terms the religious paradigm of Islam.¹²⁶ More precisely, here they hint at a series of ‘secondary causes’ that play the same role as divine attributes: the role of intermediaries between God and the world. Soul, moreover, cannot be grasped by senses — just as is the case with God. He who is able to transcend sensation will succeed in grasping the soul, and will be aware that the body and its accidents are the soul’s tools and instruments.

Just at the beginning of Epistle 19, the Ikhwān refer to the treatises in which the theological and spiritual core of their beliefs is explained most thoroughly: Epistles 42 and 32¹²⁷ about the creation of the world by God, and Epistle 38 with regard to the end of the world, and to eschatology. Creation and eschatology are among the main religious topics addressed in the natural science treatises from the standpoint of the philosophy of the Ikhwān.

Creation

In the natural science treatises, the Ikhwān repeatedly insist on the necessity of the initiate recognizing the existence of a wise Artisan who made and disposed everything:¹²⁸ such an acknowledgement

125 See pp. 44–46 of this Introduction.

126 Cf. also what happened with motion and rest, or, even later, the way in which they elaborate the issue of the existence of secondary causes; see pp. 24–26 and 45 respectively.

127 But note that [ش] merges the two titles into one and says: *Risālāt al-arā’i wa’l-madhāhibi wa’l-mabādi’i’l-‘aqliyya*, and [ج] has *Risālat al-‘aqliyya* only (see the critical apparatus, p. 247, note 3).

128 The Ikhwān’s proofs for the existence of God are mentioned by H. A. Davidson, *Proofs for Eternity*, pp. 152, 187, and 224–225, referring to the combination of contraries that would imply design, the concept of particularization (a body cannot move in every direction at the same time, and movement in a certain direction must have a cause — the reference is to Epistle 39: ‘On the Quantity

will awaken his soul 'from the sleep of carelessness and the slumber of ignorance' — the first step towards salvation. This is first noted in Chapter 7 of Epistle 18, after having explained winds, behind which God's wise administration should be recognized; in Chapter 1 of Epistle 21, the example of plants is considered in order to help in acknowledging a well-organized artefact that indicates a wise Artisan, veiled from sight perception; in Chapter 3 of the same Epistle, the mention of a certain number of plants should help the learner to understand from where, why, and for which purposes plants are generated — and consequently, to acknowledge the existence of the wise Artisan. In a more general way, in Chapter 11 of Epistle 19, the Ikhwān say that the observation of nature suggests the existence of a Creator who produced the entire world from nothing, and made man as the king of the universe.

These are all occasions for the Ikhwān to confute eternalism. For them, the multiplicity of the beings subject to generation and corruption — minerals, animals, and plants — should be a 'coercive impulse' (*ḍarūratān*) to acknowledge that a perfect work may only come from a wise Artisan. The sign (*athar*) of the work being permanent in the product¹²⁹ is a demonstration that the world is created and not eternal — the four Aristotelian causes, as we saw, are joined together in the explanation of such a production.¹³⁰

However, it would seem that a contradiction is implied in the hierarchy repeatedly mentioned by the Ikhwān — (i) the wise Artisan, (ii) nature as an artisan, (iii) human artisans.¹³¹ A reverse order is hypothesized for (i) the human artisans, who are under the eyes of everybody, and who are somewhat 'similar' to the hidden artisans; (ii) nature, more difficult to grasp, at least for common people; and (iii) God, knowledge of whom may be attained by the elect only. Certainly, in Chapter 13 of Epistle 19, the Ikhwān contrast God with the other

of the Genera of Movements', *Rasā'il*, vol. 3, p. 336.3–5), and the motion of the heavenly bodies, respectively.

129 I think that this statement by the Ikhwān hints at the wisdom of the Artisan being evident in His product.

130 See the scheme proposed above, at p. 20.

131 The debate about the possible causes of beings and events in the universe, put forward in this chapter, can be read in the translation. See pp. 188–191.

artisans, saying that He does not need instruments and tools, places and times, matter and movements,¹³² for His acts, but in some passages they appear to be recalling the Platonic conception of art three times removed from hyperuranian ideal forms (ιδέαι): in Chapter 2 of Epistle 20, they reproduce the same scheme, only substituting ideal forms with God.¹³³ This way, nature and human artisans could to some degree be considered to 'create' their products. This is in contradiction, if not to esoteric Islam, then to orthodox *kalām*, which resorted to the doctrine of *iktisāb* in order to deny humans the possibility of being 'creators' even of their own deeds.

Later, in Chapter 13 of Epistle 19, we find an answer to such a 'contradiction'. In fact, the Ikhwān clearly say — approaching the doctrine of *iktisāb* somewhat — that God creates both agents and acts, be they proper to humans, jinns, satans, angels, or nature. However, it is not God who is required to account for these acts, but His creatures. The Ikhwān use the same conceptual scheme when they deal, in this chapter, with the relation of particular souls to the Universal Soul as her faculties, and thus they may say that God's punishment and reward will depend on the quality of the performed actions.¹³⁴

Another debated issue in these natural science treatises regards the relation between the Universal Soul, nature, and the tools and instruments necessary to accomplish their acts. We already saw¹³⁵ that in Chapter 2 of Epistle 18, after having explained that the body and its accidents are the soul's tools and instruments, the Ikhwān come back to the simple bodies that are for nature the matter by which it — the first artisan after God — accomplishes its works.¹³⁶ Stated in terms of philosophy of nature, the sphere, moving itself and moving the other stars, causes heat, which dissolves waters, transforming them into

132 This idea is also expressed, e.g., in Epistle 8: 'On Practical Arts and their Goal', *Rasā'il*, vol. 1, p. 278.3–12.

133 See p. 288, note 3.

134 Later, the Ikhwān shift the focus of the discussion, by observing that no particular soul can try to be saved alone, and they invite their fellow Brethren to control their acts because their salvation depends on one another.

135 See above, pp. 40–41.

136 Here, too, we find some hints at the theological side of this doctrine, which will be fully developed in Epistle 19. See p. 273ff.

vapour, and which makes the parts of Earth subtler, transforming them into smoke. From vapour and smoke come various mixtures, which are moulded by nature, producing animals, plants, and minerals.

This chapter introduces a topic with regard to which the Ikhwān are not always consistent. Here, they state that actions belong only to the soul, whereas the body and its accidents are for the soul like tools and instruments for an artisan. Hence, 'spirit' — here opposite to body — is the agent, whereas corporeal objects can only support its actions. The same idea is recalled in the long Chapter 11 of Epistle 19,¹³⁷ where the Ikhwān repeat that a body, in that it is a body, has no act.¹³⁸

The idea of the soul as the sole agent is functional to the Ikhwān's general thesis of nature as a faculty of the Universal Soul. Therefore, simple bodies — namely, the four elements — are the matter subject to nature, which produces from them the beings of the three natural kingdoms, while the heavenly individuals are its tools. We should then infer that these heavenly individuals are considered to be bodies — namely, to be endowed with matter. This is exactly the position expressed in Chapter 2 of Epistle 18.

However, in Epistle 19, Chapter 11, the Ikhwān repeat that nature is a faculty of the Universal Soul (the same as 'angels'), but its tools and instruments are identified with animals, plants, and minerals.¹³⁹ In Chapter 12,¹⁴⁰ while dealing with magnets and iron, the Ikhwān refer to plants and minerals in particular, and state that these are the tools of the Universal Soul. In this context, nature is viewed as the sum of the reciprocal influences of the natural bodies, which are also the acts of the Universal Soul. In this case, a hierarchy appears, (i) agent (ii) acts (iii) tools, corresponding to (i) the Universal Soul (ii) nature (iii)

137 See pp. 253–273.

138 Such a statement may have been inspired from what is said in the work *On the Soul* II.2.414a14–20 and III.5.430a10–12: 'Since in every class of objects, just as in the whole of nature, there is something which is their matter, [...] and something else which is their cause or agent in that it makes them all — the two being related as an art to its material — these distinct elements must be present in the soul also'; Aristotle, *On the Soul, Parva Naturalia, On Breath*, tr. W. S. Hett. (London–Cambridge, MA: Heinemann–Harvard University Press, 1957), p. 171.

139 See p. 272.

140 See pp. 275–276.

natural kingdoms.¹⁴¹ At the end of the chapter, the Ikhwān express their theodicy, according to which God does not undertake any act on His own, but only commands His angels to execute His orders.¹⁴² Due to the identity previously established between nature and angels, we may now infer that the Ikhwān once again assert a sort of ‘secondary causality’ (= nature), which echoes ancient philosophical positions, so keeping their distance from the religious perspective proper to Sunnī Islam.

Finally, in Chapter 13, mineral substances in their variety are considered as instruments and tools of nature, which operates with the four elements in dependence on the various heavenly movements.¹⁴³ The feminine pronouns used here determine ambiguity, because they might refer to the heavenly bodies and their movements, as will be in Ḥamīd al-Dīn al-Kirmānī, but also to nature, consistently with what has been stated so far in Epistles 18 and 19.

In this case, the ‘instrumental’ value of minerals might be linked to the *sympatheia-antipatheia* relation developed in late antiquity. The issue cannot be easily solved, however. At the beginning of Epistle 20, the Ikhwān are not consistent with regard to their previous view of bodies as tools and instruments. Here, they consider the heavenly individuals to be tools and instruments of the Universal Soul, and these individuals — as is also clarified in Chapter 5¹⁴⁴ — cannot be considered to be the same as bodies. Instead, nature is still considered to be the acts of the Universal Soul, the four elements her matter, and the three natural kingdoms her products.¹⁴⁵ Stated in other terms, in this treatise it is the Universal Soul that plays the wholly active role, not nature,¹⁴⁶ and the Universal Soul is once again the first in the hierarchy. The comparison with human artisans is introduced in Chapter 2 of Epistle 20, the idea is restated, and the Universal Soul is called ‘the efficient

141 With regard to the hierarchical order of universe, see below in this Introduction, pp. 56–58.

142 See p. 276.

143 See pp. 277–278.

144 See p. 292.

145 See p. 287.

146 In Epistle 18, on the contrary, it was nature that informed matter, producing from it animals, plants, and minerals.

cause',¹⁴⁷ whereas in Chapter 9 the heavenly individuals return to being the tools of nature, and their faculties its helpers.¹⁴⁸

Eschatology

Epistle 16 deals with technical issues without interruption until the last chapter (Chapter 29), where resurrection is explained — still in astronomical terms. Here, the Ikhwān repeat widely developed topics,¹⁴⁹ such as inviting the disciple to prepare himself for the day of resurrection, so that when death arrives he will already have the means necessary for salvation. The idea is the usual one among philosophers: means to salvation are acquired during mundane life through the physical senses and the physical body. After death, only divine knowledge, good angelic habits, sound opinions and pious and pure deeds will survive with the soul.¹⁵⁰ In fact, in that they are a spiritual, luminous, brilliant form, these things remain in the essence of the soul. Every time the soul views that form in itself, it rejoices at it, and is replete with joy, gladness and pleasure (the underlying idea being that soul is a pure form, too). Similarly, its reward and blessing will consist in that which it, by its behaviour, borrowed in bygone days.¹⁵¹ But if its habits were evil, its opinions corrupted, its deeds destined to ruin, and its ignorance engrained, the soul remains blind to the vision of the true realities, and will have no escape from the regrets for its punishment.

The dualistic approach of the Ikhwān, here expressed through the opposition between physical and spiritual human dimensions, is emphasized immediately afterwards by the exhortation to give up the companionship of physical fellows, and to approach the spiritual fellows: a clear reminder of Gnostic conceptions.¹⁵²

147 See p. 288.

148 See pp. 304–305.

149 See above, p. 26.

150 Note that these four requisites correspond to the ways of imitating God highlighted above, p. 29, just like the contrary conditions that will lead to damnation, listed below.

151 Here, we have a new example of the dualism highlighted above, at p. 26.

152 See p. 168.

In Chapter 14 of Epistle 17 the Ikhwān, considering that bodily corruption cannot be avoided, encourage searching for the knowledge of the soul, because it is a permanent substance,¹⁵³ though it passes from one state into another. Then the Ikhwān introduce paradise as the world of spirits and an eternal source of joy, in that it is 'the abode of life', whereas hell is the world of bodies subject to generation and corruption, in which chastisement has no end.¹⁵⁴ The epistle finishes with a new invitation to renounce this world following the way of prophets, philosophers, and wise men. As suggested from the prophetic and sapiential descriptions of paradise and hell, renunciation of the world and following prophets and wise men should be a result of free choice, which leads the initiate to recognize the superiority of the hereafter.

Divine Wisdom and Providence

The natural science treatises also emphasize other theological themes. In Chapter 3 of Epistle 20, divine wisdom is seen to be the cause of the intermediate position given to the planets, between the centre of the world and the all-embracing sphere.¹⁵⁵

In Chapter 3 of Epistle 21, plants are said to have no sense of pain because it is not proper to divine wisdom to establish unnecessary senses for animals and plants.¹⁵⁶ At the end of the treatise, the Ikhwān mention some causes of the various compositions and purposes of plants as a proof of God's wisdom and providence. The example of seeds is given.¹⁵⁷

In Chapter 17 of Epistle 18, the incitement for awakening the soul and living in eternal joy with the pious is to observe how God placed (i) the globe (*kura*) of Ether under the sphere of the Moon as a fire without brightness, (ii) the globe of Zamharīr as a barrier between the globe of Nasīm and the globe of Ether, (iii) the globe of Nasīm endowed

153 This is once again reminiscent of ancient doctrines; see, e.g., *On the Soul* II.1.412a3–23.

154 See p. 183.

155 See p. 290.

156 See p. 343. On animals and sensation, see, e.g., *On the Soul* II.2.413b32–414a3. On plants that cannot move, see *Physics* VIII.7.261a15ff.

157 See p. 343.

with a balanced mixture, and (iv) the Sun inclined now northwards, now southwards.¹⁵⁸ In Chapter 18 of Epistle 18, comets are explained as announcements and warnings from God so that humans can be close to Him.¹⁵⁹ In Chapter 4 of Epistle 19, divine providence determines seas and mountains; in Chapter 6, it determines caves inside mountains, and the formation of sources and creeks from them.¹⁶⁰

Divine Omnipotence and Benevolence

A proof of divine omnipotence is seen in Chapter 1 of Epistle 21, in the fact that every plant is intended to produce only another plant similar to itself, so that each genus and species may be preserved.¹⁶¹ This idea is also found in Aristotle, e.g., in his work *On Generation and Corruption* II.6.333b7ff., and is later recalled in the Jābirian corpus. In the *Kitāb al-Rahma*,¹⁶² it is said that a human being does not produce but a human being and a bird does not produce but a bird and the same applies to all animals: they can only give birth to their own kind, and, similarly, it is said that gold can only come into being from gold. This indicates that the author sees transformation between the species as impossible.

Again in Chapter 1 of Epistle 21, a sign of divine benevolence is seen in the way in which the seven powers work as acts of the vegetal soul, which is in service of the animal soul, and intermediate between it and the four elements.¹⁶³

Theodicy

In Chapter 12 of Epistle 19, the Ikhwān begin speaking of theodicy. God is not in direct contact with bodies, but He orders His angels to do what He desires, like a king. Though Epistle 19 is the main text

158 See p. 216.

159 See pp. 220.

160 See pp. 233 and 241–242.

161 See pp. 321–322.

162 See M. Berthelot, ed., *La chimie au moyen âge. 3, L'alchimie arabe* (Paris: Imprimerie Nationale, 1893), p. 137. For this quotation, I am indebted to Dr Inka Nokso-Koivisto.

163 See p. 328, and also Plato, *Timaeus* 24.76e–77c.

where this issue is dealt with,¹⁶⁴ the same subject is also hinted at in Chapter 8 of Epistle 20, with regard to the action of the stars on the world of generation and corruption.¹⁶⁵

Theodicy is treated at Atif fol. 183a,¹⁶⁶ but at Atif fol. 183b¹⁶⁷ the Ikhwān repeat almost to the letter what they have stated some lines above. One might be tempted to remove this passage from the text, but it could be a repetition with a didactic purpose. On the other hand, apparently unjust acts are considered here, an issue that was not found in the former treatment, which allows the Ikhwān to deal with the problem of evil.¹⁶⁸

Also in Chapter 1 of Epistle 21, the Ikhwān repeat that God is not in direct contact with bodies, and to demonstrate this they quote Qur'an 8:17 and 9:14.¹⁶⁹

Angelology

An angelology is developed in Epistle 20, beginning in Chapter 10,¹⁷⁰ which includes mention of the names and functions of various angels,¹⁷¹ corresponding to the 'spiritual beings' (*rūḥāniyyāt*) that are linked to stars and that control sublunar life. These may be summarized as follows:

Natural Sciences: Spiritual heavenly beings and their counterparts in the human body	Religion: Angels
<i>Rūḥāniyyāt</i> of the Sun: They control the integrity of the world, perfection, and completeness of the world and of its beings; compared to innate heat in the human body	Isrāfīl

164 See p. 279ff.

165 See p. 304.

166 See translation, p. 278.

167 See translation, pp. 281–282.

168 This issue is also widely considered in Epistle 42: 'On Opinions and Religions'. See *Rasā'il*, vol. 3, pp. 430–431, 462ff. (with regard to the dualistic belief in religion), 471ff., and 474–480.

169 See p. 321.

170 See p. 307ff.

171 On these angels, see also the notes to the translation, at pp. 308–311.

Natural Sciences: Spiritual heavenly beings and their counterparts in the human body	Religion: Angels
<i>Rūhāniyya</i> of Saturn: It controls the cohesion and stability of forms in matter; compared to the humour of black bile in the human body	Angel of Death; Munkar and Nakir
<i>Rūhāniyyāt</i> of Mars: They control zeal in deeds and works, and they search for high positions and perfection; compared to the humour of yellow bile in the human body	Jibrā'il; Mālik the furious and all the guardians of hell
<i>Rūhāniyyāt</i> of Jupiter: They control the balance of contrary natures, and preserve the order of the existing beings; compared to the sanguine humour in the human body	Riḍwān, the treasurer of the Garden
<i>Rūhāniyyāt</i> of Venus: They control the adornment of the world, the goodness of its order, as well as every kind of love and affection; compared to the desire for pleasures spreading from the stomach towards the senses	the 'Houris', and 'the maids of the Garden'
<i>Rūhāniyyāt</i> of Mercury: They control knowledge and sensation, as well as thoughts, inspiration, revelation, prophecy, and all sciences; compared to the imaginative faculty spreading from the brain and to the intellectual faculties ensuing from it	'Youths', 'the honourable secretaries', and 'the honourable pious'
<i>Rūhāniyyāt</i> of the Moon: They control the breathing of the existing beings in both the heavenly and the sublunar world; compared to the respiration faculty spread from the lungs	No specific name indicated
<i>Rūhāniyyāt</i> of the fixed stars: They are effused throughout the whole body of the world, as sunlight is spread through air and preserves the forms of the genera of the existing beings in matter	Cohorts of angels, including 'the bearers of the throne'

Angelology is also recalled in brief at the beginning of Epistle 21.¹⁷² A bit later, 'particular souls' are said to be the agent of the creation of plants — that is, the 'natural faculties' of philosophers and the 'angels' of the law; the 'simple, Universal Soul' is mentioned as well, which gives shape to plants from matter.¹⁷³

Belief in Astrology

In spite of the reservations expressed in orthodox Islamic theology, the Ikhwān believe in astrology, as is especially evident in Chapter 5 of Epistle 20.¹⁷⁴ Here, every being and every event in this world is said to have a cause, which necessitates their coming to be; they occur only because of that cause. In Chapter 8, after having mentioned the defective doctrines of those who (i) acknowledge indications (*dalā'il*) from stars but deny their acts (*af'āl*), and of those who (ii) deny both *dalā'il* and *af'āl*, the Ikhwān introduce the correct doctrine, consisting in recognizing both *dalā'il* and *af'āl*. However, the discussion in favour of astrology is better developed in other treatises. For example, in Epistle 40: 'On Causes and Effects', the discussion is based on the consideration that God has two abodes, this world and the hereafter.¹⁷⁵ In Epistle 42: 'On Opinions and Religions', the ideas hinted at in Epistle 20 are fully developed, and also give consideration to divine reward.¹⁷⁶

The Spiritual Meaning of the Natural Science Treatises

As is clearly stated at the beginning of Epistle 15, the purpose of the *Rasā'il* is to make every science described in them closer to the learners' understanding. But that goal is not ascribed to the topics proper to each of these treatises, or to their Greek models only, but only in so far

172 See p. 321ff.

173 See pp. 325–326.

174 See pp. 293–294. On the Ikhwān's faith in astrology, see the recent article by R. Lohker, 'Astrologie, die Lauteren Brüder, Männliches und Weibliches', in M. Köhbach et al., ed., *Festschrift für Hermann Hunger zum 65. Geburtstag gewidmet von seinen Freunden, Kollegen und Schülern*, monographic issue of *Wiener Zeitschrift für die Kunde des Morgenlandes* 97 (2007), pp. 283–288.

175 *Rasā'il*, vol. 3, pp. 362.24–364.16.

176 *Rasā'il*, vol. 3, pp. 500.7–504.16.

these topics are part of the path to salvation sketched by the Brethren. As their ultimate purpose is the spiritual elevation of the initiate, the Ikhwān develop the ancients' knowledge in an original way, and for this reason¹⁷⁷ there is no doubt that the *Rasā'il* can be considered as a true encyclopaedia of sciences — even though the Ikhwān surely aimed at being much more than mere 'encyclopaedists'.

One of the clearest examples is Chapter 9 of Epistle 15, where the basic principles of Aristotle's *Physics* are developed in spiritual terms.¹⁷⁸ The Universal Soul continuously and constantly grants her own virtues¹⁷⁹ to particular souls, but these are capable of receiving them only gradually. The Ikhwān give the example of a teacher¹⁸⁰ who would like to teach useful things all at once, whereas his pupil can learn them only one after another. This is due to physical hindrances, and to the individuals' inclination towards passions and bodily pleasures. After their spiritual awakening, however, souls have a link to the Universal Soul, and are so able to contemplate light, and to attain everlasting joy. Resistance to the right teachings preludes the continued submersion in the sea of matter.¹⁸¹

The last chapter of this Epistle contains the spiritual counterpart of the technical discourse. The Ikhwān invite the disciple to reflect on their exposition, to emulate those who know more, and to clarify their doubts, without attributing a possible obscurity of contents to inadequacy or even lies on the part of the authors.

The spiritual dimension of the natural science treatises is revealed most obviously by the way in which prophets and wise men are

177 And contrary to what was recalled above, in note 2.

178 See pp. 116–117.

179 On which see above, p. 31.

180 As the different readings of the MS suggest (see the critical apparatus, p. 23, notes 7 and 8), a teacher is a spiritual father, or even — as the general thought of the Ikhwān suggests — the true father. See C. Baffioni, 'The concept of science and its legitimation in the Iḥwān al-Ṣafā', in C. Baffioni, ed., *Religion versus Science in Islam: a Medieval and Modern Debate*, monographic issue of *Oriente Moderno* 19 (2000), pp. 427–441, at p. 434.

181 Both these conditions are clarified by the quotation of the celebrated 'verse of Light' and of its immediate following. See above, p. 31. We have here another example of the many applications of this verse in Islamic thought.

considered. In Chapter 8 of Epistle 15,¹⁸² the Ikhwān state that the souls of the prophets are the closest to the Universal Soul. It is thanks to the emanation they receive from the Universal Soul that they are able to produce the divine books, in which part of the secrets of sciences is hidden. After, they are followed by 'the philosophical souls that discovered many true sciences'. The 'souls capable of divination' (*al-kihāniyya*) come third. Though, as is known, a *ḥadīth* states that '*lā kihāna ba'd al-nubuwwa*', 'there is no divination after the prophetic mission', *kihāna* played an important role in Islam, constituting the lowest echelon of prophetic practice, as a divine gift entrusted to a privileged group of people. The '*ilm al-kihāna*' is a part of *siḥr*, magic, and by it is meant — under the Hellenistic influence — astrological divination, involving incantations and invocations to the stars. Whereas *kihāna* indicates the conceptual aspect of divination, the term vocalized *kahāna* indicates its pragmatic aspect.¹⁸³ In this context, the mention of divination, with the consequent reading *al-kahāniyya*, might be considered as a reference to the religious ceremonies of the ancients — especially rites of Pythagorean origin — which the Ikhwān hold in demonstrably great esteem, particularly in Epistle 50: 'On the Quality and the Quantity of the Species of Government'.

It is also noteworthy that these three classes of people are here united under the label of 'imitators of God according to human capability'. Given that the first class is that of the prophets, on the one hand we deduce that these prophets have in themselves no divine element — hence the Ikhwān seem not to be counted among the *ghulāt*;¹⁸⁴ on the other hand, prophethood — Islamic prophecy included — is here linked to Neoplatonic thought. However, it is also to be remarked that whereas it is usually the Active Intellect that 'inspires' prophets by the act of *tayyīd*, in this case the Universal Soul plays a principal role as the intermediary. Differently stated, here the Ikhwān apply to prophets the degrees of transmission of knowledge that are usually ascribed to to humanity in general.

182 For these considerations, see pp. 114–116.

183 See T. Fahd, 'Kihāna', *EI2*, vol. 5, pp. 99–101.

184 Though, of course, that is not the only indicator of being among 'extremists'.

In Chapter 6 of Epistle 20, the Ikhwān repeat that prophets and physicians share the same goal and intention — spiritual and physical health — though their methods differ.¹⁸⁵ Prophets are considered by the Ikhwān to be ‘the physicians of the souls’.¹⁸⁶ Philosophers and wise men are associated with prophets–legislators and with other contributors to human salvation (note that there is another allusion to the philosophical feasts). Salvation is reaching the world of spirits, and it is noteworthy that all the Qur’anic verses quoted¹⁸⁷ contain the radicals *dh-k-r*, indicating remembrance. This may be an allusion to the primordial pact with God,¹⁸⁸ but also to the ancient Platonic doctrine according to which, the Ikhwān say, ‘learning is recollection’.¹⁸⁹

Ismaili Elements in the Natural Science Treatises

Generally speaking, the deep fusion between religious law and Greek philosophy — especially evident in the natural science treatises, because of their technical contents — seems to confirm the Brethren’s closeness to Ismailism: both religion in its exoterical and esoterical versions, and philosophy, are the necessary qualifications for salvation.¹⁹⁰

The link between religion and philosophy is emphasized in an interesting way in Chapter 8 of Epistle 15, about which we have already spoken.¹⁹¹ With regard to the prophets, they state that thanks to the emanation from the Universal Soul they produce (*atat*) the divine books, in the purity of their soul:¹⁹² this way, a sort of autonomous responsibility with regard to the Holy Books is given to them, quite similar to the one attributed to the Prophet of Islam by Abū Ya‘qūb

185 See pp. 301–302.

186 On this denomination see also Appendix B, pp. 382–383.

187 See p. 411 of the Arabic text, notes 53–55.

188 On which see Qur’an 7:172–173.

189 See Epistle 42: ‘On Opinions and Religions’, *Rasā’il*, vol. 3, p. 424.16, which refers to *Meno* 81c–86c and to the theory of ‘anamnesis’.

190 A *status quaestionis* was established in the dissertation of Meera F. H. Mawji, *The Fāṭimids and the Ikhwān al-Ṣafā’*, submitted for a Master’s degree at SOAS in September 1987.

191 See above, p. 53.

192 See p. 114.

al-Sijistānī, the well-known Ismaili thinker and *dā'i* who lived in the tenth century.¹⁹³

The natural science treatises develop other doctrines endowed with a specifically Ismaili flavour: in Chapter 2 of Epistle 17 and in Chapter 3 of Epistle 19, the elements are called 'mothers',¹⁹⁴ which is a topic that will become characteristic of the Ismailis — although this was originally stated by Aristotle.¹⁹⁵ In Chapter 1 of Epistle 18, atmospheric phenomena are said to be determined by the heavenly individuals,¹⁹⁶ heralding a theory of Ḥamīd al-Dīn al-Kirmānī.¹⁹⁷

In Chapter 2 of Epistle 18, where the Ikhwān explain what happens in the sublunar world by the action of nature, the text is uncertain, because it speaks of *āthār*.¹⁹⁸ If we keep this reading, we have to admit that the Ikhwān already presupposed that the sublunar world is influenced by the heavenly world, even though they do not repeat that clearly here. The alternative reading given by [ح], *āyāt* (see the critical apparatus, p. 187, note 11), is also indicative of an Ismaili milieu, as for Ismaili thinkers, *āyāt*, as well as being the verses of the Qur'an, are the 'signs' of God in His creation, which thus becomes His other, second writing — the writing to be investigated, nature (dealt with in the Ikhwān's natural science treatises), whereas the Qur'an is the writing to be listened to.

We already saw that the Ikhwān consider the Universal Soul to be the mover of the Absolute Body,¹⁹⁹ unlike theologians, who consider God to be the mover. This is another point — besides the question of the accidents attributed to the living body, which were reminiscent

193 See, e.g., Paul E. Walker, *Early Philosophical Shiism. The Ismaili Neoplatonism of Abū Ya'qūb al-Sijistānī* (Cambridge: Cambridge University Press, 1993), pp. 121–123.

194 See pp. 173 and 277 respectively.

195 *Physics* I.7.191a14.

196 See p. 187.

197 See Epistle 18, p. 190, note 14.

198 See p. 188.

199 See p. 24. The problem as developed in Ismaili thought is studied by Mohamed A. Alibhai, 'The Transformation of Spiritual Substance into Bodily Substance in Ismā'īlī Neoplatonism', in P. Morewedge, ed., *Neoplatonism and Islamic Thought* (Albany: State University of New York Press, 1992), pp. 167–177.

of divine attributes²⁰⁰ — in which the Ikhwān ‘translate’ theological ideas into terms of philosophy of nature. But their position might also be a sign that, for them, God is beyond certain functions and names: this way, they would partially share the Ismaili ‘negative theology’. Of course, that would be true only in part: whereas Ismaili thinkers never put God at the beginning of the derivative process of beings, for the Ikhwān, as for philosophers, God is the principle and the end of everything.

Moreover, when the Ikhwān state that rest is prior to movement, they might refer to the doctrine already preached by their contemporary Abū Ya‘qūb al-Sijistānī, that rest is a quality of the First Intellect, whilst motion is proper to the Universal Soul.

Again, in the Ikhwān’s view, their definitions of generation as ‘the acquisition of a form in matter’ and of corruption as ‘its removal from matter’²⁰¹ in Chapters 12–13 of Epistle 17, have the function of explaining that all natural beings are formed according to a cycle — an idea that hides the hierarchical structure of universe, to which we will return later.²⁰²

The most important ‘Ismaili’ feature that can be found in the *Rasā’il* is the hierarchical order of the universe, frequently emphasized by the Ikhwān since the beginning of the section on natural sciences, often with a didactic purpose.

For instance, in Chapter 13 of Epistle 15²⁰³ the Ikhwān conclude that, as matter, form, place, movement, and time envelop everything, he who does not know what they are cannot — and hence, is not allowed to — examine natural objects. Ignorance of natural objects, in its turn, hinders one from knowledge of metaphysical objects. The hierarchical ontology stated by the Ikhwān implies the impossibility of advancing in knowledge without understanding and learning the fundamentals.

As to the details of the hierarchical representation in the natural science treatises, in Chapter 4 of Epistle 15 ipseity, quantity, and quality are seen as simple intelligible forms, each of them being matter for the

200 See p. 41.

201 See pp. 180–181.

202 See pp. 180–181.

203 For these considerations, see p. 125.

one above, and form for the one below, until Prime Matter is reached, 'a simple substance with no composition, capable of receiving all forms gradually'.²⁰⁴ The same scheme will be recalled in Epistle 16, Chapter 3, where each of the seven heavenly spheres (from the Moon up to Saturn, according to Ptolemy's representation) is said to be a heaven for that which is below it, and an earth for that which is above it.²⁰⁵

In Chapter 5 of Epistle 15, the Ikhwān restate the hierarchy of beings in terms of purity and nobility. Opposite to the heavenly world (where the order is from the more perfect to the less perfect), an ascending hierarchy from minerals to animals through plants is established for the lower world, and with regard to mineral stones, a descending hierarchy from hyacinth to lead.²⁰⁶

In Chapter 6, after having stated that beings are ennobled by form,²⁰⁷ the Ikhwān state that the particular bodies that receive the form of the Universal Body are the noblest ones. This is an obvious allusion to the spherical form of the universe.²⁰⁸

The hierarchical disposition of the universe is also maintained at the beginning of Epistle 16, where the heavenly bodies are said to be the first level of specification of the Absolute Body, whereas the second level is represented by the generated bodies — animals, minerals, and plants.²⁰⁹

The most complete treatment of this idea is found in Epistle 21. At the beginning of the treatise,²¹⁰ the Ikhwān specify the hierarchical connection of the natural kingdoms: plants with animals, animals with humans, and humans with angels. In Chapter 3, the Ikhwān say that the generated beings are of four genera: minerals, plants, animals, and humans. Each kingdom has different degrees of perfection. The lowest degree of plants is linked to the highest degree of minerals, and the highest degree of plants is linked to the lowest degree of animals.²¹¹ The

204 See p. 112.

205 See p. 139.

206 See pp. 112–113.

207 Circular form is especially emphasized. Cf. on this Epistle 40: 'On Causes and Effects', cited in Epistle 16, p. 137, notes 9 and 12.

208 See p. 113.

209 See p. 135.

210 See p. 317.

211 I.e., green manure and palm respectively. See p. 340.

lowest animal degree, too, is contiguous to the highest vegetal degree, as the lowest vegetal degree is contiguous to the highest mineral degree, and the lowest mineral degree is contiguous to earth and water. The lowest and most defective animal is said to be the worm of the cane.²¹²

Later, the Ikhwān explain in which sense the animal degree is adjacent to the human degree — this way, the hierarchy observed in nature is the counterpart of a spiritual, or moral, hierarchy. Various animals share human qualities and virtues.²¹³ Having finished mentioning the animal degrees adjacent to the human level, the Ikhwān indicate the first human degree adjacent to the animal degree.²¹⁴ Even though their corporeal form is human, these persons share acts proper to the animal and vegetal souls. The Brethren must not be among them! As to the human level adjacent to the angels' level, it is the degree of those who work hard at desisting from blameful dispositions and at acquiring beautiful dispositions, so that their souls can become angels in potentiality and, after death, angels in actuality.²¹⁵ The supreme goal of the encyclopaedia is then affirmed on the basis of natural sciences.

Once humans have become angels, another kind of 'imitation of God' would seem to have been accomplished.²¹⁶ That happens in spite of the remarks — that can be widely shared — made by scholars such as Daniel De Smet²¹⁷ with regard to the fact that the Ikhwān do not preach a true evolutionism, because there is no passage of beings from one degree to the higher one, just as it can be noted of the Ismaili hierarchies.

The fact that the human hierarchy is not a fixed one can be explained by the religious dimension of the Ikhwān's thought: the ultimate goal is reached at the separation from the body. The Ikhwān's dualism is now observed in their wavering between a choice in favour of *falsafa*

212 See p. 342ff.

213 See p. 344ff.

214 See p. 345ff.

215 See pp. 346–347.

216 We note that angels appear here to be placed in a higher position than humans — contrary to the Qur'anic invitation to angels, to prostrate themselves before Adam (Qur'an 2:34).

217 See D. De Smet, *La philosophie ismaélienne* (Paris: Editions du Cerf, 2012), Ch. 6, pp. 151–157.

or of Ismaili positions.²¹⁸ The late-Greek curricula of sciences linked Aristotle to natural sciences — the sciences placed at a lower degree — whilst it was Plato who introduced theological higher knowledge. The Ikhwān knew well that Aristotle considered philosophy to be an enquiry into causes,²¹⁹ but they chose the definition of Platonic origin, seeing it as an ‘imitation of God according to human capability’.

218 The ‘intrasubstantial movement’ (*ḥaraka jawhariyya*) later theorized by Mullā Ṣadrā (Ṣadr al-Dīn al-)Shirāzī (d. 1640) seems to be anticipated here.

219 *Physics* I.1.184a10–11.

*Technical Introduction*¹

The present edition is based primarily on the manuscript *Atif* ('Āṭif) Efendi 1681, the oldest identified in public libraries. It dates back to 1182 (AH 578) and contains the complete text of the natural science treatises 15–21.

According to some scholars, *Atif* has been either directly affected by scribal interventions, or else indirectly through the transcription of earlier manuscript sources, in terms of 'misleadingly' attributing the *Rasā'il* to the utterance of the Sufis.² As considering the treatises as a part of a 'sufi discourse' would have affected the doctrinal judgement on them, a 'standard' title has been attributed to all the natural science epistles; the original titles with the eulogies that accompany them are dealt with below at p. 80ff.

Atif is almost fully vocalized and provides some marginal notes with variants and corrections. There is a double pagination, in Arabic and Latin numerals, the Arabic being one unit more than the Latin. The titles and the word *faṣl* are written in red ink. Chapters are not numbered. At the bottom left of fol. 149a (Epistle 16), there is a representation of the nine spheres.

Scribal idiosyncrasies in *Atif* are as follows: *alif madda* instead of long *alif*, and often vice versa, long *alif* instead of *alif madda*; *alif madda* before the *hamza*; *yā'* instead of *hamza*; final *hamza* sometimes

1 Some of the following considerations are the same as those stated in the technical introduction to the logical epistles; see Baffioni, *On Logic*, pp. 35–62.

2 These scholars have stressed the intellectual impress of the prevalent geopolitical circumstances in which the text was transcribed, in addition to its channels of transmission. Cf. N. El-Bizri, 'Prologue', in N. El-Bizri, ed., *The Ikhwān al-Ṣafā' and their Rasā'il*, p. 22.

not written; *alif-yā'* instead of *alif-hamza*; *yā'* instead of *alif maqṣūra*; *alif maqṣūra* instead of long *alif*; sometimes, long *alif* instead of *alif maqṣūra*; often (but not always) Atif writes الحيو instead of الحياة, and سلم and القيمة with the perpendicular *fatha* (small *alif*) instead of سلام and القيامة (the same happens with numbers 3 and 8); it often has the prosthetic *alif* at the end of verbal forms ending by *waw*. These idiosyncrasies have been normalized according to the prevailing use; the writing in the notes has been normalized accordingly. Additionally, Mr Saleh al-Achmar has normalized certain words according to the rules of Arabic grammar.

The manuscript contains several errors (mistakes in vocalizations and in diacritical dots included) that I have corrected in the edited text, reporting them in the notes.

The additions in the margin suggest that the copyist transcribed faithfully from his model, reserving for himself separate comments and corrections. However, on several occasions Atif provides — without any side remark — unacceptable readings (different from all the other collated manuscripts), which have been emended in the cases in which they made no sense. Otherwise, Atif's reading has been retained, even when it differed from those of all other manuscripts. Words or phrases I was not able to read in the consulted manuscripts have been put between angled brackets.

The final text of the treatises has been established through collation with all the 15 manuscripts provided by the general editor:

Königlichen Bibliothek, Berlin

MS 5038 (1203 CE)³ [ب]

3 See W. Ahlwardt, *Verzeichniss der arabischen Handschriften der Königlichen Bibliothek zu Berlin*, 10 vols. (Berlin: A. Asher & Co., 1892), vol. 4, p. 379: '149 Bl. 4to, 15 Z. (22½ × 16½; 16½ × 11½cm). – Zustand: Anfang und Schluss nicht recht fest im deckel; der Seitenrand am Ende wasserfleckig; ebenso der obere Rand in der 1. Hälfte; im Ganze etwas unsauber. F. 1 schadhaft und ausgebessert. Ein wenig wurmstichig. – Papier: gelb, stark, glatt. – Einband: brauner Lederbd. Titel fehlt'. The content of treatises 5–9 of the second section (i.e., Epistles 19–23) follows. Ahlwardt further remarks at p. 380: 'Schrift: gross, kräftig, rundlich, stattlich, etwas vocalisirt, aber diakritische Zeichen fehlen öfters. Die Ueberschriften grösser. F. 142 von etwas späterer Hand ergänzt. – Abschrift c. 600/1203. – Collationirt'.

Istanbul collections (the Süleymaniye and associated libraries):

MS Esad Efendi 3638 (ca. 1287 CE): [أ]

MS Esad Efendi 3637 (n.d.; ca. thirteenth century): [ن]

MS Feyzullah 2130 (AH 704) [ف]

MS Köprülü 871⁴ (820/1417) [ل]

MS Köprülü 870⁵ (fifteenth century CE, under the reign of Muḥammad al-Fātiḥ) [ك]

Bibliothèque Nationale de France, Paris:

MS 6.647–6.648 (AH 695 or 709?; Yazd)⁶ [د]

MS 2303 (1611 CE)⁷ [ر]

MS 2304 (AH 1065/1654 CE)⁸ [ز]

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- 4 See Ramazan Şeşen, Cevat İzgi, Cemil Akpınar, *Catalogue of manuscripts in the Köprülü Library* (Istanbul: Research Centre for Islamic History, Art and Culture, 1406/1986), vol. 1, p. 431 (in Arabic). The incipit and explicit of the manuscript are given. Writing: *naskh*; 531 folios, dimensions of the page 35 x 24.5 cm; script 26 x 17 cm. 23 lines per page. Saljuki binding. Up to p. 437 it was written and revised before the end of the sixth century AH; the last section, from p. 438 to the end of the book, was completed on 22 Jumāda al-awwal 820H.
- 5 See Ramazan Şeşen, Cevat İzgi, Cemil Akpınar, *Catalogue of manuscripts in the Köprülü Library*, *ibid.* The incipit and explicit of the manuscript are given. Writing: *naskh*; 338 folios, dimensions of the page 35 x 22 cm; script 26 x 14.5 cm. 31 lines per page. Golden frame. Adornments at the beginnings; at the end, the place of the word *qāla* is occasionally void. By commission of the Sulṭān Muḥammad al-Fātiḥ. Bibliographical references complete the entry.
- 6 See [William Mac Guckin,] Baron de Slane, *Catalogue des manuscrits arabes* (Paris: Imprimerie Nationale, 1883–1895), p. 404: '[...] Les figures sont restées en blanc. En tête du volume se trouve une vignette coloriée et dorée; le frontispiece, en or et en couleurs, est resté inachevé. Papier. 488 feuillets. Hauteur, 29 centimètres et demi; largeur, 20 centimètres et demi. 31 lignes par page. – (Ancien fonds 1105, Colbert 2393)'.
- 7 See [William Mac Guckin,] Baron de Slane, *Catalogue des manuscrits arabes*, *ibid.*: 'C'est à tort qu'on a écrit sur la tranche de ce volume le nom d'Al-Madjriti. Papier. 529 feuillets. Hauteur, 27 centimètres et demi; largeur, 16 centimètres. 31 lignes par page. – (Supplément 1845)'.
- 8 '[...] le premier volume est précédé d'une table de matières qui renvoie à la pagination orientale des volumes; cet exemplaire a été collationné à Yazd, en Perse, en l'année 709. Naskhi date à la fin du premier volume du 21 Sha'ban 695. 191 et 218 feuillets. 36,5 sur 26 centimètres'; cf. E. Blochet, *Bibliothèque Nationale. Catalogue des manuscrits arabes des nouvelles acquisitions (1884–1924)* (Paris: Leroux, 1925), pp. 327–328.

Bodleian Library, Oxford:

MS Hunt 296 (n.d.) [ح]

MS Laud Or. 255 (n.d.) [ح]

MS Laud Or. 260 (1560 CE) [خ]

MS Marsh 189 (n.d.) [غ]

Biblioteca del Escorial, Madrid

MS Casiri 923/Derenbourg 928 (1535–1536 CE)⁹ [ش]

The Mahdavi Collection, Tehran:

MS 7437 (AH 640) [ط]¹⁰

These are the oldest complete manuscripts now available.¹¹ Of the present collection, the editorial board consider Köprülü 871 [ل], Feyzullah 2130 [ف], Bibliothèque Nationale 6.647–6.648 [د], Tehran 7437 [ط] and Esad Efendi 3638 [ا] as especially relevant. With regard

9 See the catalogue of the *Bibliotheca Arabico-Hispana Escorialensis* [...], 2 vols. (Madrid: Matriti, Antonius Perez de Soto, 1760–1770), vol. 1, p. 364: 'CMXXIII. Codex literis Cuphiciis exaratus die 3. mensis Dilhagia, anno Egiræ 862. quo continetur Tomus I. Operis longè celeberrimi, cui titulus *Literatorum Societas* (5): ubi Tractatus de multiplici disciplinarum genere occurrit. Auctor est Moslema Ben Ahmad Ben Cassem Ben Abdalla [name in italic small capitals] *Matritensis*, qui omnium Philosophorum placita in unum collecta Hispanorum Scholis proponit'. H. Derenbourg confirms that the work preserved in the manuscript is the Ikhwân's encyclopaedia, but adds that it ends with Epistle 22: 'On Animals'; he also confirms the authorship of al-Majriiṭi, located at the second half of the ninth century and considered to be the one who introduced the encyclopaedia to the Western world. He then adds: 'Copie datée de Dû l-Ḥiġġa 862/octobre–novembre 1458 J.-C.', and later: 'Papier. Écriture magribine. 262 feuillets. 26 lignes par page. Dimensions: 0.21 × 0.26. Reliure moderne aux armes pontificales. Titre: *Memorias de los hermanos de la pureza*. (Cas. 923)'; see *Les manuscrits arabes de l'Escorial*, 3 vols. (Paris: Ernest Leroux, 1884–1928), vol. 2 (1903), p. 37 (the 3rd volume is published by the Librairie orientaliste Paul Geuthner).

10 On these manuscripts, see Nader El-Bizri's foreword to the present volume, pp. xxii–xxiv.

11 Cf. Nader El-Bizri, 'Prologue', in El-Bizri, ed., *The Ikhwân al-Ṣafâ' and their Rasâ'il*, on pp. 21–22. Some of these manuscripts are considered to be 'as valuable to us as the 'Āṭif manuscript' by Ismail K. Poonawala, 'Why We Need an Arabic Critical Edition with an Annotated English Translation of the *Rasâ'il Ikhwân al-Ṣafâ'*', *ibid.*, pp. 33–57, on p. 57.

to the Epistles considered, however, it is to be noted that [١] and [ط] provide incomplete texts for the set of epistles on the natural sciences.

It is to be added that, unlike the other natural science treatises examined here, Epistle 21: 'On Plants' was particularly difficult to edit and translate. The text of the Atif manuscript is corrupt and/or suspect, often the scribe did not understand words, and the manuscripts consulted provide numerous alternative readings. Dieterici's edition (based on Cod. Paris. 1005 compared with the Cod. Wien 1 and with our Marsh 189 [= غ])¹² could not be of much help, because he often differs from the Atif manuscript. However, in some cases, when Atif's text seemed to me unclear, or not emendable on the basis of the other manuscripts consulted, I have followed Dieterici, indicating the alternative readings in the notes. In other cases, the Şâdir edition clarified some technical terms that were rare or difficult to understand. Another difficulty came from the various meanings assumed in the treatise by some technical terms, so that it was not possible to translate them univocally. Then, mine is a first attempt at editing and translating this text, offered for further attention to scholars.

The Arabic text presented here is partially vocalized for reasons of clarity. The beginning of each folio of the Atif manuscript is indicated, as well as the pagination of the second volume of the printed Şâdir edition between square brackets.

Description of the Manuscripts¹³

[١] Clear, unvocalized. 34/35 lines per page. Incomplete text. Pagination in Arabic (from fol. 2 onwards) and Latin figures (from fol. 73 onwards). The titles of the epistles and of chapters, and the word *faṣl* are written in red ink. At the bottom of each verso of the folio the first

12 Cf. F. Dieterici, *Die Abhandlungen der Iḫwān es Safā (Der Lautern Brüder, Arabisch)* (Leipzig: J. C. Hinrich'sche Buchhandlung, 1886), p. xvii. It is the eleventh volume of his comprehensive work *Die Philosophie der Araber im IX. und X. Jahrhundert n. Chr. aus der Theologie des Aristoteles, den Abhandlungen Alfārābīs und den Schriften der Lautern Brüder*, a milestone in the research into the Iḫwān al-Şafā'.

13 The manuscripts have been available on CD or in photocopy only, which necessarily affects the following descriptions.

word of the following recto is given (*raqqāṣ*, catchword). In Epistle 16, fol. 76b, there is a diagram of the universe indicating the names of the heavenly spheres. There are very few notes in the margins in Epistle 19. Omissions, lacunae: Epistle 20 is missing in this manuscript. Cases of *lectio facilior*: *al-kayfiyya* instead of *al-kathīfa* at fol. 168b19 (like [خ]); *al-ḥarb* instead of *al-harb* at fol. 195a22. Peculiar orthography: *kull man* instead of *kullman* at fol. 197a10; العجماوات instead of العجمات at fol. 198b1. Mistakes: 'yuhṣadu fi'l-rabī' *al-kharīf* instead of 'yuhṣadu fi'l-kharīf' at fol. 192b23. Other remarks: the word *al-awwal* is deleted in the locution 'Ādam *al-awwal*' at fol. 146b16 (like [غ] and Dieterici); there are some indiscernibly faint words at fol. 150a4–5; [أ] departs from [ف] at fol. 164b20, as [ف] reads *al-shamāl* instead of *al-jirbī*, and *al-janūb* instead of *al-taymī*.

[ب] 15 lines per page, apart from the first two folios that have 20 lines. Incomplete text. A sort of unclear ex-libris (apparently by a second hand) is found at the top of the first folio of Epistles 19 (repeated in the fifth folio) and 21:

من كتب الوثائق بمو>كا... علل... الغيوب إلى عبد العزيز ابن السيد على الدين
ابن أيوب.

The title of Epistle 19 is partially unreadable and there are some damaged pages at the beginning of the epistle. Several words are missing in this manuscript. A few additions in the margins. One addition in the margin, quite long, in Epistle 21. Omissions, lacunae: this manuscript contains Epistles 19–21 only. The text is cut at fol. 175a15 (at the word *wa-miyahihā*) and begins again at fol. 175b14 up to the word *sab'ami'a*; then the text is again cut at fol. 198a25, after the words 'ka-mā taf'alu' (but it reads 'ka-mā yaf'alu'). Cases of *lectio facilior*: 'illa *darūriyya*' instead of *ṣūriyya* at fol. 179a17; *al-shukūk* instead of *al-shawk* at fol. 194b24 (with [ش]); *al-ḥayawān* instead of *al-khayrāt* at fol. 195b17 [cf. the reading *al-ḥayawānāt* in [د] and [ل]].¹⁴ Mistakes: at fol. 196a16, after the words 'al-mawādda

14 My research did not reveal any particular relation between these two manuscripts;

kathīra, the words ‘*wa-dhālika*’l-*ḥāja* [...] *ilā*’l-*mawāddi*’l-*kathīra*’ are omitted, due to homoioteleuton; the word *al-ajl* has fallen from the expression ‘*tuqāruba al-ajl*’ at fol. 197a1; [ب] copies the text without understanding at fol. 198a5, where it reads ‘*naḥw nabāt*’ instead of *tajwīfāt*, and then, immediately after, *tahrīf* instead of *fī jawf*; the words ‘*wa-lakinnahā aḍyaqu qalīlan*’, ‘*wa-hākadhā tarkību shajarati*’l-*tīn wa-la-hā ‘uqadun mithlu ‘uqadi*’l-*qaṣb*’ are added after the words ‘*la-hā ‘uqadun mithlu ‘uqadi*’l-*qaṣb*’ at fol. 198a6; metathesis at fol. 175b18 (*yanfariku* instead of *tatafarraku*; an unreadable correction above the word). Other remarks: very uncareful use of diacritics (especially in Epistle 20); it always writes *lakinna* as if it were لا يکن; some words are divided at the end of the line; at fol. 171a17, instead of the words: ‘*wa-alwānihā* [...] *ma’ādinihā*’ it adds in the margin two lines that do not belong to Epistle 19.

[ج] 23/25 lines per page. Complete text. Unvocalized. Titles in bigger characters, but totally or partially unreadable; the word *faṣl* was probably rubricated in Epistle 21. *Raqqāṣ*. Long additions in Epistles 15 and 16 (vertical to the script and encircling the page); some notes in the margins; numerous notes in Epistles 19 (one reversed and running vertical to the script) and 20. It adds in the margins a long passage of Epistle 16, from 152b17 (‘*ẓanna kathīrun min al-nāẓirīn*’, the beginning of Chapter 18) to 153b1 (*mukhtalif*). Immediately before the conclusion of the epistle, it has a long addition similar to the addition provided by [ف]. Cases of *lectio facilior*: *sittīn* instead of *sinīn* at fol. 189b25; ‘*shākaluhu mustadīr*’ instead of ‘*shakluhu mustadīr*’ at fol. 193b22; *al-‘aql* instead of *al-‘uqad* at fol. 198a10. Special readings and writings: *al-thanawiyya* (sic) instead of *al-nabawiyya* and *al-thanāwī* (sic) instead of *al-nabawī* at fol. 150a4–5; العجماوات instead of العجمات at fol. 198b7; ‘*al-‘ināya al-azaliyya*’ instead of ‘*al-‘ināya al-rabbāniyya*’ at fol. 198b11. Mistakes: the word *al-taghyīr* missing at fol. 143a10 (or there is a blank space instead of the word); *al-awwal* instead of *al-arḍ* at fol. 161b2; blank space instead of the word *thamānī* at fol. 176a10; the words ‘*wa-raqqdati*’l-*jahāla*’ are missing at fol. 186b17; metathesis at

see below, pp. 93–99.

fol. 195b9 ('aṭan instead of ṭa'n); 'li-qabūl tilka jamī' al-ṣuwar' instead of 'li-qabūl jamī'i'l-ṣuwar' at fol. 197b13. Other remarks: a line is found above the first line (word: سُرْعَة) at fol. 151b4.

[ح] 27 lines per page. Complete text. Unvocalized. Double pagination, in Arabic and Latin figures, the Latin being four units more than the Arabic. Titles unreadable. In Epistle 17, the first four lines are unreadable until the words رَدْنِي عِلْمًا. The word *faṣl* is marked and bigger than the other words; some notes in the margins; some conclusions disposed to form a triangle. It has an addition of a few lines in Epistle 16, at fol. 156b20, after *samijatan*. At the end of Epistle 21, on the left side of the folio, near the ending phrase, there are some lines I was not able to read, perhaps a colophon, perhaps containing a signature. Nine other lines of script follow, unreadable, before the beginning of Epistle 22. Cases of *lectio facilior*: 'ashr instead of *kasr* at fol. 151a13. Peculiar orthography: يَا أَخِي instead of يَا أَخِي at fol. 182a3. Mistakes: 'ḥararatu'l-ḥaririyya' instead of 'ḥararatu'l-jaww' at fol. 196b9; a sign of 'mechanical' copying may be seen in the addition *dhakarnā* (shared with [ن]) at fol. 198a17. Other remarks: at fol. 143b20 it adds the adjective *al-zakiyya* to the words 'bi-jawhari'l-naḥs'; the measures in Epistle 16 are always indicated in figures.

There is an addition after the words 'amilat al-a'māl' that correspond to wa-a'māluhā at fol. 156b19:

السَّئَةُ وَفَعَلَتْ الْأَفْعَالُ الْقَبِيحَةَ، بَقِيَتْ هَذِهِ الرِّذَائِلُ مُصَوَّرَةٌ فِي ذَاتِهَا، وَيُخْرَجُ مِنَ الْعَالَمِ عَلَى كَرِهٍ مِنْهَا، وَصُورَتِهَا الْقَبِيحَةُ بَاقِيَةٌ عَلَيْهَا <...> إِلَى الطَّعَامِ وَمَا لَهَا <...> وَيَشْتَاقُ إِلَى الْمَاءِ وَقَدْ نَزَعَتْ لِبَاسَهُ وَيَشْتَاقُ إِلَى الْجَمَاعِ وَقَدْ <...> أَدْوَاتِهِ، فَتَسْقَى <...> قَدْ <...> عَيْنَاهُ وَقَطَعَتْ يَدَاهُ وَجَبَتْ ذِكْرُهُ <...> رَجُلُهُ وَلَمْ يَبْنِ لَهُ حَاسَهُ سِوَى نَفْسِهِ يَسْتَدْعِي الْمَاءَ فَلَا يَسْقَى وَتَشْتَهِي إِلَى طَعَامٍ فَلَا يَعْطَى وَيَشْتَاقُ إِلَى الْجَمَاعِ فَلَا <...> وَلَا <...> لَهُ تَذَكُّرُ مَا قَدْ فَاتَهُ فِي <...> وَمَا قَدْ فَعَلَهُ فِي الْأَعْصَرِ الْمَاضِيَةِ يَتَمَنَّى الْعُودَ وَلَا سَبِيلَ لِلَّهِ <...> عَلَى مَا فَاتَهُ وَيَكْثُرُ الْحَسْرَةُ عَلَيْهِ.

The text begins again at fol. 156b20 with the words *kullamā laḥaẓat* [...].

In Epistle 19, fols. 181a3–b2 ('*tan'aqidu* [...] *al-ḥayāh*') are out of place; at fol. 181a3 of Atif, after the words '*aw ḥararatu'l-ma'din*', there is a *signe de renvoi*, and then the text continues with the words (fol. 181b1–2):

والرطوبات الروحانية اللطيفة في أعضاء بدن الحيوان التي بها صحة المزاج وقوام الحياة
Then, the words '*wa-tan'aqidu* [...] *tujmidu'l-damma*' (fols. 181a3–b1/2) are copied, with repetition of the final words. The text runs as follows:¹⁵

تنعقد وتصير أملاحاً وشبوباً وبوارق وفنون الزاجات ومن الجواهر المعدنية أنواع
الزرايخ والمرقشيثا والمغنيسيا والشادنج والكجل والتوتيا ومنها الزجاج والبلور والمينا
والطلق والسبج والعقيق والفيروزج والبجادي والجزع واللازورد والعنبر والدهنج ومنها
القيصر والنفط والجص والإسفيداج وما شاكلها. واعلم يا أخي بأن لكل نوع من هذه
الجواهر خواص ومنافع ومضار تركناها ذكرها مخافة التطويل إذ قد ذكرتها الحكماء في
كتبهم وهي موجودة في أيدي الناس ولكن نذكر من خواص بعضها طرفاً ليكون دليلاً
على الباقي الذي لم نذكره. أما الدهنج فهو حجر يكون في معدن النحاس وطبيعته باردة
لينه لأنه دُخان يرتفع من الكبريت المتولد في معدن النحاس أخضر مثل الزنجار وإذا
صار إلى موضع من جبال المعدن تكاثفت وتلبّدت أجزاءه بعضها فوق بعض وتجسد
وتحجر وهو مختلف الألوان أخضر كمدحسن [؟] اللون وفيه خاصية سم من سقي
من سخالته نفطت أمعاوه وأمراضه وتلتهب مدته. وإن شرب وهو صحيح ضده وهو
يصفوا مع الماء ويتكدر معه ويذهب تكسير الذهب وتشقيقه عند الطرق ومع التنكار
يكون أقوى فعلاً وإن ذلك مع الذباب على لسع الزنابير سكتها وإن سحق وأدیف
بالخل وطلي على القوباء أذهبها وينفع من السعفة التي في الرأس ومن الجواهر المعدنية
الفاخر وهو حجر لين أملس مختلف الألوان وأصله كان رطوبة هوائية جمدت في

15 I have underlined the words that differ from the established text; there are many differences in orthography, and several words have been omitted (see pp. 352–356 of the Arabic text).

معدنه بطول الزمان وهو حجر شريف تظهر منه أفعال كريمة وذلك أنه ينفع من السموم القاتلة حارة كانت أم باردة حيوانية كانت أم نباتية أو معدنية تلك السموم ونحتاج أن نزيد في شرح هذا الباب إذا كانت عقول كثير من الناس قد تحيرت في كيفية أفعال السموم والترياقات والفازهرات في الأجسام الطبيعية لأنها أجسام جامدات وقد قام البرهان بأن الجسم لا يفعل له من حيث هو جسم ولا العرض له فعل أيضاً لأنه أعجز من الجسم بكثير. فنحتاج أن نذكر أولاً كيفية الأفعال التي تظهر من هذه الأجسام بعضها في بعض ثم تبين الفاعل من الحقيقة لها وفيها ومنها وبها. وأما السموم فنوعان حارة وباردة فالباردة منها أن تجمد الدم والرطوبات الروحانية اللطيفة في أعضاء بدن الحيوان التي بها صحة المزاج وقوام الحياة [...]

[خ] 33 lines per page. Incomplete. Partially vocalized. Pages framed by rectangles. *Raqqāṣ*. The titles of Epistles are totally or partially unreadable. In Epistle 16, on the verso of the second folio, there is the space for a diagram of the universe, not drawn. Some words are also unreadable, perhaps because rubricated. Omissions, lacunae: the text is cut at fol. 164a20 with the words 'risālat al-kawn wa'l-fasād', and it begins again at fol. 166a3 with the words 'kāna maṭaran'; later, the text is cut at fol. 168a2 with the word *al-laṭīf*, and begins again at the beginning of Chapter 15. Cases of *lectio facilior*:¹⁶ *kawn* instead of *lawn* at fol. 176b17; 'ka'l-ma'ādin' instead of 'ka'l-mu'āwinīn' at fol. 188a6; *al-ajnās* instead of *al-iḥsās* (with [ف]) at fol. 189a21; *al-mu'affanāt* instead of *al-mu'aqqibāt* at fol. 189b10; *li-burūjihi* instead of *li-tarwīhihi* at fol. 189b7; *al-kawn* instead of *al-lawn* at fol. 191b25; *asmā'ihimā* instead of *asbābihā* at fol. 193b6; *al-nabāt* instead of *al-turāb* at fol. 194b6; *thamaruhā* instead of *numuwwuhā* at fol. 194b20 (with [ش] and [غ]); *al-nās* instead of *al-libās* at fol. 195b22; *hādhihī* instead of *mādda* at fol. 194a11; *rutba* instead of *zīna* at fol. 189a14.¹⁷ Special readings: at fol. 141b14–15, instead of

16 Many of the following examples might demonstrate that the scribe was copying from a model without diacritics.

17 But note that at fol. 189a17 we find again *al-rutba* instead of *al-zīna*, without any possibility of speaking of a *lectio facilior*.

فهوولى الصناعة كل جسم يعمل منه وفيه الصانع صنيعة

[خ] has:

فهوولى الصناعة كل جسم يعلم منه وفيه يعمل الصانع صنيعة،

demonstrating a proneness to the distinction between theory and praxis without any attention to the content of the text; *'kayfiyya fanā'i'l-'ālam* *'ālam al-ajsād*' instead of *'kayfiyya fanā'i'l-'ālam*' at fol. 170b5, which might have a theoretical value in that it seems to indicate of what world the authors are speaking; at fol. 171a17, instead of *'wa-rawā'ihihā*', it has: *'wa-taghyīrāt alwānihā*', and the words *'rawā'ihihā [...]* *wa-taghyīrāt*' have been omitted; *rikhwa* instead of *wujūh* at fol. 191a12; *munajjimīn* instead of *mutahayyirīn* at fol. 193b10; the synonym *al-injāsh* instead of *al-ijjāsh* at fol. 194a16; *'wa-ḥassat zi'yābir*' instead of *'wa-ḥushiyat zi'yābir*' at fol. 198a10; *'ināyatihā* instead of *ghāyatihā* in the addition at fol. 196a10 that substitutes the word *idh*;¹⁸ *al-awwal* instead of *al-anwā'* at fol. 197b1; *ṣāhibihi* instead of *ḥāmilihi* at fol. 195b8.¹⁹ Mistakes:²⁰ a case of mechanical copying at fol. 149b23, where it has *'lahu ḥaqīqa*' instead of *'lā ḥaqīqata lahu*'; *'jama'nā fihā*' instead of *jughrāfiā* at fol. 159a5, which denotes that perhaps the copyist did not know the title of the Ikhwan's treatise; metathesis at fol. 195b9 (*'arafnā* instead of *faraghnā*); another metathesis, and uncertainty in the use of diacritics, at fol. 163b18 in the reading *al-r-j-r* (?) instead of *al-jazr*; *lam* instead of *thumma* at fol. 164a12; *ijtihādiḥā* instead for *ijtimā'ātiḥā* at fol. 186a2; *وايضا لانها* instead of *ittiṣālātuhā* at fol. 186a14, and a bit later *'fī ḥudūd al-rīḥ*' instead of *'fī ḥudūd al-mirrikh*'; *'an kāna*' instead of *arkān* at fol. 188b11. Other remarks: the addition of *'fa-i'lam dhālika*' at fol. 143b17; blank space at fol. 180a1 instead of the word *naẓāratahu*; at fol. 181a8, instead of the word *al-jawāhir*, it has *al-aḥjār*, then deleted and substituted by *al-jawāhir*;²¹ at fol. 183b1, while quoting Qur'an 6:58, after *ta'ālā* there is the addition *انتم تحرثون*, erased; *'fī'l-risāla*

18 We may wonder whether this follows from that misunderstanding, or whether it is a *lectio faciliior* on the basis of the previous contents, given that we still have a plural.

19 These two last readings are especially difficult to explain.

20 Many of the following mistakes indicate that often the copyist of this manuscript fails to catch the sense of the discourse.

21 This demonstrates that the scribe was copying from a preceding version.

al-ithnayn wa'l-khamsin' instead of *'fi'l-risāla al-ḥādiya wa'l-khamsin*' at fol. 197a2.

[د] 24 lines per page. Complete text. Unvocalized. Double pagination, in Arabic and Latin figures, the Latin being one unit more than the Arabic. The title of Epistle 20 is unreadable. Lines across words (or, less often, above written lines), indicate titles, chapters, eulogies, important parts of the speech; the word *faṣl* is sometimes in bold (perhaps in a different colour?); some words are bigger for emphasis. Marginal notes, some of them by the same scribe, different from the copyist of the manuscript. In Epistle 16, at fol. 86b, there is a diagram of the universe. Cases of *lectio facilior*: *'al-musammā 'lān'* instead of *'al-musammā'l-ās'* at fol. 180b1;²² *al-ḥayawānāt* instead of *al-khayrāt* (as in [ج]) at fol. 195b17. Other remarks: at fol. 176b24, it adds in the margin after *"amilat fihā al-ḥarāra"*, the following phrase, with some changes from the established text:²³

المعدين، تحللت تلك الرطوبات، وصارت بخاراً وارتفعت في <الجو> كما ذكرنا من قبل، وما بقيت محبوسةً مُلازمةً للأجزاء الأرضية، مما عمل هذا الحارة.²⁴

[ر] 31 lines per page. Complete text. Vocalized. Double pagination, in Arabic and Latin figures, the Latin being one unit more than the Arabic. *Raqqāṣ*. In the first page of each treatise there are traces of writing that cannot be identified (ornamental title pages, illegible script, or the impression of ink?); titles totally or partially unreadable, initially disposed to form a triangle, and in the following folio framed by a rectangle. Some words are too faded to be read. A few notes in the margin (sometimes probably by a second hand); some of them disposed to form a triangle.

Cases of *lectio facilior*: *al-iḥsān* instead of *al-iḥsās* at fol. 189a21 and at fol. 189a24. Mistakes: the addition of *mā'* to *ma'nā* at fol. 161b12;

22 See the critical apparatus, p. 326, note 1.

23 The established text runs as follows:

المعدين، تحللت أكثر تلك الرطوبات، وصارت بخاراً وارتفعت في الهواء كما ذكرنا قبل، وما بقيت منها محبوسةً مُلازمةً للأجزاء الأرضية، مُشجدةً بها، عَمِلَتْ فيها الحرارة.

24 The text is unclear and probably by a second hand.

the addition of *al-nās* after *yakūnu* in the phrase '*yakūnu'l-insān*' at fol. 167b4; uncertain use of diacritics at fol. 169a21 (*mazlūba* instead of *mawṣūfa*); *تقع منها إلى* instead of *ضع منها على*; *al-qadar/qadr* (?) instead of *al-miqdāru* in the phrase: '*lam yadhab 'alayhā hādha'l-miqdār*' at fol. 198b11. Other remarks: at fol. 195b25, after the exhortation '*jamī'a ikhwāninā haythu kānū fī'l-bilād*', there is the following addition (with unclear or apparently mistaken words shown between angled brackets):

واستعذ بالله من الشيطان الرجيم وتخلق بأخلاق الملائكة أجمعين لأنك <...> بتلك الأخلاق أشد العذاب وبأخلاق الملائكة تنال السرور والغبطة والفرح وبقاء الأبد والثواب الجزيل في جوار رب العالمين، كما قال زين العابدين، رضى الله عنه: وما <...> الغناء لنا <باهل؟> وما دار الغناء لنا بدار وما أموالنا إلا عوامر <...> المغير من المعار.

[ز] 31 lines per page; the script is framed by a rectangle. Complete text. Very clear, fully vocalized. Latin pagination. The titles of Epistles 19 and 20 are totally or partially unreadable. *Raqqāṣ*. Sometimes the ending of the words are outside the frames. Very few notes in the margins (outside the frame); in Epistle 16, at fol. 118r, there is a space for a diagram of the universe, not drawn. One addition in the margin, disposed to form of a triangle. Blank spaces, perhaps due to rubricated words. Cases of *lectio facilior*: *al-līf* instead of *al-laṭīf* at fol. 196b22. Mistakes: *ارتفعت* instead of *irtafa'at* at fol. 165b9; *تعتني/اعتني* instead of *yaghtadhī* at fol. 170b25; *kurī* instead of *karkī* at fol. 197b3; metathesis at fol. 173b15 ('*zi'bqan wa-jazājan*' instead of '*zi'bqan rajrājan*'). Other remarks: in Epistle 21 especially, it often differs from [ك] in spite of the strong similarities between the two manuscripts.

[ش] 25 lines per page. Incomplete text. Passages of the text are often repeated or resumed (even extending to several lines) in the margins, together with marginal notes. In Epistle 16, at fol. 138 (indicated in Latin figures) there is a space for the diagram of the universe, not drawn. New pages almost always begin with the last word

of the previous page. Phrases may be distinguished by blank spaces. Words are broken at the end of the lines. Maghrebi script; among other characteristics, the diacritics indicating the second person singular of the verb are often written below the word. An *alif* is often added over an *alif maqṣūra*, as a correction. Omissions, lacunas: it contains Epistles 16–21 only; the text of Epistle 17 is cut at Atif fol. 158a5 (with the words ‘*wa-tamāsakat ajzā’uhā*’), and it begins again at fol. 159 a17–18 (with the words ‘*fī hādhihi’l-ajsām*’); at fol. 183b16 (‘*wa-minhum man nasabahā ilā’l-bakht wa’l-ittifāq [...]*’), the words ‘*al-bakht wa’l-ittifāq wa-minhum man nasabahā ilā’l-nujūm wa-minhum man nasabahā ilā’*’ are omitted, then there is an unclear addition of five lines in the margin, vertical to the script, which continues at the top of the page for 21/2 lines. A lacuna is found from Atif fol. 185b23 (‘*fa-kull kawkab yadūru [...]*’) up to the words ‘*markaz al-‘ālam*’ at fol. 186b8; then the text begins again at fol. 186b8 from the words: ‘*wa-dhālika annahā*’.

Cases of *lectio facilior*: *yakūnu* instead of *lawn* at fol. 176b17; *al-kathīr* instead of *al-kummathrā* at fol. 192b6; *al-fahl* instead of *al-nakhl* at fol. 194b19; *thamaruhā* instead of *numuwwuhā* (with [خ] and [غ]) at fol. 194b20; *al-shukūk* instead of *al-shawk* (with [ب]) at fol. 194b24; *al-qīṣṣa* instead of *anqaṣuhu* at fol. 195a5; *al-barūda* instead of *al-dūda* at fol. 195a6; *nāwa* نواة instead of *nadāwa* at fol. 196b12; *al-ḥayawānāt* instead of *al-ḥubūb* at fol. 197a23. Special readings/writings: *al-babāniyya* instead of *al-thābita* at fol. 172a3;²⁵ *tanfa’u* instead of *tanqaṭi’u* at fol. 172a25; *al-muzz* instead of *al-mawz* at fol. 175b2; مائة instead of *mā’iyya* at fol. 175b18; للرباعة instead of *li’l-dabbāghīn* at fol. 181a1;²⁶ ‘*kitāb al-aghdhiya*’ instead of ‘*kutub*

25 On this name for the fixed stars see, e.g., P. Kunitzsch, ‘Albumasariana’, *Annali dell’Università degli Studi di Napoli “L’Orientale”* 62 (2002), pp. 19–28 with related bibliography. It is also worth noting that at fol. 152b18, instead of *al-thābita*, some manuscripts (such as [د], [ز], [ط], [غ], and [ك]) have *al-sayyāra* (and so does Dieterici, whereas [ل] emends this in the margin), other manuscripts (such as [أ] and [ش]) give *al-baybāniyya*, or (such as [ج] in the margin) *al-bayābāniyya* (a similar unclear word is added in [ح] to *al-thābita*).

26 This reading may indicate either that the copyist’s model was lacking diacritical dots, or that he did not understand the topic addressed, or even that the copyist did not know Arabic.

al-aghdhiya at fol. 192a1;²⁷ العجماوات instead of *al-‘ajamāt* at fol. 198b2. Mistakes: مكائنها قد خول instead of *‘amākinihā aw wuḥūl* at fol. 171b5; metathesis at fol. 196a12 (*al-‘asf* instead of *al-sa‘af*). It sometimes shares the readings of [غ].

[ط] 20 lines per page. Incomplete text. Generally unvocalized; not always clear. Two apparently different Arabic paginations are at the top of the recto of the folios, but one of them is generally unclear. The word *faṣl* is emphasized by elongated letters. Some notes in the margins, also vertical to the script; in Epistle 16, at fol. 196a, there is a diagram of the universe, without the names of the spheres. Colophon at the end of Epistle 16. Omissions, lacunae: the text is cut at fol. 162a16 from the words *‘wa-ajsām li’l-ṣunnā*’, and it begins again at fol. 163a3 with the words *‘wa-huwa miqdār [...]*’. The text is definitely interrupted in Epistle 19, at fol. 176a21, with the words *‘ajzā’ al-kibrīt wa’l-zi’baq’*. Other remarks: it shows some closeness to [د].

[غ] 29 lines per page. Complete. Partially vocalized. *Raqqāṣ*. The title of Epistle 19 is unreadable. Titles of treatises and chapters are in bigger characters and in bold, as are the words *faṣl* and *i‘lam*. A few notes in the margins. In Epistle 16, at fol. 2 on the verso, there is a blank space for the diagram of the universe. In Epistle 17 some words are marked in bold, while others are unreadable, perhaps because they were rubricated. Omissions, lacunae: in quoting the title of Chapter 11 of Epistle 16, it stops at the words *‘fī maqādir aqtārihā*’; it cuts from *wa-hādhā* until *tashkurūn* at fol. 169a7–8, but it adds the following words:

فمن كان له عقلٌ فليتكفر في هذا وسلة وأيّ دلالة أقوى على وجود الصنائع من هذه الإشار البينة الظاهرة وإنما يتذكر أولو الأبواب وإنما <...> الله من عبارة العلماء.

In general, it provides readings different from those of all the other consulted manuscripts; in particular, it selects synonyms of the words found in the other manuscripts.

27 This reading may indicate that the copyist is referring to Hippocrates’ work and not to general works concerning the subject.

Cases of *lectio facilior*: *al-kullī* instead of *al-kuḥl* at fol. 181a5; '*min warā'a Ibrāhīm*' instead of '*min warā'ihim wa-marātibihim*' at fol. 187b18; *muhandasa* instead of *muhandama* at fol. 194a1; *thamaruhā* instead of *numuwwuhā* at fol. 194b20 (with [خ] and [ش]). Mistakes: at fol. 160b3, instead of '*mā taḥallala minhā al-bukhārāt*', it gives '*mā yataḥallalu minhā al-taḥliyāt* [written as: التجليات] *al-bukhārāt*'; metathesis at fol. 161b22 (*sā'ira* instead of *sāriya*); مصلعين instead of *muttaṣilan* at fol. 167b12; *r-b* instead of *turba* at fol. 171b5; *bāqī* instead of '*mā fī*' at fol. 186b6; another metathesis at fol. 196a14 (*al-sa'ba* instead of *al-sa'afa*, with [ل] and Dieterici). Other remarks: this manuscript always uses the word *kitāb* instead of *risāla* — that which corresponds to the use in a more ancient period. In many cases it shares the readings of [ش]; e.g., at fol. 156a13–14, both [غ] and [ش] complete the title of Chapter 28 of Epistle 16 with the words '*wā lā yābisa*', perhaps due to a desire to complete the list of the four qualities (note that, a bit later, at line 15, it still adds — this time, with [ر] and Dieterici — '*wā lā yābisa*' after '*wā lā raṭba*'). It often has a hurried calligraphy; at fol. 176a12, instead of *nuḥtāju*, it gives *turīdu*, and then it puts at the centre of the line, as if they were the title of a chapter, the words: '*wa-nurīdu an nashraḥa hādhā'l-bāb*'; at fol. 177a19, it gives the words '*wa-ammā'l-yāqūt*' as if they were a title; finally, it has a blank space in introducing the verses in Epistle 21 — perhaps the result of an attempt at reporting the name of their author?

[ف] 32/33 lines per page. Complete text, partially vocalized. Pagination not always visible. Some titles and the word *faṣl* are written in red ink. Some terms are emphasized by a red line above them. One of the two additions in the margins of Epistle 15 is vertical to the script. In Epistle 16, in the verso of fol. 2, there is a diagram of the universe, without the names of the spheres. In Epistle 17 the word *faṣl* is emphasized, and there is only one addition in the margin. An enormous وقف at the top of the verso of the fourth folio (fol. 195a23 Atif) is of note. Immediately before the conclusion of the epistle, it has a long addition similar to the addition provided by [ج].

Cases of *lectio facilior*: *al-kawn* instead of *al-lawn* at fol. 192b2; *mā-t-b* instead of *thābit* [fī'l-ard] at fol. 194b23;²⁸ *innamāhā* (with [ل]) instead of *atammahā* at fol. 196a11; '*fa-ammā*'l-*ḥikma*' instead of '*fa-mā al-ḥikma*' at fol. 198b9. Mistakes: *al-q.lāl* instead of *al-kalāl* at fol. 179b25;²⁹ '*wa-tanfari*'u[?] fī'l-*jihat* [sic] *al-hawā*' to the words '*yartafi*'u fī'l-*hawā*' at fol. 192a22–23; after the words '*tilka*'l-*mādda*' (with [أ], [ج], and [غ]) it mistakenly adds '*fannan ākhar*' instead of '*waqtan ākhar*' at fol. 198a1. Other remarks: there is then a second addition to the words *ilā 'ālam al-arwāḥ* at fol. 156b12.³⁰

وتصل إلى حقيقتها لا عين رأت ولا أذن سمعت ولا خطر على قلب بشر وتسمع نداء
الذين أحنوا الحنى (?) وزيادة وتشرب من خمر لذة للشاربين وتذوق من عسل
مصفى وتنعم بما تشتهي الأنفس وتلذ الأعين وا<...>فها خالدون فهذه الجملة وأكبر
وعنيت (?) الصالحين من عباده والمتقين من خالص أوليائه.

[ك] 31 lines per page. Complete text. Clear, vocalized. The script is inside a rectangular frame. The titles and the word *faṣl* are written in blue ink, as well as the word *i'lam*; sometimes these words are written in brown (or golden?) ink. The incomplete words at the end of the line are completed under the line. Epistle 16 has a highly decorated diagram for the universe on the recto of the second folio; one word is emphasized in Epistle 19; in Epistle 21 there is an adornment at the end; minimal additions in the margins. At the end of the chapters, or even single parts of the treatises, the eulogy '*wa-llāh [ta'ālā] a'lam*' is very frequently added. One exception is at fol. 151b15, where we have the addition '*wa-llāh ta'ālā a'lam bi'l-ṣawāb*'. At fol. 174b11 there is an addition to the title of Chapter 7 in blue ink. Shift of folios: at fol. 179b18, after the word *al-mabādir*, it goes on with the text of the epistle 'On Plants', from fol. 196a15 ('*al-ṭabī'iyya al-jādhība*') to fol. 198a8

28 This indicates that the copyist has neither understood his model, nor followed the sense; there is also confusion with the diacritical dots.

29 This is probably because of a mistaken pronunciation.

30 See the critical apparatus, p. 149, note 14; for the other additions in the manuscripts, see the Appendices.

(‘*ajzā’ arḍiyya*’), cutting the text of Epistle 19 from ‘*li-shiddati* [...]’ up to *ma’rifa* at fol. 180b12.

Cases of *lectio facilior*: *al-kull* (with metathesis) instead of *al-lakk* at fol. 175b23; ‘*al-maḥabbāt wa’l-muwalladāt*’ instead of ‘*al-maḥabbāt wa’l-mawaddāt*’ at fol. 189a15–16;³¹ مايعا (with [أ], [ف], and [ل]) instead of *mā’an* at fol. 175b25.³² Peculiar orthography: *hawā’* always written with final *alif maqṣūra*. Mistakes: *yajib* instead of *taḥta* in the phrase ‘*taḥta falak al-qamar*’ at fol. 172a12;³³ *ru’ya* instead of *ri’a* at fol. 189b5.³⁴

[ل] 23 lines per page. Complete text. Quite clear *naskhi* script, fully vocalized. Arabic pagination on the recto of the folios. The different parts of the discourse are marked by three points disposed in triangle. Chapter titles and the word *faṣl* are also emphasized. Numerous additions in the margins, even vertically to the script or upside down (as if the text were revised by more than one person at a time), which are often very long. It shows extreme care in verifying every detail, surely through collation of various manuscripts. In Epistle 16 at fol. 169b there is the diagram of the universe.

Cases of *lectio facilior*: *al-ḥayawānāt* instead of *al-khayrāt* at fol. 195b17 (with [د]). Other remarks: *al-mutaṭabbib* is added above the word *al-ṭabīb* at fol. 181b22.³⁵ The words ‘*yā akhī*’ are added in the margin at fol. 186b20.

[ن] 29 lines per page. Complete text. In general, unvocalized. Double pagination, in Arabic and Latin figures, the Latin being one unit more than the Arabic. The titles of the epistles and chapters, and the word *faṣl* are written in red ink, as are some lines above words, marking the division of the text, and some additions in the margin. *Raqqāṣ*. Very numerous additions in the margin, even by hands other than the scribe’s. Some of them are emphasized by a line written above

31 This might demonstrate that the copyist did not understand the context.

32 It also writes the letters ما between the lines.

33 This might demonstrate that the copyist had a model without diacritics but looked for a suitable reading.

34 Again, this might demonstrate that the copyist did not understand the context.

35 Here [ل] resembles [أ], which in its turn has no correspondences with [ف] or [ن].

the words — the verses in Epistle 15 are also emphasized thus — or even by dashes that cross words. Deletions. One *signe de renvoi* at fol. 165b15 above the word *hīna'idhin*. In Epistle 16, at fol. 138b, there is the diagram of the universe. Shift of folios: in Epistle 15, by a second hand.

Peculiar readings/orthography: *qiyāma* with small *alif*; *ilāhiyya* beginning by *alif madda* at fol. 195a20; *inshā'a* instead of *in shā'a*, and *ta'ālā* with final long *alif* instead of *alif maqṣūra* in the addition at fol. 160b5. Mistakes: after the words '*fa-nakhtim hādhihī'l-risāla*', it adds in the margin at fol. 160b4–5: *الخ wa-hiya al-mulaqqaba bi'l-āthār*, but the explanation is mistaken; '*hādhihī'l-ṣanā'i*' instead of '*hādhā'l-ṣānī*' at fol. 165b1; metathesis at fol. 190b12 (تبلغها instead of تلغها); '*min funūn* [added in the margin] *'ilal tarkībihā*' instead of '*min 'ilal funūn tarkībihā*' at fol. 196a9; '*ajzā' al-turābiyya*' instead of '*ajzā' al-turba*'.

As a general remark, orthography is often post-classical in all manuscripts, and letters are not always fully pointed; *yā'* at the end of a word after a *fatha* is often written with two dots: ي; sometimes the *hamza* follows the long *alif*, sometimes the *hamza* does not follow the long *alif*.

Editing Method

The present edition is the result of a close and systematic collation of all the above-listed manuscripts. However, only select readings are found in the apparatus. I have chosen to list all readings that differ from the Atif manuscript in meaning, leaving aside those different in other aspects (i.e., form, grammar, scribal idioms, etc.), apart from some significant cases.³⁶

36 I have not listed the following: instances in which the order of the words was inverted or changed; the various uses of the verbal tenses, moods, and persons (due also to the frequent lack of diacritical points in the manuscripts); alternatives in the use of cases; alternatives in the use of number and gender of nouns; alternatives in the use of the accusative; alternatives in the use of the article; the use of *fa* instead of *wa* and vice versa; the addition or elimination of *fa*; the use of *bi-an* instead of *an* (with or without annexed pronouns) and vice versa; repetitions in the manuscripts. With regard to nouns: · Reverse order

I have reported in the apparatus all words or expressions in Atif that were left out in the other manuscripts. Conversely, the mention of additions in the margins is limited to the long passages.

The titles and the use of eulogies in the various manuscripts are described below. I have also indicated in the notes the titles of the chapters as they are found in the Ṣādir edition, as they may testify to a different manuscript tradition. For the same reason, I have systematically compared the edited text with Dieterici's edition; the titles of the chapters in this edition have been reported, too. The great majority of the cases in which Dieterici differs from the readings given in the notes are also indicated, and below a few other readings that seemed especially relevant are reported. For a general survey on Dieterici's edition and its relation to the consulted manuscripts, see pp. 99–106. The writings of Dieterici and of the Ṣādir edition have been reported as they are in the original.

The Titles of the Natural Science Treatises in the Manuscript Tradition

For the sake of brevity, I will discuss here the most interesting differences or additions only. First of all, let us remark that the name of the authors — the Pure Brethren — is completed as follows: by [ا], at the beginning of Epistle 15, as *Ikhwān al-ṣafā' wa-khullān al-wafā'*; [ر] has *Ikhwān al-ṣafā'* followed by: *wa'l-aṣḍiqā' al-ḡurafā'* (cf. also Epistles 17, 18, 19 and 20); [ز] has *Ikhwān* only. [د], [ز], [ك], and [ل] add: *al-karrām*. In Epistle 17, [ط] has *Ikhwān al-sa'āda*, whereas in Epistle 18, it has *aḥwāl al-sa'āda*, a clear mistake for *Ikhwān al-sa'āda*.

of words; · Use of different cases; · Lack of the accusative case, and, inversely, the introduction of the accusative (though less frequent); · Use of the feminine instead of masculine, and vice versa; · Use of the singular instead of plural, and vice versa; · Elimination of the article, and, inversely, addition of the article, (occurs in all manuscripts); · Use of the plural instead of dual, and vice versa; · Use of synonyms (occurs only in some manuscripts). With regard to verbs: · Use of different persons, moods, and tenses; · Use of *fa* instead of *wa*, and vice versa; · Addition of *fa*; · Use of *bi-an* instead of *an*, alone or with annex pronouns, and vice versa (occurs in all manuscripts); · Elimination of *fa* (occurs only in some manuscripts).

Again in Epistle 17, [ل] has: *Ikhwān al-ṣafā' wa-khullān al-wafā'*; the same occurs in Epistle 18; the form *Ikhwān al-ṣafā' wa-khullān al-wafā'* is found in Epistle 19 in [ا] and [ب]; and in Epistle 20 in [ب].

Manuscripts [د],³⁷ [ز],³⁸ [ط],³⁹ and [ك]⁴⁰ give the eulogy '*ṣāna'llāh aqdārahū*', often in addition to the name of the authors.

Note that in Epistle 18, instead of '*fi'l-ṭabī'iyyāt*', we find '*min al-rasā'il al-ikhwāniyya*' in [ا], and *al-falsafiyya* in [ج]; in Epistle 19, instead of '*fi'l-ṭabī'iyyāt*', *al-falsafiyya* in [ج].

As to the title of Epistle 15, [ا], [د], [ز], [ط], [ف], [ك], [ل], and [ن] add the alternative title *Sam' al-kiyān*, clearly approaching the treatise to Aristotle's *Physics*. Atif (which counts fifty-one epistles only) introduces the 15th treatise simply as the first epistle on natural sciences. It is interesting to recall that [ج] considers the natural sciences section to be the first of the encyclopaedia, as is made clear by the titling of Epistles 16, 17, 18, and 20.

The numeration of the Epistles is not always consistent in the manuscripts. Epistle 15 is introduced as the 14th by [ا], [د], [ط], and [غ], which adds: '*min al-tartīb fi'l-fihrist*'. (Note, however, that with reference to Epistle 18, [غ] says it is 'the fourth of the natural books', and the 14th '*min al-tartīb fi'l-fihrist*'.) Epistle 17 is considered to be the 16th by [ا]; Epistle 18 is considered to be the 17th by [ط]. Manuscripts [د] and [ش] consider Epistle 18 to be the 17th; [د] considers Epistle 20 to be the 19th, and Epistle 21 to be the 20th. Manuscripts [ج] and [ر] introduce Epistle 19 as the 6th, and not the 5th, of the second section. Epistle 20 is introduced as the 5th, and not the 6th, of the natural science section by [ج]. Manuscript [ك] indicates it as the 13th, and Epistle 21 as the 20th. Note, finally, the following:

37 In the titles of Epistles 17, 18, 19, 20, and 21.

38 In the title of Epistle 18.

39 In the title of Epistle 17.

40 In the titles of Epistles 18, 19, and 21.

Epistle 15, Atif fols. 141a1-b1

الرسالة⁴¹ الأولى من القسم⁴² الثاني في الطبيعيات⁴³
في بيان الهيولى والصورة⁴⁴ من جملة إحدى وخمسين رسالة من رسائل إخوان
الصفاء
في تهذيب النفس وإصلاح الأخلاق من كلام الصوفية
بسم الله الرحمن الرحيم رب وفق

Epistle 17, Atif fols. 157a10-b1

الرسالة الثالثة من القسم الثاني في الطبيعيات
في⁴⁵ بيان الكون والفساد من⁴⁶ جملة إحدى وخمسين رسالة من رسائل

41 بسم الله الرحمن الرحيم الرسالة الأولى في الطبيعيات الجسمانية وهي سبعة عشر رسالة أولها هذه الرسالة [...] في ماهية الهيولى والصورة والحركة والزمان من جملة إحدى وخمسين رسالة من رسائل إخوان الصفاء وخلان الوفاء في تهذيب النفس وإصلاح الأخلاق [أ] الرسالة الأولى في الطبيعيات الجسمانية وهي سبعة عشر رسالة أولها هذه الرسالة [...] في ماهية الهيولى والصورة والحركة والزمان من جملة الرسائل إحدى والخمسين في تهذيب النفس وإصلاح الأخلاق [ف] القسم الثاني في الطبيعيات يشمل على سبعة عشرة رسالة من القسم الثاني [وأضاف في الهامش: من القسم الثاني الرسالة الأولى في الهيولى والصورة] [ن].

42 الثاني: المنطقيات [ز].

43 زيادة في ل: الجسمانيات وهو مشمل على سبعة عشر رسالة والله أعلم الرسالة الأولى.

44 زيادة في ل، ن: والغرض منها هو البيان عن ماهية الصور المقومة لكل واحد من هذه الأركان [سقط من ن: هذه الأركان] الأربعة التي هي النار والهواء والماء والأرض وإنما هي الأمهات الكائنة منها المعادن والنبات والحيوان وكيفية إستحالة بعضها إلى بعض بدوران الأفلاك حولها ومطارح شعاعات الكواكب عليها وأن الطبيعة هي الفاعلة لها و [سقط من ن] هي قوة من قوى النفس الكلية الفلكية.

45 زيادة في أ: وهي السادسة عشر من رسائل إخوان الصفاء في الكون والفساد والغرض منها هو البيان عن ماهية الصور المقومة لكل واحد من الأربعة التي هي النار والهواء والماء والأرض وهي الأمهات الكائنة منها المعادن والنبات والحيوان وكيفية إستحالة بعضها إلى بعض بدوران الأفلاك حولها ومطارح شعاعاتها الكواكب عليها وأن الطبيعة الفاعلة لها هي قوة من قوى النفس الكلية الفلكية.

46 زيادة في ل، ن: والغرض منها هو البيان عن ماهية الصور المقومة لكل واحد من هذه الأركان [سقط

إخوان الصفاء في تهذيب النفس وإصلاح الأخلاق من كلام الصوفية
بسم الله الرَّحْمَنِ الرَّحِيمِ رب رَدْنِي علماً

Epistle 18, Atif fols. 161a1-b1

الرسالة الرابعة من القسم الثاني في الطبيعيات
في بيان الآثار العلوية⁴⁷ من جملة إحدى وخمسين رسالة من رسائل
إخوان الصفاء في تهذيب النفس وإصلاح الأخلاق من كلام الصوفية
بسم الله الرَّحْمَنِ الرَّحِيمِ رب وَفِّقْ

Epistle 19, Atif fols. 170a1-b1

الرسالة الخامسة من القسم الثاني في الطبيعيات
في⁴⁸ بيان المعادن⁴⁹ من جملة إحدى وخمسين رسالة من رسائل

من ن: هذه الأركان [الأربعة التي هي النار والهواء والماء والأرض وإنما هي الأمهات الكائنة منها المعادن والنبات والحيوان وكيفية استحالة بعضها إلى بعض بدوران الأفلاك حولها ومطارج شعاعات الكواكب عليها وأن الطبيعة هي الفاعلة لها و [سقط من ن] هي قوة من قوى النفس الكلية الفلكية.

47 زيادة في ل: وحوادث الجو؛ زيادة أخرى في أ، ف، ن: والعرض منها هو البيان عن كيفية حوادث الجو وتغيرات الهواء من النور والظلمة والحر والبرد وتصاريق [تصريف ن] الرياح [المزاج ل] من البخارات [البخار ل] والدخانات [الدخات ف] الصاعدة في الهواء من البحار والأنهار وما يكون فيها من الغيوم والضباب والطل والأنداء والأمطار والرعد [الرعود ل] والبرق [البروق ل] والثلوج والبرد والهالات وقوس قزح والشهب وذوات الأذنان وما شاكل ذلك؛ زيادة أخرى في ل: من الأمور التابعة لما ذكرناه.

48 يوجد في [ل]: من كتاب إخوان الصفاء في كمية الجواهر المعدنية على اختلاف جواهرها وكيفية تكوينها في باطن الأرض والغرض منها هو البيان بأنها أول مقولات الطبيعة التي دون فلك القمر التي هي قوة من قوى النفس الكلية الفلكية، ومنها يهتدي الأنفس الجزئية بالترقي من أسفل السافلين مركز الأرض إلى أعلى عِلَتَيْن مُحِيطِ الأفلاك، وهذا أول صراط يجوز عليه الأنفس الجزئية، ثم النبات، ثم الحيوان، ثم الإنسان، ثم الدخول في نَفَرِ الملائكة سُكَّانِ الأفلاك والملاء الأعلى الذين هم أهل السموات.

49 زيادة في ب: وكمية الخواص المعدنية وعلّة اختلاف جواهرها وكيفية تكوينها في باطن الأرض والغرض منها هو البيان >بأنها أول< مفعولات الطبيعة التي دون فلك القمر التي هي قوة من قوى النفس الكلية الفلكية، ومنها يهتدي الأنفس الجزئية بالترقي من أسفل سافلين مركز الأرض إلى

إخوان الصفاء في تهذيب النفس وإصلاح الأخلاق من⁵⁰ كلام الصوفية
بسم الله الرَّحْمَنُ الرَّحِيمُ رب يسر

Epistle 20, Atif fols. 184a9-b1

الرسالة السادسة من القسم الثاني في الطبيعيات
في ماهية الطبيعة وكيفية⁵¹ صنائعها⁵² من جملة إحدى وخمسين رسالة من
رسائل إخوان الصفاء في تهذيب النفس وإصلاح الأخلاق من كلام الصوفية
بسم⁵³ الله الرَّحْمَنُ الرَّحِيمُ رب وَقَف

Epistle 21, Atif fols. 190a15-b1

الرسالة السابعة من القسم الثاني في الطبيعيات

أعلى عِلْتَيْن مُحِيطَ الْأَفْلَاكِ، وهذا أَوَّلُ صراطٍ تجوز عليه النفس الجزئية، ثم النبات، <...>، ثم
الدخول في زمرة الملائكة سُكَّانِ الْأَفْلَاكِ وَالْمَلَأِ الْأَعْلَى.

50 زيادة في أ، ف، ن: في [ورد أ، مطموس: تكو] كيفية [سقط من ف] تكوين المعادن وكمية
الجواهر المعدنية [زيادة في ن: ولة إختلاف جواهرها] وكيفية تكوينها في باطن الأرض والغرض
منها هو البيان أنها [بأنها ف، ن] أَوَّلُ [أضاف ناسخ أ في الهامش] معقولات [مفعولات ف]
الطبيعية [الطبيعة ف، ن] التي دون فلك القمر [سقط من ف] التي هي قوة من قوى النفس
الكلية [سقط من أ، ف] الفلكية، ومنها يبتدي [تبتدي ف، ويجد هنا تكرير] الأنفس الجزئية
بالترقى من أسفل السافلين من [سقط من أ، ن] مركز الأرض إلى أعلى عِلْتَيْن مُحِيطَ الْأَفْلَاكِ،
وهذا [هو ن] أَوَّلُ صراطٍ يجوز [تجوز ن] عليه الأنفس الجزئية، ثم النبات، ثم الحيوان، ثم
الإنسان، ثم الدخول في زمر الملائكة سُكَّانِ الْأَفْلَاكِ وَالْمَلَأِ الْأَعْلَى الَّذِينَ هُمْ أَهْلُ السَّمَوَاتِ.
51 زيادة في ر: أفعالها و.

52 صنائعها: أفعالها [ف، ك، ل، ن]: زيادة في ف، ك، ل، ن: في الأركان الأربعة وكيفية [سقط من
ف] موالدات [موالدها ك؛ موالدها ل، ن] التي هي [سقط من ف] الحيوان والنبات والمعادن،
والغرض منها هو التنبيه [تنبيه ك، ل، ن] للغافلين [الغافلين ك، ل؛ نفوس الغافلين ن] على [عن
ك، ل، ن] أفعال النفس وماهية جوهرها والبيان عن أجناس [أخبار ن] الملائكة [الملئكة ك]
التي [سقط من ك] تسميها الحكماء [الفلاسفة ك، ل، ن] روحانيات الكواكب.

53 زيادة في غ: وهو <...> والغرض المقصود منه هو تنبيه الغافلين على أفعال النفس وماهية جوهرها
والبيان عن الأجناس التي تسميها الفلاسفة روحانيات الكواكب.

في النبات⁵⁴ من جملة إحدى وخمسين رسالة من رسائل اخوان
الصفاء في تهذيب النفس واصلاح الأخلاق من كلام الصوفية
بسم الله الرحمن الرحيم رب وقف

Other remarks: the name of 'Umar ibn al-Khaṭṭāb at fol. 159b25 is cited by [أ] simply as 'Umar; by [خ] as *amīr al-mu'minīn 'Alī*; by [ح], [د], [ز], [ط], and [ك] as *'Alī ibn Abī Tālib*; and by [ف] as *asad Allāh fī'l-arḍ*; at fol. 164a16, the verb *yumkin* is read *yunkar* by [أ], [ج], [د], [ن], [ل], [ك], [ف], [غ], [ط], [ش], [ز], [ر], and by Dieterici.

The Endings of the Natural Science Treatises in the Manuscript Tradition

In the conclusions of the Epistles, the name of the authors is given as *Ikhwān al-ṣafā' wa-khullān al-wafā'* by [ل] in Epistle 15 and by [ب] in Epistle 19 and (in the margin) at the end of Epistle 20. Note that at the end of Epistle 20, instead of *jamī' al-Ikhwān*, [خ] has *sā'ir al-Ikhwān*, which is interesting because *sā'ir* may mean both 'all' and 'the other'.

In its conclusion [ل] repeats the name *sam' al-kiyān* for Epistle 15, and it refers to *al-rub' al-ṭabī'ī* at the end of Epistles 15 and 16. [ط] repeats in the conclusions that Epistle 15 is the 14th, and that Epistle

54 زيادة في ش، ن: وأنواعها وكيفية سريان قوى النفس النباتية فيها؛ زيادة في ل: وكيفية سريان القوى النباتية فيها؛ زيادة أخرى في ش: وهي جسمانية طبيعية؛ زيادة في غ، وزيادة أخرى في ل، ن: والغرض منه [فيها ل؛ منها ن] هو [سقط من ل] تعديد أجناس النبات وبيان [سقط من ل] كيفية تكوينها وأسباب [سقط من غ، ن] نشوها [نشوها ل] وأسباب [سقط من ل] اختلاف أنواعها من الأشكال والألوان والطعوم والروائح وما فيها من [سقط من ل، ن: ما فيها من] الأوراق [أوراقها ل، ن] والأزهار [أزهارها ل، ن] والثمار [ثمراتها ن؛ سقط من ل: والثمار] والحبوب [وحبوبها ل، ن] والنباتات [نباتاتها ل، ن] والضموع [ضموعها ل، ن] واللحاء [لحاءها ل، ن] والعروق [عروقها ل، ن] والقضبان [قضبانها ل، ن] والأصول [أصولها ل، ن] من المنافع، وأن أول مرتبة النبات متصلة [متصل ل، ن] بآخر مرتبة المعادن، وآخر مرتبتها متصلة [متصل ل، ن] بأول مرتبة الحيوان.

16 is the 15th. MSS [ز] and [ك] indicate Epistle 16 as the 15th out of 51 Epistles. MSS [أ], [د], [ز], and [ك] indicate Epistle 19 to be the 18th — but they continue to say it is the fifth of the natural science section. MSS [د] and [ز] say Epistle 20, though being the sixth, is the 19th. In the conclusion of Epistle 20, [ش] announces Epistle 21 indicating it as the 20th.

It is also noteworthy to remark that in the conclusion of Epistle 17, [ن] adds in the margin: '*wa-hiya al-mulaqqaba bi'l-āthār*', but the addition is not in the correct place.

Epistle 15, Atif fols. 147a25–b3

وَفَقَّكَ اللَّهُ، أَيُّهَا⁵⁵ الْأَخ، وَجَمِيعَ إِخْوَانِنَا لِلرِّشَادِ، وَ⁵⁶ أَوْصَلَكَ وَإِيَّانَا إِلَى دَارِ السَّلَامِ بِرَحْمَتِهِ وَمَنِّهِ، أَنَّهُ⁵⁷ عَلَى مَا يَشَاءُ قَدِيرٌ.
تَمَّتِ الرِّسَالَةُ⁵⁸ فِي مَاهِيَةِ الصُّورَةِ وَالْهَيُولَى وَالْحَمْدُ لِلَّهِ حَقَّ حَمْدِهِ وَالصَّلَاةُ وَالسَّلَامُ عَلَى نَبِيِّهِ الْمُصْطَفَى وَرَسُولِهِ الْمُجْتَبَى مُحَمَّدٍ وَآلِهِ مِنْ بَعْدِهِ.

Epistle 16, Atif fol. 157a6–9

وَفَقَّكَ اللَّهُ أَيُّهَا الْأَخ الْبَارَّ الرَّحِيمَ لِلصَّوَابِ وَأَرْشَدَكَ وَإِيَّانَا إِلَى سَبِيلِ الرِّشَادِ وَبَلَّغْنَا مَعَكَ إِلَى دَارِ الْقَرَارِ مَعَ الْأَبْرَارِ، إِنَّهُ عَلَى مَا يَشَاءُ قَدِيرٌ.
تَمَّتِ الرِّسَالَةُ الْمُلقَّبَةُ بِالسَّمَاءِ وَالْعَالَمِ وَالْحَمْدُ لِلَّهِ رَبِّ⁵⁹ الْعَالَمِينَ وَالصَّلَاةُ عَلَى مُحَمَّدٍ الْمُصْطَفَى وَآلِهِ، وَحَسْبُنَا اللَّهُ وَحْدَهُ، وَهُوَ نَعَمُ الْوَكِيلُ.

55 وَفَقَّكَ اللَّهُ، أَيُّهَا الْأَخ، وَجَمِيعَ إِخْوَانِنَا لِلرِّشَادِ: بَلَّغَكَ اللَّهُ وَإِيَّانَا، أَيُّهَا الْأَخ، إِلَى دَرَجَاتِ الْمُتَّقِينَ وَجَمِيعِ إِخْوَانِنَا الْمُؤْمِنِينَ [...] [ع]: سَقَطَ مِنْ ل: لِلرِّشَادِ؛ سَقَطَ مِنْ أ، ف: لِلرِّشَادِ [...] دَارِ السَّلَامِ.

56 سَقَطَ مِنْ غ: وَأَوْصَلَكَ [...] مِنْ بَعْدِهِ.

57 زِيَادَةٌ فِي ح: وَطَوَّلَهُ وَقَوَّيْتُهُ وَحَوَّلَهُ [...].

58 زِيَادَةٌ فِي ف: وَيَتْلُوهَا الرِّسَالَةُ الثَّانِيَّةُ فِي السَّمَاءِ وَالْعَالَمِ وَكَمِيَّةُ أَطْبَاقِ السَّمَوَاتِ وَكَيْفِيَّةُ تَرْكِيبِ الْأَفْلَاقِ وَمَا هُوَ الْعَرْشُ الْعَظِيمُ وَمَا هُوَ الْكَرْسِيُّ الْوَاسِعُ، وَالْغَرَضُ مِنْهَا هُوَ الْبَيَانُ عَنْ تَحْرِيكِ الْأَفْلَاقِ وَكَيْفِيَّةِ تَسِيرَاتِ الْكَوَاكِبِ، وَأَنَّ الْمَحْرُكَ لَهَا عَلَى النَّفْسِ الْكَلِيَّةِ الْفَلَكَيَّةِ بِإِذْنِ رَبِّهَا تَعَالَى.

59 زِيَادَةٌ فِي ف: وَيَتْلُوهَا الرِّسَالَةُ الثَّالِثَةُ مِنَ الطَّبِيعِيَّاتِ فِي الْكَوْنِ وَالْفَسَادِ وَالْغَرَضُ مِنْهَا هُوَ الْبَيَانُ عَنْ مَاهِيَةِ الصُّورِ الْمُقَوِّمَةِ لِكُلِّ وَاحِدٍ مِنَ الْأَرْبَعَةِ الَّتِي هِيَ النَّارُ وَالْهَوَاءُ وَالْمَاءُ وَالْأَرْضُ وَإِنَّمَا هِيَ الْأُمَمَاتُ

Epistle 19, Atif fol. 184a6-8

وَفَقَّكَ اللهُ أَثَمًا الْأَخَ لِلتَّسَادِدِ، وَهَدَاكَ إِلَى الرَّشَادِ وَإِيَّاَنَا وَجَمِيعَ إِخْوَانِنَا حَيْثُ كَانُوا فِي
الْبِلَادِ، إِنَّهُ زَوْوَفٌ بِالْعِبَادِ.
تَمَّتْ رِسَالَةُ الْمَعَادِنِ⁶⁰. وَالْحَمْدُ لَوْلِيَّهِ وَالصَّلَاةُ عَلَى نَبِيِّهِ.

Epistle 20, Atif fol. 190a12-14

أَعَاذَكَ اللهُ، أَيُّهَا الْأَخَ الْبَارِ وَبَلِّغْكَ وَإِيَّاَنَا وَجَمِيعَ الْإِخْوَانِ إِلَى دَارِ الْقَرَارِ مَعَ الْأَبْرَارِ، إِنَّهُ
عَلَى مَا يَشَاءُ قَدِيرٌ.
تَمَّتْ رِسَالَةُ مَاهِيَةِ الطَّبِيعَةِ وَ⁶¹ كَيْفِيَةِ صَنَائِعِهَا، وَالْحَمْدُ لَوْلِيهِ، وَالصَّلَاةُ عَلَى نَبِيِّهِ⁶².

The Eulogies of the Natural Science Treatises in the Manuscript Tradition

The majority of the consulted manuscripts use special eulogies in the titles (often after the *basmala*), and in the endings of the treatises. The most interesting ones are listed below, together with some additional noteworthy eulogies.

الكائنة منها المعادن والنبات والحيوان وكيفية إستحالة بعضها إلى بعض بدوران الأفلاك حولها ومطارح
شعاعات الكواكب عليها وإنَّ الطبيعة الفاعلة لها هي قوة من قوى النفس الكلية الفلكية.

60 المعادن: الخامسة من القسم الثاني من الطبيعيات في كيفية تكوين المعادن وعلة اختلاف جواهرها
ويتلوها الرسالة السادسة من القسم المذكور من الطبيعيات في ماهية الطبيعة وكيفية صنائعها من
جملة أحد وخمسين رسالة من رسائل إخوان الصفاء وخلق الوفاء؛ أضيف يد آخر: في تهذيب
النفس وإصلاح الأخلاق [ب].

61 زيادة في ف: ويتلوها الرسالة السابعة في أجناس النبات وكيفية سريان القوى النباتية فيها،
والغرض منها تعدد أجناس النبات وكيفية تكوينها ونشوها وأسباب اختلاف أنواعها من الأشكال
والألوان والطعوم والروائح وأوراقها وأزهارها وحبوبها وبزورها صموغها ولحائها وعروقها وقضبانها
وأصولها من المنافع، وأنَّ أوَّلَ مرتبة النبات متصلٌ بآخر مرتبة المعادن وآخر مرتبته متصلٌ بأوَّلَ
مرتبة الحيوان.

62 زيادة في ب: [...] يتلوها الرسالة السابعة من القسم الثاني من الطبيعيات في أجناس النبات
وأنواعه وكيفية سريان قوى النفس النباتية فيه من جملة إحدى وخمسين رسالة من إخوان الصفاء
وخلق الوفاء [هذه في الهامش] في تهذيب النفس وإصلاح الأخلاق.

[ب] In Epistle 19, it has '*rabb la-yassir wa-a'in*'; in Epistles 20 and 21 (by a second hand): '*al-ḥamdu li'llāh wa-salām 'alā 'ibādihi alladhīna iṣṭafā. Allāh khayrun am-mā yushrikūn*'(?).

[ج] In Epistle 15, it has: '*al-ḥamdu li'llāh al-malik al-waḥḥāb wa-l-ṣalāh 'alā rasūlihi Muḥammad al-muntaḥāb wa 'alā ālihi wa'l-
<aṣḥāb>*'. In Epistle 17, instead of *rabb*, it has '*yā rabb yassir*'. In the conclusion of Epistle 15, it (with [ر]) has '*wa-bi'l-ijāba jadīr*'.

[ح] In Epistle 15 (with [ل]), it has '*bi-hi nasta'in*' (as does [ل]), also in Epistle 19). In Epistle 17: *وعلیه التکلال* (sic); in Epistle 19: '*wa 'alayhi muwakkil*' (sic); in Epistle 21: '*ḥasbī Allāh waḥdahū*'. In the conclusion of Epistle 15, it has: '*al-ḥamdu li'llāh waḥdahū ḥamd kabir wa-ṣallā'llāh 'alā sayyidinā nabīhi Muḥammad wa-ālihi ajma'in wa-ḥasbunā'llāh ta'ālā ḥidatan*' (?). At the very end of Epistle 20 it has: '*wa-ḥasbunā'llāh ta'ālā bi-hādiyan wa-mu'inan wa-kāfiyan*'. At the end of Epistle 21, it adds: '*wa-li-wāhib al-'aql*' (?) '*al-ḥamd bilā nihāya, wa-ḥasbunā'llāh hādiyan wa-mu'inan*'.

[خ] In Epistles 15, 17, 18, 19, 20, and 21, it has: '*bi-hi'l-tawfiq wa-(minhu) al-i'āna*'. Note also that at fol. 154a1, after *al-bāri*', the word *al-muṣawwir* is added — a quite unusual solution. In the conclusion of Epistle 16, it has: '*bi-'awni'llāh ta'ālā wa-tawfiqihi*', and later, instead of *wa-ḥasbunā*, it adds: '*wa-ṣaḥbihi wa-sallama taslīman kathīran dā'iman ābadan ilā yawmi'l-dīn*'.

[د] In Epistle 15, it has: '*tawakkaltu 'alā'l-ḥayy alladhī lā yamūtu*'; in Epistle 19: '*yaqnī bi'llāh waḥdahū*'; in Epistle 20: '*man i'taṣama bihi kafā wa man tawakkala 'alayhi naḥā*'; in Epistle 21: '*Allāh nāṣirun kulli ṣābirin*'. In the conclusion of Epistle 15, it adds: '*ḥasbunā'llāh ni'ma'l-mu'in*', and at the very end of Epistle 20: '*ḥasbunā'llāh wa-ni'ma'l-wakīl*'.

[ر] In Epistle 15, it has: '*al-ḥamdu li'llāh rabb al-'ālamīn wa-ṣallā'llāh wa-sallama 'alā sayyidinā Muḥammad wa-ālihi wa-ṣaḥbihi ajma'in*'. It concludes all its eulogies by *āmīn* (written with long *alif* instead of *alif madda*). In Epistle 21, it has: '*ṣallā'llāh 'alā sayyidinā Muḥammad wa-'alā ālihi wa-sallama taslīman kathīran āmīn*'. Note, finally, that in Epistle 17 it speaks of a '*kitāb rasā'il*'.

In the conclusion of Epistle 15, instead of *'al-ḥamdu li'llāh ḥaqqi'*, it has: *'al-ḥamdu li'l-wāhibi'l-kull, muḥiḍi'l-jūd wa-manī'i'l-khayri wa'l-wujūd, wa-mustaḥaqqi'l-sujūdi wa'l-maḥdi li-rasūlihi Muḥammad wa-ālihi al-akramīn al-aṭyabīn āmin āmin āmin'*. In Epistle 16, it has: *'wa-llāh huwa al-muwaffiq li'l-ṣawāb wa-ilayhi'l-marj'u wa'l-ma'āb'*, and later, after *wa-ḥasbunā* it has: *'wa-ṣaḥbihi al-aṭyabīn al-akramīn āmin āmin'* (see also [ج]: *'wa-ṣaḥbihi ajma'in'*). At the end of Epistle 16, instead of *'rabb al-'ālamīn'*, it has again: *'wāhib al-kull'*. At the very end of Epistle 20, it has: *'Muḥammad khātim al-anbiyā' wa'l-rusul wa-'alā ālihi wa-aṣḥābihi alladhīna <...> ḍaḥū al-subul āmin. Hādhīhī risāla mulaqqaba bi'l-ma'ādin [sic] wa-hiya al-risāla al-sādisa min al-qism al-thānī < ...> wa'l-aṣdiqā' al-ḡurafā', ayyadahum Allāh bi-rūhin minhu āmin.'*

[ز] In Epistles 17, 18, 19, 20, and 21 it has: *'al-ḥamdu li'llāh [li-walīyatihi in Epistles 18 and 19; li-walīyihī in Epistles 20 and 21] (wa'l-ṣalāh) (wa'l-salām) 'alā nabihi wa-ālihi [or wa-walīyatihi, or/and wa-walīyihī]'*. Note that similar eulogies are found in [ك], in Epistles 20 (*al-ḥamdu li-walīyihī...*) and 21 (*al-ḥamdu li'llāh...*).

In the conclusion of Epistle 15, after *wa-ālihi*, it adds: *'wa-ṣaḥbihi ajma'in'*, and [ط] adds: *'ajma'in wa-ḥasbunā'llāh ni'ma'l-wakīl'* (see the eulogy of [د] above).

[ش] In Epistle 17, it has: *'ṣallā'llāh 'alā sayyidinā Muḥammad wa'alā ālihi'*. At fol. 172b21, the words *'alladhī khalaqahā'* are added to *'Allāh 'azza ismuhu'*. At the end of Chapter 1 of Epistle 21, the following eulogy is added: *'lā ya'lamuhā illā'llāh wa'l-rāsikhūna fī'l-'ilm'*. As is known, these are the words of Qur'an 3:7 referring to the comprehension of the obscure verses. Traditionally reserved to God alone, such a comprehension was enlarged also to philosophers by Averroes through a special reading of the verse. I hypothesized that widening the comprehension of the obscure verses to those 'who have a solid science' — as these words are to be translated — may have already been proposed by the Ikhwān,⁶³ and this addition might confirm my hypothesis.

63 The evidence is given in my article 'Antecedenti "orientali" per la legittimazione del

[ط] In Epistles 16 and 18 it has “*alayhi tawakkaltu*”.

[غ] In the conclusion of Epistle 15, it has: “*ṣallā'llāh 'alā sayyidinā Muḥammad wa-'alā ālihi wa-ṣaḥbihi wa-sallama*”.

[ف] In Epistles 17, 19, 20, and 21 (like [ب] above) it has: “*al-ḥamdu li'llāh wa-salām 'alā 'ibādihi alladhīna iṣṭafā. Allāh khayrun am-mā yushrikūn?*”. In Epistles 15, 17, 18, 19 and 21, [ف] also variously elaborates the idea of God restoring with His gentleness (*tu'ammiru bi-luṭfik*, etc.).

[ك] In the conclusion of Epistle 15 (with [ل]) it has: “*wa-ḥasbunā'llāh ni'ma'l-wakīl*” (see the eulogy of [د] and [ز] above); and a bit later, introducing the following Epistle: “*al-ḥamdu li'llāh rabb al-'ālamīn, wa'l-ṣalāh 'alā rasūlihi Muḥammad wa-ālihi*” (see the eulogy of [ط] above).

[ل] In Epistles 20 and 21 it has: “*wa bi-hi al-thiqa*”. The words “*alayhi al-salām*” are added to “*Ādam abī'l-bashar*” at fol. 189b16. In reference to the Messenger of God, at fol. 197a19 (with [ب]) it has: “*ṣallā'llāh 'alayhi wa-ālihi wa-sallama*” instead of “*alayhi'l-salām*”.

Finally, note the following in the introductions:

At fol. 166b1 of Atif, instead of *al-bāri* there is *al-jabbār* in [ج], [ر], [ز], [ش], [غ], [ف], [ك], and [ل], mistakenly written *al-jibāl* in [ا], and *al-jinān* in [خ].

At fol. 178a20, eulogies are added to the word *fa-yazdādu*: “*bi-rabbihi ta'ālā*” by [ا], [ج], [ز], [ف], [ك], [ل], and [ن]; *bi-rabbihi* by [ب] and [غ]; *li-rabbihi* by [خ] and [ر].⁶⁴ A unique case, at fol. 197a10 in Atif, there is the addition of *ta'ālā* in the usual invocation to the Brethren.

At fol. 186b6 [د], [ر], [ز], and [ك] give *wa-riḍwān* instead of “*azza wa-jalla*”, and [خ] gives: “*azza wa-jalla wa-riḍwān*”.

ta'wīl dei filosofi in Averroè?, in A. M. Di Tolla, ed., *Studi Berberi e Mediterranei. Miscellanea offerta in onore di Luigi Serra*, monographic issue of *Studi maghrebini* 4 [85] (2006), pp. 131–139.

⁶⁴ MSS [ح], [د], and [ش] have *bihi* only.

At fol. 186b20, [ح] has 'labbayka, labbayka Allāhumma labbayka'; [خ] has 'labbayka, labbayka Allāhumma'; Dieterici has *labbayka* only.

At fol. 187b2, before the quotation of Qur'an 89:27, [ح], [ف], [ل], and [ن] add to 'kamā qāla, 'azza wa-jalla' the words "Īsā, wa-kamā qāla'llāh" (Allāh missing in [ن]).

At fol. 189b20, after the name of Noah, [ب], [ح], [خ], [د], [غ], [ف], [ك], and [ل] add: "alayhi al-salām" (السلام in [ح] and [ل]); [ر] adds: 'shaykh [written sh-n-j] al-mursilīn ṣalawāt Allāh wa-salāmihi 'alayhi'; [ش] adds: 'al-nabī, ṣallā'llāh 'alayhi'; and [ن] adds: ع م.

At fol. 197a18–19, after 'Muḥammad rasūl Allāh, 'alayhi'l-salām', [ب] and [ل] add: 'ṣallā'llāh 'alayhi wa-ālihi wa-sallama'.

As for the conclusions, note the following:

In the conclusion of Epistle 16, note that instead of the words: "alā Muḥammad al-muṣṭafā wa-ālihi", only [ط] and [ك] keep the mention of the Prophet's family in their conclusion, whereas [ا] has: "alā sayyidinā Muḥammad al-nabī"; [خ] has: "alā sayyidinā Muḥammad"; [د]: "alā Muḥammad"; [ر]: li-rasūlihi; [ز]: "alā sayyid al-mursilīn".

In the conclusion of Epistle 18, after *ahdā*, [ا] and [ف] add: 'bi-fadlihi, innahu dhū fadlin 'azīmin' (see also [ن]); [ح], [د], [ز], [ط], and [ك] add: 'bi-raḥmatihī innahu qarīb mujīb'.

In Epistle 20, instead of *a'ādhaka'llāh*, [غ] has 'a'ādhanā [with [ح] and [خ]]⁶⁵ 'llāh wa-iyyāka wa-jamī'a Ikhwāninā min 'adhāb al-nār wa-atū li-nā bi-minna <...> al-abrār'. "Adhāb al-nār" is also variously mentioned, later, in [ب], [ج], [خ], [د], [ر], [ز], [ش], [ف], [ك], [ل], and [ن].

After *al-abrār*, [ج] adds: *wa'l-akhyār*, and then continues with: 'wa bi'l-ijāba jadīr', whereas [ر] adds: 'wa<...> wa'l-akhyār', and then it continues with: 'al-karīm al-raḥīm al-ghaffār al-jabbār al-qahhār'. [خ] has: 'bi-'awni'llāh ta'ālā wa-karamihī'.

65 This way, the Ikhwān would place themselves at the same level as their disciples.

Contrarily to what has been noted above, instead of the words ‘*al-ḥamdu li-walīyihī*’, [ب], [ح], [خ], [د], [ز], [ك], and [ل] have: ‘*al-ḥamdu li’llāh*’, and [ر]: *bi-ḥamdi’llāh*; [ر] also adds later: ‘*ta’ālā wa-‘awnihī wa-ḥusni tawfīqihī*’ (see above [خ]). [خ] has: ‘*wa-ḥasbunā’llāh wa-ni‘ma’l-wakīl*’ (see above [د], [ز], and [ك]).

Instead of the words “*alā nabīhī*”, [ب] has: ‘*al-muṣṭafā wa-khayr bi-hi min khalqihī Muḥammad wa-ālihī al-akhyār al-abrār al-ṭāhirīn al-aṭhār*’. MSS [ج], [ح], [د], [ز], [ك], and [غ] variously add the mention of *ālihī*.

Alternate Notations

Each of the manuscripts has its proper style of writing words, though various features are common to several of them. In addition to what is stated in the critical apparatus, here I give a list of the variations noted:

- *Hamza* instead of *yā*’;
- *Alif madda* instead of *alif maqṣūra*;
- *Alif madda* instead of long *alif*;
- *Alif maqṣūra* instead of long *alif*;
- *Alif maqṣūra* instead of *yā*’;
- Final *tā*’ instead of *tā’ marbūta*;
- Final *tā’ marbūta* instead of *tā*’;
- Final *tā’ marbūta* instead of *hā*’;
- Final *tā’ marbūta*, not written;
- *Hamza* not written;
- Long *alif* instead of *alif madda*;
- Long *alif* instead of *alif maqṣūra*;
- Long *alif* instead of *yā*’;
- *Hā*’ instead of *tā’ marbūta*;
- *Wa* added to *hamza*;
- *Wa* instead of *hamza*;
- *Yā*’ instead of *hamza*;
- *Yā*’ instead of long *alif*;
- *Yā*’ instead of *alif maqṣūra*;
- Peculiar orthography: – *Alif* not written in *ilāhī* and its derivatives – Long *alif* written in *ilāhī* and its derivatives – *Alif madda* in *ilāhī* and its derivatives – *Alif* not written in *thamānī* and its derivatives – *Alif madda* in *thalāth* – *Alif madda* in *ālahī* and its derivatives – *Alif* not written in *qiyāma* – *Ḥuyūt* instead of *ḥayāt*;
- No nunation in the accusative;
- Nunation in the accusative.

Mistakes

Besides the cases in the description of the consulted manuscripts (such as carelessness of the copyist: either a word or part of a word falls out, or one or more letters or even a word are added to a word; metathesis of letters; cases of *lectio faciliior*; *lapsus calami* due to

mistaken pronunciation), mistakes in the manuscripts are due to several reasons: mistaken concordances between noun and adjective, pronoun and noun, etc.; mistaken position of the article in the construct state of the noun; inverted order of the words. There are also erroneous repetitions in the manuscripts, both of single words, and of expressions.

Note in particular the following cases: · Unclear or unreadable words;⁶⁶ · Unreadable additions; · Omission of diacritical dots; · Uncertainties in diacritical dots;⁶⁷ · Uncertainties in letters;⁶⁸ · *Wa* at the end of the line; · Repetitions; · Corrections; · Deletions

Conclusions

None of the consulted manuscripts seems to have had Atif (or its archetype) as its source. They must rely on different sources.

In very numerous cases all the consulted manuscripts share readings different from those of Atif. On the other hand, these manuscripts often differ from each other in their readings, even though the numerous additions in the margins usually nullify the differences between them, or between those that appear to be families of manuscripts. This fact in particular made it impossible to hypothesize any *stemma codicum*.

However, I will report here some cases that may be of some help in trying to establish some kind of link among the consulted manuscripts.

First of all, some indications about the selection method I followed, which has been accomplished on the bases of all the readings assembled during the editing process. I have omitted the readings belonging to single manuscripts, as well as every combination of manuscripts with less than seven cases in each Epistle, as insignificant for my purposes.⁶⁹

66 In many cases, this may be due to the quality of the reproduction and the fact that the manuscripts have not been inspected directly.

67 Sometimes, confusion in diacritical dots leads to words that exist but do not make sense in the context examined (often they are cases of *lectio faciliior*); sometimes, it leads to non-existing words.

68 Again, sometimes confusion in letters leads to words that exist but do not make sense in the context examined (they may be due to incorrect pronunciation); sometimes, it leads to non-existing words

69 As this was a sample enquiry, I have also left out the cases in which readings were shared with Dieterici.

The sum of all the other results taken into consideration allows the following remarks.

After Atif, the oldest of the collated manuscripts is [ب]. As to [ب], it is found in association with [خ] 49 times.⁷⁰ The group [ب]-[ج] occurs 37 times.⁷¹ The group [ب]-[غ] occurs 28 times.⁷² The group [ب]-[ن] occurs 19 times.⁷³ The group [ب]-[ش] occurs 17 times.⁷⁴ The group [ب]-[ح] occurs 11 times. The group [ب]-[أ] occurs 9 times.⁷⁵ The group [ب]-[ل] occurs 8 times. The groups [ب]-[د] and [ب]-[ر] occur 7 times each. [ب] with [أ], [ج], [خ], and [ش] occurs also 7 times.

Among the most independent manuscripts, there are [ط], belonging to the thirteenth century; [ش], belonging to the sixteenth century; and [غ], which is not dated. In consideration of its uniqueness, and of the fact that it indicates every epistle as a *kitāb*, I already had the occasion of suggesting that it is quite old — or that the copyist relied on a source that has not been affected by other traditions.⁷⁶

70 And in association with [خ] and [ش] 14 times; in association with [ش] and [غ] 66 times; in association with [ش], [غ], and [ف] once; in association with [ش], [غ], and [ل] twice; in association with [ش], [غ], and [ن] twice; and in association with [غ] 19 times.

71 And in association with [خ] 5 times; in association with [خ] and [ش] twice; in association with [خ], [ش], and [غ] 7 times; and in association with [ش] and [غ] 5 times.

72 And in association with [ف]-[ل] twice; in association with [ن] twice.

73 Note that in the cases of association with [ن], the cases reported may be found in the margins.

74 And in association with [غ] 14 times.

75 And in association with [ش] 4 times; in association with [ش] and [غ] twice.

76 My conjecture was strengthened by G. de Callatay, *Ikhwan al-Safa'*, p. 3: 'Nor is there much point in debating whether one should refer to the work as the 'Book' (*Kitab*), as do some of the oldest manuscripts, or as the 'Epistles' (*Rasa'il*), the more common title today'. However, Halflant's contrary opinion should also be taken into account; see G. de Callatay and B. Halflants, ed. and tr., *On Magic I. An Arabic Critical Edition and English Translation of Epistle 52a* (New York-London: OUP-IIS, 2011), p. 70, note 2. See also B. Halflants, 'Considérations ecdotiques et linguistiques à propos de quelques manuscrits des *Rasā'il Ikhwān al-Ṣafā'*', in J. Den Heijer, P. La Spisa, and L. Tuerlinckx, ed., *Autour de la langue arabe. Études présentées à Jacques Grand'Henry à l'occasion de son 70^e anniversaire*, Publications de l'Institut Orientaliste de Louvain, 61.

The manuscripts that most frequently give unique readings are [غ] and [ش], readings that not only differ from all others, but are also often remarkable for introducing very interesting turns of phrases. As a matter of fact, the association [ش]–[غ] occurs 252 times;⁷⁷ [ش] is associated to [خ] 101 times (161 in association with [خ] and [غ]); the group [ش]–[ل] occurs 8 times. As to [غ], it is also associated to [خ] 76 times,⁷⁸ to [ن] 25 times, and it is associated to [أ],⁷⁹ to [ف], and to [ل]⁸⁰ 7 times in each case.

In general, it can be noted that [أ] (thirteenth century) and [ن] (n.d., but probably belonging to the thirteenth century, too) have many common readings with [ف] (thirteenth/fourteenth century; but with regard to the natural science treatises, I have remarked that [ف] often differs from [أ] and [ن]. In some cases, [ن] coincides with [أ] and [ف], but it departs from them in its additions in the margins. One may hypothesize these manuscripts belong to the same family. Often the three show similarities with [ل] (fifteenth century), whose contents are supplemented by massive additions in the margins, evidently based on an earlier tradition.

In particular, the group [أ]–[ف] occurs 164 times;⁸¹ the group [أ]–[ن] occurs 15 times; the group [أ]–[ل] occurs 13 times;⁸² the group [ف]–[ل] occurs 111 times;⁸³ the group [ف]–[ن] occurs 26 times; the group [ل]–[ن]: 18 times.⁸⁴

(Louvain-la-Neuve: Université Catholique de Louvain, Institut Orientaliste, 2012), pp. 207–218.

77 And 8 times in association with [ل]; once in association with [ن].

78 And once in association with [ف]; once in association with [ن].

79 Plus 4 cases in association with [ف].

80 Note that in the cases of association with [ل], those reported may be found in the margins or as emendations or additions.

81 Note that this association occurs in Epistle 21. The group [أ]–[ف] is in association with [ل] 64 times; 92 times in association with [ن]; twice in association with [ك] and [ن]; 6 times in association with [ل] and [ك]; 3 times in association with [ل], [ك], and [ن]; and 32 times in association with [ل].

82 And 4 times in association with [ن].

83 One of them emended; in association with [ن]: 16 times.

84 Note also that the group [أ]–[ج] occurs 12 times (and twice in association with

MS [د] is also quite ancient (thirteenth/fourteenth century). It is associated with [ط] 64 times; and as well as with [ط], also twice in association with [غ]; 5 times in association with [ك]; 62 times in association with [ح]; 13 times in association with [ح] and [ك]; 57 times in association with [ز] and [ك]; 10 times in association with [ح], [ز], and [ك]; once in association with [ز], [ك], and [غ]; and 12 times in association with [ز], [ك], and [ل].

It is associated 52 times with [ح]; and as well as with [ح], 4 times in association with [ز] and [ط]; 17 times in association with [ز], [ط], and [ك]; 5 times in association with [ز]; and 7 times in association with [ز], and [ك].

It is associated with [ز] and [ك] 51 times; and additionally, 9 times in association with [ل], and twice in association with [ن].

It is associated with [ز] 43 times; and with [ز] and [ك] 50 times.

It is associated with [ك] 36 times; and twice with [ك] and [ل].

It is associated with [غ] 11 times; and four times with [غ] and [ك].

It is associated with [ر] 9 times; and three times with [ر] and [ش], once with [ر] and [غ].

[ك] (fifteenth century) and [ز] (seventeenth century) also share a lot of readings: the association [ز]-[ك] occurs 115 times,⁸⁵ but [ز] is also associated with [غ] 26 times. However, sometimes [ك] and [ز] differ from each other. For instance, at fol. 175b22, [ز] has: *'fa-yaqifu wa-yanbut'* instead of *wa-yathqub*. Though it is clear that [ك] and [ز] belong to the same family, this may confirm that [ز] has had also other sources.

[ف]; 3 times in association with [ك] and with [ن]; once in association with [ل]; with [ف] and [ل]; with [ف], [ل], and [ن]; with [ل] and [ن]). The group [أ]-[ج]-[ف] occurs 7 times; this group in association with [ك] and [ل] occurs 4 times; in association with [ل] 14 times; in association with [ل] and [ن] 15 times; in association with [ن] 11 times. The group [أ]-[خ] occurs 14 times; the group [أ]-[ز]-[ف]-[ك]-[ل] occurs 8 times.

85 And 22 times in association with [ل].

An example of 'contamination' among manuscripts is at fol. 178b18, where we read: '*kay-mā yatafakkaru al-'uqalā' fī kawnihā wa-ḥudūthihā wa-ṣan'atihā*'. After *ḥudūthihā*, [ك] and [ز] add *wa-khalqihā*,⁸⁶ and [ل] does the same, but in the margin. This might demonstrate the existence of a relation between [ل] and [ك], which was later copied by [ز] (see below).

MS [ر], too, provides 15 readings in common with [ز],⁸⁷ which is about 40 years older than [ر]. As [ر] and [ز] belong to the same Parisian collection, it is difficult to establish what relation there is among the three manuscripts. [ك] does not seem to have been the source of [ر], because it has much more similarities with [ز]. It also happens that [ر] shares readings with [ش] (21),⁸⁸ with [غ] (15), with [ن] (8), and with [ل] (7).

Finally, the number of readings occurring in [ج] and [ح], often shared also by [خ], connects these three manuscripts together, too, but only [خ] is dated and quite late (sixteenth century). We have the following associations among these manuscripts: [ج]-[خ] 28 times;⁸⁹ [ح]-[خ] 20 times (or 21: one case is suspect); [ج]-[ح] 7 times.⁹⁰

Note also the following associations of [ج] with [ر] (41 times), with [غ] (27),⁹¹ with [ن] (24), with [ش] (20), with [ف] (16),⁹² with [ل] (11), with [ز] (8), and with [د] (7); of [ح] with [ف] (13 times),⁹³ with [ل]

86 MSS [ح] and [د] have *khalqihā* instead of *ḥudūthihā*, which is omitted in [غ].

87 And 4 in association also with [غ].

88 And 3 readings in association with [غ].

89 And 10 times in association with [ش] and [غ].

90 And 4 times in association with [ف] and [ل].

91 And twice in association with [ن].

92 And 12 times in association with [ل], once in association with [ك] and [ل].

93 This group occurs 29 times in association with [ل]; 27 times in association with [ل] and [ن]; 5 times in association with [ن]; once in association with [ك], and once in association with [ك] and [ل]; twice in association with [ك], [ل], and [ن].

(10),⁹⁴ with [ط] (9),⁹⁵ and with [غ] (8);⁹⁶ and of [خ] with [ر] (35 times), with [ل] (10), with [د] (9),⁹⁷ and with [ف] (9).⁹⁸

That [ح] is later than [د] can be demonstrated at fol. 182a12, where we have: 'lā yuḥtakku'; [ح] reads 'lā yuḥtaddu', but indicates in the margin *yaḥullu*, a reading shared with [د]).

We note, moreover, that at fol. 182a16, instead of *taqharuhu*, [خ] reads 'yaḍurru bihi', whereas [ش] and [غ] read *yadrubuhu*. These two verbal forms are constituted by the same letters in Arabic, but the reading of [خ], which is a slightly later manuscript than [ش], is the right one. Incidentally, [خ] depends on both [ش] and [غ], which also appear to be linked together — even though nothing can prove that [غ] is older. The case of fol. 171b18 leads us to the same conclusion. [غ] has: 'tanqasimu bi-qismayn' instead of 'tanqasimu bi-niṣṣayn', but it emends above the word *niṣṣayn*. This can only confirm that [غ] has collated other sources.

Several cases demonstrate that [ن] also relied on various sources. For instance, at fol. 145a19, with [أ] and [ف], it adds *shuhūr*, but deletes the words *wa-shuhūr*, and in the margin emends it into: 'wa-minhā mā' (like the other manuscripts); at fol. 159a10, [ن] shares with the much later [ر] the plural *khalijāt* instead of *khuljān* (so in this case it departs from [أ] and [ف]). At fol. 174b11, [ن] adds in the margin, in red ink, the indication of Chapter 7 of Epistle 20. At fol. 196a11, [ن] gives *annahā hā* instead of *atammahā*, but in the margin it corrects it to *atammahā*. At fol. 198a16–17, [ن] adds the words 'wa-'alayhā līf' to 'shajarat al-tīn'. This demonstrates that the scribe was copying from a model and collated his copy with a manuscript belonging to another family (which confirms the data reported above).

The same is made apparent by the comparison between [ن] and [ح], which are found in association 29 times. MSS [ح] and [ن] might

94 And 3 times in association with [ن].

95 In 2 cases [ط] has emendations.

96 And once in association with [ف], once in association with [ن]; twice in association with [ف] and [ل], and twice in association with [ف] and [ن]; 3 times in association with [ف], [ل], and [ن].

97 Five times in association with [د], [ز], and [ك].

98 Twice in association with [ل], and once in association with [ل] and [ن].

have had a common source — which can have some importance for dating [ح] — but [ن] used various manuscripts for collation.

At fol. 171b9, [ن] (with [ط]) adds in the margin the words ‘*wa-huwa’l-marjān*’ (these are added in the margin in Atif, too), which are lacking in [ح] and in Dieterici. An interesting case is at fol. 161b11, with reference to the words: ‘*wa-lā ya’tabirūn āyāt kitābihi*’. [ن] deletes *ya’tabirūn*, and emends into ‘*tafsīr āyāt*’, whereas [أ] and [ف] have *yu’tabirūn*. So it shares its reading with [ط], [د], [ل], [ر], [ز], [ج], [ح], and [غ], which all have ‘*tafsīr āyāt*’. Note that only [ط] is assumed to be older than [ن], excluding [ج], [ح], and [غ], which are not dated.

The Arabic Text of the Natural Science Treatises in Dieterici’s Edition

In general, almost everywhere Dieterici cuts the mention of ‘brothers’ and/or the introductory exhortation at the beginning and inside the various chapters of the natural science epistles,⁹⁹ as well as expressions such as ‘as we have explained’ and similar.¹⁰⁰

99 However, at the beginning, he has: اعلم يا اخي ائذك الله وايتانا بروح منه. Sometimes (e.g., at fol. 142a22) he has ‘*yā akhi*’ instead of ‘*ayyuhā’l-akh*’. In comparison with Atif, he adds ‘*yā akhi*’ in Epistle 15, Chapters 8 and 14; ‘*i’lam bi-annahu*’ in Epistle 16, Chapter 18; ‘*i’lam*’ at fol. 171b12 before a long cut of the text (on which see below). Note, finally, that at fol. 141b3, he adds ‘*al-kirām*’ to ‘*Ikhwāninā*’ instead of ‘*ayyadahum Allāh bi-ruḥin minhu*’.

100 He cuts ‘*kamā bayyannā*’ at fol. 155b16 and in Epistle 16, Chapter 18, and ‘*kamā bayyannā qablu*’ in Epistle 16, Chapter 10; at fol. 198b11 he omits the words ‘*ayyuhā’l-qā’il*’. At fol. 149b13 he has *li-’umrī* instead of ‘*wa-i’lam annahu*’.

He does not even report internal references to the other Epistles, apart from a few cases.¹⁰¹ Only in some cases does Dieterici introduce the various chapters by the word *faṣl* or by a precise title.¹⁰²

As to eulogies, he has a free use of them. He often leaves them out, but sometimes he provides different eulogies from those of the consulted manuscripts.

Other remarks

There is a blank space at fol. 145b21 instead of *dā'iman*. At fol. 192b23 he has '*yastahkimu fī'l-kharīf*' instead of '*yuḥṣadu fī'l-kharīf*'.

Cuts in the Text

Epistle 15: at fol. 141b10–12 from '*wa-kadhālika'l-bāb*' to *fa-wāḥid*; 143b12–13 from '*inna'l-makān*' to *wa-qīla* — probably due to homoioteleuton; at fol. 145b6–13 from '*ilā sittin daraja*' to '*al-sā'at al-thāniya 'ashara*'.

Epistle 16: at fol. 148b11–13 from '*fī kitāb al-tashrīḥ*' to '*wa-naqūlu inna'l-jism*'; 150b4 from '*fa-quṭr al-arḍ*', until the text begins again with Chapter 10; the text is cut from Chapter 11 up to the title of Chapter 15; 151b5–12 from '*hākadhā yajrī*' to '*fa-qad bāna bi-hādhā'l-sharḥ*'; 151b19 from '*yakūnu miqdār [...]*', until the text begins again with Chapter 17; 152a6–b9 from '*wa-fī'l-yawm*' to '*wa-lammā bāna li-ashābi'l-raṣd*'; the title of Chapter 18 and the following *wa* (fol. 152b16–17) are omitted; the text is cut from fol. 153a6, '*mithāl ikhtilāf*', up to the end of Chapter 20 (fol. 154a2); finally, the text is cut from fol. 156b7, *fa-ntabih*, up to the end of the epistle, and he adds:

101 He cuts the references to Epistle 24: 'On Sense and Sensibilia' at fol. 148b14; to Epistle 15: 'On Matter and Form' at fol. 148b15; to Epistle 35: 'On Intellect and Intelligibilia' at fol. 148b16; to Epistle 2: 'On Geometry' at fol. 148b21; to Epistle 39: 'On the Quantity of the Genera of Movements' at fol. 148b22; to the epistle 'On Qualities and Qualified Objects' at fol. 148b23; to Epistle 19: 'On the Formation of Minerals' at fol. 171a13. He also cuts the words '*wa-qad bayyannā al-'illa fī amri'l-arḍ wa'l-qamar*', and the following reference to Epistle 40: 'On Causes and Effects' at fol. 148b24–25; to the epistles in general at fol. 187a8–9; but he emphasizes the reference to Epistle 18: 'On the Explanation of Meteorology' at fol. 184b10.

102 For these cases, see the critical apparatus.

فالقِيامة قيامتان قِيامة صغرى وهى مفارقة النفس الجزئية من الجسد الانساني وقِيامة كبرى وهى مفارقة النفس الكلية من العالم.

Epistle 17: Chapter 14 is omitted from the beginning, at fol. 159b19 until *'ilā'l-janna aw ilā'l-nār* (fol. 160a2); fol. 160a4–7 from *'li-annahā hiya dār* to *khālidūn*.

Epistle 18: the text is cut at fols. 165a24–b1, from *'fa-nzur yā akhī* to *fa-tanzur*; 168b21–24 after *'khāṣṣatan'l-insān* to *'fī samm al-khiyāf*; 169a3–5 from *'wa-tāratān taṭlu'u* to *'wa-jamadat al-miyah*; 169a7–11 from *'dhālika taqdīr* to *tashkurūn*; 169a12 from *'kadhālika law anna madārahā dāma* to Chapter 18 at fol. 169b3, not introduced by *faṣl*; 169b9–19 from *'wa-kullu hādhihi'l-ḥawādith* up to the end of the epistle.

Epistle 19: after the title, the introductory lines are missing until fol. 171a7: *'min al-awtād wa'l-āfāq*; 171a8–9 from *'wa-idh qad faraghnā* to *'fī risālatin li-nā, wa*; 171a11–12 from *'bi-idhni bāri'hā* to *'fī risālatin li-nā*; 171b12–175b5 *'wa-nurīdu an [...] al-jawāhiri'l-ma'daniyya*; 175b12, *'wa-yuḥṣī [...] wa-lakinna*; 177b4–5, *'lā ya'limu [...] ismuhu*; 177b11–12, *'wa-yuqālu [...] al-mashriq*; 177b16–178a2, *'arafa al-nās [...] aḥsan al-khāliqīn*; 178a17–179a19, *'fa-ammā ta'thīrāt [...] min kayfiyyati takwīni'l-ma'ādin*; 179b20–22, *'huwa qalīl [...] wa-umūr ma'āshihi*; 179b24–25, *'wa-min akthar [...] salima min al-ṣar*; 180a2–5, *'wa-ammā'l-durr [...] ṣar' sakkanahu*; 180a15–17, *'wa-man admana [...] samman qātilan*; 180a18–23, *'fa-in ittakhadha minhu [...] fī dhālika'l-mawḍi*; 180b11–12, *'wa'l-martak min al-usrub [...] fī kutub al-ṭibb bi-sharḥihā*; 180b21–23, *'ka-l-libn wa-l-ajurr [...] fī faṣlin qablu hādihā*; 181a7–10, *'wa i'lam [...] alladhī lam nadhkurhu minhā*; 181a13–14, *'wa-fīhi khāṣṣiyatun [...] wa-huwa ṣaḥīḥ didduhu*; 181a15–17, *'wa-yadhhabu taksīr [...] wa min al-jawāhiri'l-ma'daniyya*; 180b6–7, *'wa-laysa yastaghni [...] wa'l-mā' wa'l-milḥ*; 181a20–182a9, *'wa-huwa ḥajarun sharīf [...] al-jazā' al-awfā*; 182a13–18, *'wa-i'lam yā akhī [...] subḥānahu wa bi-ḥamdihi*; 182b7–10, *'fa-ammā'l-ta'līf wa-l-tarkīb [...] wa khadamihim wa junūdihim. Faṣl*; 182b14–16, *'huwa manāfi'u li-l-nās [...] bi-anna'l-jawāhira'l-ma'daniyya*; at fol. 182b16 he cuts from the words *'wa-anwā'i ashkāliahā* up to the end of the epistle, and then he adds:

هو منافع الناس والحيوان واصلاح امر الحيوة ومعيشة الحيوان فيها الى وقت معلوم;¹⁰³
 Note, finally, that at fol. 179b8, after ‘*wa-lā yaḥtariqu*’, he adds
 ‘*wa-huwa manṣūb ilā’l-shams*’ (cf. fol. 179b10), then omits the words
 ‘*wa-idhā suḥiqa [...] ṣāhīran illā’l-qalīl*’ (fol. 179b13).

Epistle 21: at the beginning, he cuts fol. 190b2–3, ‘*wa-idh qad faraghnā [...] wa-qad bayyannā fihā*’; and at fols. 190b4–5, ‘*fa-nurīdu [...] nubayyina fihā aydan*’, with the addition of a *wa* as a link with the following statement; 190b6, ‘*thumma nutbī’uhā bi-risālati’l-ḥayawān, wa-nubayyinū*’, with the addition of a *wa*; 190b8–25, ‘*alladhīna khalaqahum Allāh ta’ālā [...] wa-tazawwad li-l-safar*’; 191a1–2, ‘*wa-dhālika; anna’l-bārī*’ [...] *li-dhawī’l-albāb*’; 191a4–8, ‘*kullu dhālika [...] in shā’a’llāh ta’ālā. Wa i’lam*’; 191a21–b1, ‘*wa-dhālika annahu [...] min amri’llāh*’; 191b25–192a2, ‘*wa’l-lawn [...] mukhāfata’l-taṭwīl*’; 192a5–7, ‘*dhālika [...] wa-i’lam yā akhī*’; 192 a10–12, ‘*nuḥtāju [...] bi-dhikr al-ashjār. Fa-naqūlu*’; 192b10–13, ‘*faṣl fī bayān [...] fī’l-basātīn wa’l-afraja*’; 193a9–25, ‘*ma huwa mustaṭīl [...] al-shajar wa’l-nabāt*’; 193b7–9, ‘*wa-tanbīhan [...] wa fī’l-anfus*’; 198b7–9, ‘*dhālika [...] tughrasu*’. Finally, note that at fol. 194b3, instead of the words ‘*wa’l-tartīb al-muwalladāt*’, he has:

واما ترتيب المولّدات ونظامها التي هي دون فلك القمر وهي اربعة اجناس المعادن والنبات والحيوان والانسان فهو موجود في الصفحة السابعة عشر من هذا الكتاب.

A chapter on palm, fig, and grapes then follows in Dieterici, which begins with ‘*fa-min dhālika*’ (fol. 196a11 Atif) and ends with ‘*tilka’l-illatu wa’l-sabab*’ (fol. 198b11–12 Atif; cf. pp. 172.16–177.11 of the Šādir edition).

Typical Notations

Dieterici often (but not always) has *alif maqṣūra* instead of *hamzaed alif*;¹⁰⁴ · *Alif madda* instead of long *alif*; · *Alif maqṣūra* instead of *yā*; · *Hamza* not written; · Long *alif* instead of *alif madda*; · Long *alif* instead of *alif maqṣūra*; · *Tā*’ instead of *tā’ marbūṭa*; · *Yā*’ instead

103 Cf. fol. 182b14–15.

104 For instance, in the writing هوى (but we find often also هواء).

of *hamza*; · Addition of the article;¹⁰⁵ · Abolition of the article; · *Wa* instead of *fa*-; · *Fa*- instead of *wa*; · Abolition of the *fa*-; · Addition of the *fa*-; · Different persons of the verb; · Different tenses of the verb; · Different forms of the verb; · Passive verb instead of active verb; · Masculine instead of feminine; · Feminine instead of masculine; · Masculine plural instead of inanimate feminine; · Inanimate feminine (plural) instead of masculine; · Broken plural instead of sound plural; · Plural instead of dual; · Dual instead of plural; · Singular instead of dual; · Dual instead of singular; · Plural instead of singular; · Singular instead of plural; · Singular instead of collective; · Collective instead of singular; · Collective instead of plural; · *Nomen unitatis* instead of collective; · Collective instead of *nomen unitatis*;¹⁰⁶ · Singular instead of *nomen unitatis*; · Different cases of a noun (sometimes marked by vocalizations); · Different vocalizations; · Abolition of the accusative (nunation) (mostly from the *alif*, sometimes from the *tā' marbūṭa*); · Addition of the accusative (nunations in the *alif* or in the *tā' marbūṭa*); · *An* instead of *annahu*, *annahā*, or *annaka*; · *An(na)* instead of *bi-an(na)* — also with annex pronouns; · *Bi-an(na)* instead of *an(na)* — also with annex pronouns; · *'Alā anna* instead of *bi-anna*; · *Idh* instead of *li-anna*; · Inverted terms.

Particular Orthography

Long *alif* in *al-ilāh* and derivative forms; long *alif* in *thalāth* and derivative forms; long *alif* in *thamān* and derivative forms; *حياة* instead of *حياء*; *قيامة* instead of *قيمة*; *alif madda* in *ālah* and *ālāt*. Note also the following writings:

Epistle 15: fol. 142b14 *الأسطرلاب* instead of *الأسطرلاب*; 145b15 *فسل* instead of *فاسل*; 145b16 *المجسطي* instead of *المجسّطي*; 146a20 and 21 *نشوها* instead of *نشوءها*; 147a10 *المأكل* instead of *المأكّل*.

Epistle 16: fols. 150a24 *جزؤا* instead of *جزاء*; 152b21 *الرحاء* instead of *الرحى* (but he has *الرحى* at line 22); 154b20, addition *جزؤا* instead of *جزو*; 155a4 *نراها* instead of *نرايها*.

¹⁰⁵ Including the case of *al-Anṭakiyya* in Epistle 18.

¹⁰⁶ Note, in addition, that in Epistle 21 he always has *لبة* instead of *لب*, and *شحم* (singular) instead of *شحمة* (*nomen unitatis*).

Epistle 17: fols. 158a4 طبائعا instead of الضوضاء; 158b21 instead of طباعها; 159b12 بلاها instead of بلائها; 160a9 التغير instead of ان ما; 162a7 كل ما instead of كلما; 161b12 البلى instead of البلاء; والتغير instead of حقى; 162b15 حماء instead of كل ما; 162b15 كلما instead of انما; 165a21 الكلاء instead of الكلاء; 166a22 المطفى instead of المضطئ; 167a16 مضئ instead of مضئ; 168b19 مضاء instead of مضاء.

Epistle 19: fols. 175b20 الباذهرات instead of الباذهر; 175b22 الباذهر instead of الباذهر; 178a13 النوشادر instead of النوشادر; 179b8 المرقشيشا instead of المرقشيشا; 180b8 الاسفيدرويه instead of الاسفيدرويه; 180b25 المرداسنج instead of المرداسنج; 180b9 الاسفيدروي instead of البوارق (بوره); 181a1 البوارق instead of البوارق; 181a1 البوارق instead of البوارق; 181a5 المرقشيشا instead of المرقشيشا; 181a4 شوارج instead of شوارج (شوره); instead of التوتيا; الشاذنج instead of الشاذنج; المغنيسيا instead of المغنيسيا; البزادي instead of السبج; السبج instead of السبج; المينا instead of المينا; التوتياء instead of يصفوا; 181a14 يصفو instead of الاللازود; البجادي instead of السنبادج; 182a18 الباذهر instead of الباذهر; 181a18 الباذهر instead of الماس (twice); 182a20 الالماس instead of الماس; 182a19 الالماس instead of المغناطيس instead of المغناطيس.

Epistle 21: fol. 191a12 رؤوس instead of رؤوس; 191a13 اجزاءهما instead of اجزاءهما; 192b23 الباقي instead of الباقي; 192b24 البدنجان instead of رؤوس; 196b19 رؤوس instead of رؤوس.

Synonyms¹⁰⁷

Epistle 15: fol. 141b15 and 17 صنيعته instead of الصناعة; 141b17 الصناعة instead of الصناعة; 142b8 حجارة instead of أحجار; 142b17 الاحوال instead of لتفوسهم instead of لانفسهم; 147a11 الجسم instead of الجرم; 145a4 الحالات instead of الأجسام; 147a14 الاجساد instead of الأجسام.

Epistle 16: fol. 148b3 يشاكلها instead of شاكلها; 149a22 مثال instead of طبائعا; 153a2 طبائعا instead of طباعها; 150a24 درجاتها instead of مثل; 150a24 طبائعا instead of طباعها.

107 Often shared with the collated manuscripts.

154b4 الجسد instead of الأجسام; 155a9 نحو instead of إلى; 156b4 الجسد instead of الجسم;

Epistle 17: fol. 158b6 امتزاج instead of مزاج;

Epistle 18: fols. 162b24 الخلقة instead of الخليفة; 162b16 إلى instead of الى; 166b23 أو instead of قطب الشمال; 162b19-20 القطب الشمالي instead of حتى; 167b14 فاعلة instead of فاعلية; 167b16 and 17 الفاعلية instead of الكواكب ذوات الأذنان; 169b3 شفا instead of شفاً; 168b19 الفاعلة instead of طبائعها; 171a17 دَوْرانها instead of دورانها; 169b5 الكواكب ذوات الذوائب instead of كذلك; 175b24 الأرضين instead of التراب; 175b10 طبائعها instead of الزرقة; 176b22 الزرقة instead of طبائعها; 176a4 هكذا; 177b15 القياس instead of أو; 177b4 واما instead of أو; 177b3 مثل instead of كلون; 180a13 الصفحتين instead of صفيحتين; 178a6 المثل instead of مادتها; 179a18 لغلط instead of لغظة; finally, at fol. 176a2 he makes مادتها explicit as: مادة الجواهر;

Epistle 20: fols. 185b1 النصر instead of النصرة; 185b19 ما instead of الطباع; 188b6 المفساد instead of الفساد; 189a8 and 10 الطباع instead of رِضْوَان خازن الجنان; 189a13 رِضْوَان خازن الجنة; at fol. 184b16 and 17 he adds ما شاكلها to فهيولاهم وأدواتهم;

Epistle 21: fols. 193b21 حولها instead of عليها; 196a20 جرم instead of مثل; 198b7 كحكم instead of جسم.

Mistakes

Fol. 141b24 بذلك instead of بذل; 144a3 تصاعف instead of بتضاعف; 145b24 الطبعية instead of بالاهية; 149a19 بمخه instead of بمجها; 149a22 البطيخة instead of بطيح; 150a21 على instead of غلى.

In nine cases Dieterici shares the readings of Atif alone; he has a high quantity of readings common to the majority of the collated manuscripts, according to the following scheme:¹⁰⁸

¹⁰⁸ The second figure corresponds to some unclear readings. I also recall that [أ], [ب], [ش], [ط], and in some way [خ], are incomplete manuscripts.

[ط] 308; [ب] 518; [أ] 673; [ر] 779/777; [خ] 808; [ش] 820; [غ] 898/892;
[ن] 918; [ف] 951/948; [ج] 976/974; [ح] 1004/998; [ل]: 1010/1009; [د]
1138; [ك] 1243/1241; [ز] 1472/1470.

These are the similarities between Dieterici's readings and those of individual manuscripts:

[ز] (95); [ر] (58); [ن] (23); [ج] (20); [ل] (19); [غ] (16); [ح] (14); [أ],
[د] (9); [ك] 8; [خ], [ش], [ف] (6); [ب] 3; [ط] (1).

(Atif fols. 141a–b) [p. 5 Şâdir]

Epistle 15
On Matter and Form

[Being the first epistle from the second
section of the *Epistles of the Brethren of Purity*,
on the Natural Sciences]*

In the name of God, the Compassionate, the Merciful

Chapter 1

Know, O pious and merciful brother, may God help you and us through a spirit coming from Him, that as the study of the sciences concerning natural beings is a part of the art of our Brethren, may God help them through a spirit coming from Him, and as the root of this science is the knowledge of five things — namely, matter, form, motion, time, and place — and of their meanings when they are joined to each other, we need to mention in this epistle a part of the meanings attributed to matter and form as the introduction and premises, so that the study of natural beings might become more immediate to the comprehension of those who are beginning it and easier for them being taught.

Chapter 2

[p. 6] Know, O brother, that when philosophers speak of ‘matter’, they mean by this concept each substance capable of receiving a form, and when they speak of ‘form’, they mean by this each figure or engraving received by substance. And know that the diversity of existents is due to form, not to matter, because you find many things, the substance of which is the same, but of which their forms are different; for instance, a knife, a sword, an axe, a saw, and all instruments, tools, and vessels made of iron. In fact, the diversity of their names depends on the diversity of their forms, not on the diversity of their substances, as all of them, from the standpoint of iron, are the same thing. And likewise, the diversity of the names of a door, a bed, a chair, a boat, and of all that is made of wood is caused by the diversity of their forms, while their matter — that is, wood — is the same.¹ According to this example, the state of matter and form can be illustrated in all artefacts, as each

¹ The title in MS Atif Efendi 1681 (fols. 141a1–b1) runs as follows: ‘The First Epistle from the Second Section on the Natural Sciences, on the Explanation of Matter and Form, among the Fifty-one Epistles of the Brethren of Purity, on the Purification of the Soul and the Rectification of Morals as a Part of a Sufi Discourse’. It is completed by the following eulogy: *In the name of God, the Compassionate, the Merciful. O Lord, give us success.*

1 Cf. Aristotle, *On the Heavens* I.9.277b33–278a6.

artefact certainly has matter and a form from which its manufacturer assembles it.²

Chapter 3

And know that matter is said to be of four species: the matter of art, the matter of nature, the matter of the whole, and Prime Matter.

The matter of art is every body from which and in which a manufacturer makes his piece of art, as with wood for carpenters, iron for blacksmiths, earth and water for masons, yarn for weavers, and flour for bakers; and according to this example each manufacturer certainly has a body from which and in which he makes his piece of art, and that body is the matter of art. As to the figures and the engravings the manufacturer makes in it, they are forms, and this is the meaning of 'matter' and 'form' with reference to the arts.

The matter of nature is fire, air, water, and earth, because all generated beings that are under the sphere of the Moon — plants, animals, and minerals — come from them and will be transformed into them when corruption occurs. The nature that acts on these [i.e., on the four elements] is one of the faculties of the heavenly Universal Soul, and we already commented on how it acts on this matter in another epistle.³

The matter of the whole is the Absolute Body from which the entire world comes — spheres, stars, elements, and all generated beings. [p. 7] They all are bodies and their diversity depends on their different forms.

Prime Matter, finally, is a simple substance known by the intellect, which senses do not grasp because it is the form of being and no more, namely, 'ipseity'. And when ipseity receives quantity, it becomes the Absolute Body, of which one says that it is endowed with the three dimensions — length, breadth, and depth.⁴ When the [Absolute] Body receives quality, namely, shape, like being circular, (fol. 142a) triangular, square, and so on, it becomes a specific body, of which one

2 Cf. also the beginning and the end of Chapter 5, below.

3 The text refers here to Epistle 20: 'On the Quiddity of Nature'; see, in particular, p. 287ff below.

4 On the definition of the body as a three-dimensional being, see Aristotle, *On the Heavens* I.1.268a7.

says 'which' [ayy] it is. So, quality is like the three, quantity like the two, and ipseity like the one; and as the three follows the two in being, so quality follows quantity in being, and as the two follows the one in being, so quantity follows ipseity in being; and ipseity precedes quantity, quality, and the other [properties] in being, as the one precedes the two, the three, and all numbers in being.

Chapter 4

And know that ipseity, quantity, and quality are all simple forms which can be known by the intellect and not by the senses, and when they are assembled one with another, some of them are like matter and others like form. Quality is a form in quantity and quantity is matter [hayūlā] for it; quantity is a form in ipseity and ipseity is matter for it.

An example of this, taken from sensible objects,⁵ is that a garment is a form in a cloth and the cloth is matter for it; a cloth is a form in the yarn and the yarn is matter for it; the yarn is a form in the cotton and cotton is matter for it; cotton is a form in the plant and the plant is matter for it; the plant is a form in the elements and they are matter for it; the elements are a form in the [Absolute] Body and the [Absolute] Body is matter for them; and the [Absolute] Body is a form in the substance⁶ and the substance is matter for it.

And likewise, bread is a form in dough and dough is matter for it; dough is a form in flour and flour is matter for it; flour is a form in the seed and the seed is matter for it; the seed is a form in the plant and the plant is matter for it; the plant is a form in the elements and they are matter for it; the elements are a form in the [Absolute] Body

5 This and the following examples are similar to the those reported in Epistle 35: 'On Intellect and Intelligibilia', *Rasā'il*, vol. 3, pp. 234.10–236.19 passim, but see also Epistle 32: 'On the Principles of the Intelligible Existing Beings According to the Pythagoreans' Opinion', *Rasā'il*, vol. 3, p. 183.14–19. Apart from the references to the natural science treatises here edited, I indicate the volume, page(s), and line(s) of each quotation or reference using the Ṣādir edition; *Rasā'il Ikhwān al-Ṣafā'*, 4 vols., ed. Buṭrus al-Bustānī (Beirut: Dār Ṣādir, 1957). The text recalls the addition found in Atif at the end of Epistle 10. See Baffioni, *On Logic*, pp. 163–164.

6 I.e., the Prime Matter mentioned above, here called *jawhar*.

and the [Absolute] Body is matter for them; the [Absolute] Body is a form in the substance and the substance is matter for it.

[p. 8] The state of form with reference to matter and the state of matter with reference to form are illustrated according to this example, until all things arrive at the Prime Matter that is the form of being and no more, with no quality or quantity in it, namely, a simple substance with no composition in it from any regard, capable of receiving all forms, but gradually, as we explained, because a form does not follow or precede [in itself], but [comes] one after another. An example of this is cotton that receives the form of the cloth only after having received the form of the yarn; and yarn that receives the form of the garment only after having received the form of the cloth. And likewise, a seed receives the form of the dough only after having received the form of the flour, and the flour receives the form of the bread only after having received the form of the dough; and matter receives forms one after another according to this example.

Chapter 5

Know, O brother, that all bodies are of the same genus and that their substance and matter are the same, while their diversity is in accordance with the diversity of their forms, and because of it [i.e., the diversity of the forms] some of them are purer and nobler than others. In fact, the world of spheres is purer and nobler than the world of elements, and a part of the world of elements is nobler than another, because fire is brighter and nobler than air, air is purer and subtler than (fol. 142b) water, water is purer and nobler than earth, and all of them are natural bodies that are transformed, one into the other. In fact, when fire is extinguished, it becomes air, when air becomes thicker, it becomes water, and when water becomes thicker and solidifies, it becomes earth, while neither can fire become subtler nor earth thicker so as to become something else, but when their parts are composed, the begotten beings come from them — minerals, plants, and animals — though some of them are nobler than others.

In fact, hyacinth [*yāqūt*] is purer and nobler than crystal, crystal is purer and nobler than glass, glass is purer and nobler than porcelain;

and likewise, gold is nobler and purer than silver, silver is purer and nobler than copper, [p. 9] copper is purer and nobler than iron, and iron is nobler than lead. All of them are mineral stones, the root of them all being quicksilver and sulphur;⁷ and the root of sulphur and quicksilver is earth, water, air, and fire, so their matter is the same while their forms are different, and their pureness and nobility are in accordance with their composition and with the diversity of their forms. Likewise, animals and plants are the same with regard to matter, while their diversity and the nobility of one in respect to another are in accordance with the diversity of their forms.

Chapter 6

Know that among the particular bodies, some receive the form of the Universal Body when they are informed [*ḡuwwira fīhi*], and by receiving that form they become more excellent and nobler than other primitive, particular bodies. An example of this is a piece of copper when it receives the form of a sphere, like an astrolabe, or when it is provided with the shape of a disk or a globe: at that moment, it becomes more excellent and nobler than when it was primitive copper; and likewise is the rule that governs each body that receives a certain form: at that moment it becomes more excellent and better than when it was without it.

7 The Ikhwān refer here to the basic conception of alchemy, which considers sulphur and quicksilver to be the active, masculine and the passive, feminine principles of minerals. At the end of Book III of his *Meteorology*, Aristotle stated that minerals — which he calls ‘fossils’ (ὀρυκτά) and ‘metals’ (μεταλλεύόμενα) — are originated by a vaporous and a smoky exhalation (ἀναθυμιάσεις). The heat of the dry exhalation is the cause of fossils, namely, the stones that cannot be melted, as well as of realgar, ochre, ruddle, sulphur, cinnabar, and the like. The vaporous exhalation is the cause of metals — the bodies that are either fusible or malleable, such as iron, copper, and gold. They are formed by the imprisonment of the vaporous exhalation in the earth. So, for Aristotle, sulphur is counted among fossils; as to quicksilver, it is extracted from cinnabar. For further considerations, see Epistle 19: ‘On Minerals’, below.

Chapter 7

And thus is the rule that governs the substances of the souls, because they are all of the same genus and of the same substance, and their diversity is in accordance with their knowledge, morals, manners, and deeds, as these states are forms in their substance and they are like matter for them. In fact, when particular souls receive a certain science they become more excellent and nobler than the other souls of their genus. And know that sciences in the soul are nothing but the forms of knowable objects that that soul extracted [from matter] and represented in its thought;⁸ and at that moment the substance of the soul is for the forms of those knowable objects like matter, and they are in it like a form.

[p. 10] Chapter 8

And know that among the particular souls, some possess the same forms as the Universal Soul, and some are close to it — this is in accordance with their reception of the sciences, knowledge, and good morals emanated into them; and whichever of them receives more is more excellent and nobler than the others of its genus, for example, the souls of the prophets — God's blessings be upon them. When, in the purity of their substance, they receive the emanation from the Universal Soul, they produce the divine books⁹ in which there is part of the wonders of the hidden sciences, (fol. 143a) the subtle meanings and the concealed secrets that can be touched only by those who are pure from the pollution of nature, as well as that which was established by the general laws useful to the whole and by right and chaste behaviour, then, through them, [the prophets] saved many souls drowned in the sea of matter and in the prison of nature.¹⁰ Or, for example, the

8 These words reflect the well-known definition of sciences given by the Ikhwān, as 'the forms of intelligibles in the knower's soul'; see the Introduction, p. 40, note 120.

9 I.e., scriptures.

10 Two different ideas coexist in the *Rasā'il*. On the one hand, sharing the Muslim approach to creation, the Ikhwān consider life in this world to be the necessary condition for gaining reward in the hereafter. On the other hand, they are strongly influenced by the Pythagorean doctrine according to which the physical

philosophical souls that discovered many true sciences, found out marvellous arts, built temples of wisdom, and prepared wonderful talismans. And, for example, the souls capable of divination which inform about the generated beings before their coming-to-be, thanks to the indications of the spheres and the signs of *zajr*.¹¹ These souls were hinted at when it was said, 'Philosophy is the imitation of God according to human capability';¹² they were hinted at when it was said, 'A property of the passive intellect is that a part of it receives the forms of the whole';¹³ they were hinted at by he who said:

Every image is a blameworthy form,
 Apart from that which is in the form of spheres
 And the most complete among the essences, because it
 Completely received the form of angels.¹⁴
 How much [differs] a soul lofty in the apex,

body is a tomb for soul; to take an example, their considerations about the immortality of the soul in Epistle 44: 'On the Belief of the Ikhwān al-Ṣafā' and the School of the Divines [*al-rabbāniyyīn*]', and the 'case study' connected to it — in particular their quotation of Pythagoras' *Golden Verses* in *Rasā'il*, vol. 4, pp. 35.22–36.4 — are to be read in this vein. See my article "Detti aurei" di Pitagora in trasmissione araba', quoted above in the Introduction, p. 21, note 36.

- 11 *Zajr* is one of the two kinds of 'iyāfa (the art of divining omens in birds). More particularly, *zajr* consisted in causing a bird to take flight; if the bird flew to the *zājir*'s right, it constituted a good omen, if to the left, it was a bad omen. Later, the term assumed a wider significance. Cf. T. Fahd, "Iyāfa", *El2*, vol. 4, pp. 290–291. However, introducing his translation of Epistle 52: 'On Magic', G. de Callatay notes that 'From what the Ikhwān say of this practice below in Chapter 7, one should nevertheless infer that none of the definitions given by Fahd fits here. By *zajr*, the authors seem to refer to the general practice of taming various sorts of animals by giving them incitements'; de Callatay and Halflants, *On Magic I*, p. 87, note 1.
- 12 This saying has a Platonic origin (*Theaetetus* 176b). See C. Baffioni, 'Sulla ricezione di due luoghi di Platone e Aristotele negli Iḥwān al-Ṣafā', *Documenti e studi sulla tradizione filosofica medievale*, 8 (1997), pp. 479–492.
- 13 This statement might hint at the function of the passive intellect as represented by Aristotle in *On the Soul* III.430a10ff. This passage is at the basis of the Islamic elaborations of the theory of the four intellects, which depart remarkably from the original doctrine.
- 14 Following Dieterici (see below, note 16), I am inclined to accept the reading *al-amlāk* proposed by [ز], [ك], and [ل], though it is emended in [ط] and [ن] (see the critical apparatus, p. 22, note 6), and though we should have *al-malāk*.

And¹⁵ what is like the stones of a polisher?¹⁶

And they were hinted at by he¹⁷ who said:

Was he not a star among us?

Then he said farewell to us, and their places were largely granted with fine rain.

[p. 11] He saw a high abode,¹⁸ worthier than those of the same kind,

Then he flew off, and became, among its figures,¹⁹ a star.²⁰

Chapter 9

Know that the virtues of the Universal Soul emanate into the particular souls all at once, being granted to them all the time; however, the particular souls are capable of receiving them only one after another in the course of time. An example of this is the emanation of particular souls, one into another. In fact, a solicitous father and a teacher eager to teach his pupil would like to teach that pupil all that is good for

15 The text has *aw*.

16 I have not been able to identify these verses. This and the following text are quoted by D. R. Blumenthal, 'A Comparative Table of the Bombay, Cairo, and Beirut Editions of the *Rasā'il Iḥwān al-Ṣafā'*', *Arabica* 21/2 (1974), pp. 186–203, p. 199. The author remarks that the second text occurs also in the first part of the encyclopaedia, on p. 139 of the Ṣādir edition (lines 5–6 in the Epistle 3: 'On Astronomy'), but he gives no identification, and nor does the Ṣādir edition, which only explains certain words in it. Dieterici translates the text as follows: 'Auf sie deutet der Dichter hin mit den Worten: Jedes Gebild hat eine tadelnswerthe Form; dasjenige ausgenommen, welches auf der Form der Himmelskreise beruht. Das vollendetste seiner Wesenheit ist, dass es als Vollendung annimmt die Form der Engel. Welch ein Abstand ist doch zwischen einer gipfelhoch erhabenen Seele und dem, was da wird zum Stein des Polirers'; F. Dieterici, *Die Naturanschauung und Naturphilosophie der Araber im zehnten Jahrhundert. Aus den Schriften der lautern Brüder übersetzt* (Posen: M. Jagielski, 1864), p. 7.

17 Instead of *al-qā'il*, [] gives 'Ibn al-Rūmī'.

18 I.e., the sky.

19 I.e., the constellations.

20 Cf. Dieterici, *Die Naturanschauung*, p. 7: 'Auch deutet darauf hin des Dichters Wort. War er nicht wie ein Stern, der unter uns erschien? Da schied er von uns, doch die Vorstellung vergegenwärtigte ihn uns; Er sah ein, die erhabene Wohnstätte sei würdiger Seinesgleichen. Da ward er entrückt zu Seines gleichen, ein Stern unter den Sternbildern'.

him all at once, but the soul of the learner receives only one thing after another, gradually.

Know, then, that what hinders the particular souls from receiving the emanation of the Universal Soul is their sinking in the sea of matter and the accumulation of the obscurations of the bodies before their sight, owing to the strength of their inclination towards physical passions and their illusion of bodily pleasures; and when they are awakened from the sleep of their carelessness and woken up from the slumber of their ignorance, and they begin to rise in sciences and knowledge and persist in that condition, they come into contact with the Universal Soul, witness those intellectual and radiant lights, and attain those spiritual delectations and those eternal, everlasting joys. Instead, when they resist against what we described and incline towards the pursuit of carnal passions and to the rank of nature, they go far away from here, sink to the lowest of the low, and are submerged in the sea of matter, [where] its waves envelop (fol. 143b) them and its obscurations accumulate before their sight. He, be He blessed and exalted, hinted at these two conditions, saying, *Allah is the Light of the heavens and the earth. The parable of His Light is as if there were a Niche and within it a Lamp: the Lamp enclosed in Glass: the Glass as it were a brilliant star: lit from a blessed Tree, an Olive, neither of the East nor of the West, whose oil is well-nigh luminous, though fire scarce touched it: Light upon Light! Allah doth guide whom He will to His Light: Allah doth set forth Parables for men: and Allah doth know all things,*²¹ and He, be He exalted, said, *Or (the Unbelievers' state) is like the depths of darkness [p. 12] in a vast deep ocean, overwhelmed with billow topped by billow, topped by (dark) clouds: depths of darkness, one above another: if a man stretches out his hand, he can hardly see it! For any to whom Allah giveth not light, there is no light!*²²

21 Qur'an 24:35. All translations are by Abdullah Yusuf Ali, *The Holy Qur'an* (London: Wordsworth, 2000).

22 Qur'an 24:40.

Chapter 10

On the discourses of the learned about the quiddity of place

Place — according to the majority of people — is the receptacle in which something firmly established is found;²³ in fact, it is said, ‘The place of water is the mug it is in’, ‘The place of vinegar is the skin it is in’, and it is also said, ‘The place of fish is water, the place of birds is air’.²⁴ In sum, the place of everything firmly established in [something] is the body that embraces it. And it was said that place is the surface of the embracing body, adjacent to the embraced one,²⁵ and it was said, ‘No, place is the surface of the embraced body adjacent to the embracing one’.²⁶ According to both these opinions place is necessarily a substance.

But it was said that place is the intersection common to the surfaces of the embracing and the embraced bodies, and according to this opinion place is necessarily an accident.²⁷

It was also said that place is the void in which the body is extended in length, breadth, and depth; that the place of each body coincides with it; and then, that the place of each body, be it circular, square, triangular, or of whatsoever form, coincides with it,²⁸ being neither smaller nor bigger, to the point that it was said in the aphorism, ‘Place is the measure of the body’, and according to this opinion place is necessarily a substance.

Chapter 11

Know that those who have said that place is void looked at the form of the body, then extracted it from matter thanks to the cogitative faculty, represented it in their souls, and called it ‘void’, while when they looked

23 Cf. Aristotle, *Physics* IV.4.210b34–211a1.

24 These lines may echo the discussion in Aristotle, *Physics* IV.3.210b27–31. In IV.2.209b28–29 (cf. IV.3.209a24) and in IV.4.212a28–29, place is said to be a ‘surface-continent that embraces its content after the fashion of a vessel’.

25 Cf. Aristotle, *Physics* IV.4.212a20–21.

26 Cf. Aristotle, *Physics* IV.4.211a23–b5.

27 Cf. Aristotle, *Physics* IV.4.212a29–30. A similar statement is confuted in Aristotle, *Physics* IV.4.211b11–12.

28 Cf. Aristotle, *Physics* IV.1.209a4–7. In IV.2.209b5–6, place is said to be the same as form.

at it within matter, they called it 'place'.²⁹ This also demonstrates the paucity of their knowledge of the substance of the soul and the [poor] quality of such knowledge. And know that the fact that the soul extracts the form of sensible objects from their matter, represents it in itself, looks at it freed [p. 13] from matter, distinguishes between matter and form, and looks at each of them sometimes separately and sometimes in composition with the other, [that fact] owes to the nobility of its substance, to the wonders of its faculties, and to the beauties of its knowledge. Indeed, by the strength of its imaginative faculty, at times it looks at the world as if it were out of it, and at times it looks at it as if it were inside it; and sometimes it absolutely removes the world from existence, sometimes it approaches the past and the future time, (fol. 144a) examines the beginning and the generation of the world, and searches for the cause of its generation from nothing [*ba'd an lam yakun*],³⁰ and sometimes it forestalls future time, views the annihilation of the world before its time, and represents to itself how that will happen. And also by the strength of its [imaginative] faculty, number can be multiplied infinitely and a measure can grow infinitely, and [the soul] can imagine that outside the world there is an infinite void, and similar fanciful acts and representations, thanks to its imaginative faculty. But those who have thought that void is a self-subsistent substance, that outside the world there is an infinite void, that void is a substance derived from the world, that any part of matter is infinitely divisible, and similar questions, [they] make all these discourses owing to the paucity of their knowledge of the substance of the soul, of the wonders of its faculties, and of how freely it disposes of knowledge and sciences.

29 Cf. Aristotle, *Physics* IV.6.213a15–19, 213a27–29, IV.7.213b31, 214a16–22.

30 Literally, 'after it did not exist'. Though the idea of *creatio ex nihilo* is obviously more exactly rendered in Arabic by the words '*min lā shay'in*', I think this translation fits the general doctrine of the Ikhwān. See Y. Tzvi Langermann, 'An Important Collection of New Studies on the Shī'a: An Essay Review of *Fortresses of the Intellect: Ismaili and Other Islamic Studies in Honour of Farhad Daftary*, edited by Omar Ali-de-Unzaga', *Ilahiyyat Studies* 3/1 (2012), pp. 107–116, p. 110.

Chapter 12

The discourses of the wise on the quiddity of motion

Know that motion is spoken of in six ways:³¹ generation and corruption, increase and diminution, and change and translation. Generation is the emergence of a thing from not-being to being or from potentiality to actuality, and corruption is the contrary of this. Increase is when the limits of a body move farther from its centre, and diminution is the contrary of this. Change is the shift of qualities with regard to the qualified being. As to the motion called 'translation', according to the majority of people it is the emergence from one place to another, and it is said that translation is a generation along another direction at a second time.

Both these discourses are correct with regard to rectilinear [p. 14] motion,³² but with regard to circular motion they are not correct, because what is moved in a circle neither passes from one place into another, nor proceeds along another direction at a second time.³³ It has been said that all parts of what is moved in a circle change their places and proceed along other directions at a second time, except the part that is in the centre — in fact, it is at rest and is not moved. He who makes this discourse and presumes that this opinion is correct should know that the centre is an imaginary point and that it is the extremity of a line, and that the extremity of a line is not a place for a part of a body. He should also know that what is moved in a circle is moved in all its parts, but it neither passes from one place to another, nor proceeds along another thing at a second time.

As to rectilinear motion, it is possible only by passing from one place to another and by proceeding along other directions at a second time. It has been said that this is possible. But if a man moves, for instance, his hand or one of his limbs without passing from one place to another, what would you say — in what condition is the hand? Can it be [said

31 In the *Physics*, Aristotle speaks of three kinds of motion: qualitative, quantitative, and local (see V.1.225b7–9, V.2.226a16–18, VII.2.243a35–37, VIII.7.260a26–29). The six kinds of motion as they are mentioned here are listed in *Categories* 14.15a13–14.

32 See *Physics* IV.8.215a14ff. and VIII.10.267b9ff.

33 See *On the Heavens* I.3.270a3ff.

that it is] moved without emerging from one place towards another? So is the rule that governs a finger: can it be [said that it is] moved without passing from one place (fol. 144b) to another or without proceeding along another direction at a second time?³⁴ Know that when the parts of a body are moved, that whole is moved, and when the whole is moved, those parts are moved, because those parts are not different from that whole. In fact, when a man is moved, the whole of his limbs are moved, and when the whole of his limbs are moved, he is moved; and if only his hand is moved, all parts of the hand are moved, because the hand is not different from those parts, and likewise if he moves a finger only, all parts of the finger are moved, because the finger is not different from those parts. Then he who thinks that it is possible [to say] that parts are moved and the whole is not, or that the whole is moved and some of its parts are not, commits an error.³⁵

Know that many people of science thought that what is moved according to a rectilinear motion can be moved [p. 15] according to many movements, because it proceeds in its motion along many directions; but the multiplicity of the movements is not to be explained with the multiplicity of the directions; in fact, the procession of an arrow until its movement comes to a stop is only one, even though it proceeds along many things, and likewise the movement of what is moved in a circle is only one until it comes to a stop, even if it makes many turns.³⁶

Know that a movement is distinguished from another movement only by the rest between them. The experts in the musical art know this and have no doubt about it, because their art is the knowledge of the composition of a melody, and a melody is made only by sounds: the sounds derive only from the clash of bodies, the clash of bodies comes only from movements, and movements are distinguished one from

34 Aristotle refers to a finger in *Physics* IV.3.210a15–16. The discussion of these lines recalls Aristotle's discussion in *Physics* VIII.5.257b2ff.

35 These considerations recall, in particular, *Physics* VIII.5.257b28ff., VI.10.240b8ff., and also VI.4.

36 Later, the Ikhwān note that multiplicity of movements does not depend on multiplicity of directions, as is testified by the movement of an arrow or of an object that is moved in circle. *On the Heavens* II.3.286a7–b9 seems particularly meaningful in this regard.

another only by the moments of rest between them. Because of this, those who studied the composition of a tune have said that between the time of every second beat there is a time of rest, and we already explained a part of this science in an epistle of ours on the composition of melodies [Epistle 5]: what they are, how many they are, and how they are— therefore learn them from there, God willing, exalted be He.³⁷

Know that he who studies the true natures of things and researches their quiddity first must begin with, and study and research, whether a thing is substance or accident, matter or form, physical or spiritual; and, if it is a substance, which substance it is; if it is an accident, which accident it is; if it is matter, what it is; and if it is form, how it is.

Know that movement in some bodies is substantial to them, like the movement of fire — in fact, when its movement stops, it is extinguished and its existence ceases — while in other bodies it is accidental, like the movement of water, air, and earth, because if their movement stops, their existence does not cease. And know that movement is a form placed by the [Universal] Soul in the [Absolute] Body after shape, and that rest is the absence of that form; that rest in a body is prior to motion, (fol. 145a) because the body has sides and it can neither be moved towards all its sides all at once, [p. 16] nor is its movement towards one direction prior to that in another direction, so rest is prior to it.

Know that even though motion is a form, it is a spiritual, complementary form that pervades all parts of a body and passes away from it instantaneously, just as light pervades all parts of a diaphanous body and slips away instantaneously. You see a lamp; when it comes into a house, it casts light upon the house in its entirety all at once, and when it is taken out, the house becomes dark all at once, instantaneously; and likewise with the Sun: when it rises in the east, it casts light upon the air from the east to the west all at once, and when it sets down in the west, the air becomes dark all at once,

37 The text refers here to one of the main topics of Epistle 5: 'On Music'. See, e.g., *Rasā'il*, vol. 1, pp. 192.16ff. and 193.4–6; = pp. 34.2ff and 35.7–10 in O. Wright, ed. and tr., *On Music: An Arabic Critical Edition and English Translation of Epistle 5* (New York–London: OUP–IIS, 2010), translation on pp. 91–92 and 92–93, as well as the whole of Chapter 7, p. 98ff.

instantaneously. Heat, instead, spreads gradually and heats air in time, and when the Sun sets, the air becomes cold gradually in time. Know that the rule that governs motion is like the rule that governs light, because if there were a piece of wood whose length went from east to west, and it were pulled eastwards or westwards with a single blow, all its parts would be moved all at once.

And know that some of the acts of the soul in the body are in time, and some are instantaneous, as a sign that the substance [of the soul] is beyond time, because time is joined to the movement of the body, and the body is the object of the action of the soul; and as the [Universal] Soul gave to the Universal Body a spherical shape that is the most excellent of the shapes,³⁸ so it also made its movement a circular motion that is the most excellent of movements.³⁹

[p. 17] **Chapter 13**

**The quiddity of time, according to the discourses
of the learned**

Time, according to the majority of people, is the procession of years, months, days, and hours. It has been said that it is the number of movements of the [all-embracing] sphere; and it has been said that it is a period measured by the movements of the sphere.⁴⁰ It is considered that time, if regarded this way, does not exist absolutely, because the years are the longest part of time, and of the years, some have already passed away and some have not yet come, and only one year exists among them [that is, the present one]; and of this year also, some months have already passed away and others have not yet come, and only one month exists among them [that is, the present one]; of this month, some days have already passed away and others have not yet come, and only one day exists among them [that is, the present one]; and of this day, [some] hours have already passed away and others

38 See Aristotle, *On the Heavens* II.4.286b10–11.

39 See Aristotle, *Physics* VIII.9.265a13. In fact, the circular motion is infinite, single and continuous; *Physics* VIII.5.261b27–28.

40 See Plato, *Timaeus* 11.38b–39e, and also Aristotle, *Physics* IV.10.218a33–b1. According to Aristotle, time is 'the calculable measure or dimension of motion with respect to before-and-afterness'; *Physics* IV.11.219b1–2.

have not yet come, and only one hour exists among them [that is, the present one]; and of this hour, some parts have already passed away and others have not yet come; so, according to this consideration, time has no existence absolutely.⁴¹

And if it is considered according to the other way, time always exists,⁴² because time in its entirety is night and day, twenty-four hours, which exist (fol. 145b) in twenty-four zones of the Earth while it eternally rotates on itself. An explanation of this is that when it is Sunday midday in the country whose longitude is 90°, the first hour of this day is in the countries whose longitude goes from 1° to 15°, the second hour is in the countries whose longitude goes from 16° to 30°, the third hour is in the countries whose longitude goes from 31° to 45°, the fourth hour is in the countries whose longitude goes from 46° to 60°, the fifth hour is in the countries whose longitude goes from 61° to 75°, the sixth hour is in the countries whose longitude goes from 76° to 90°, the seventh hour is in the countries whose longitude goes from 91° to [p. 18] 105°, the eighth hour is in the countries whose longitude goes from 106° to 120°, the ninth hour is in the countries whose longitude goes from 121° to 135°, the tenth hour is in the countries whose longitude goes from 136° to 150°, the eleventh hour is in the countries whose longitude goes from 151° to 165° and the twelfth hour is in the countries whose longitude goes from 166° to 180°.⁴³ At the opposite of each of these zones where the Earth rotates on itself there are the hours of the night, each in the zones corresponding to these. Should you doubt what we have said, ask the experts of the art who study the science of [Ptolemy's] *Almagest*⁴⁴ so that they may explain

41 Cf. Aristotle, *Physics* IV.10.217b33–34: 'Some of it is past and no longer exists, and the rest is future and does not yet exist'.

42 Cf. Aristotle, *Physics* IV.10.218b9ff.

43 A similar vision is expressed in Epistle 4: 'On Geography', *Rasā'il*, vol. 1, pp. 168.18–169.20. Cf. also J. Kirtland Wright, 'Notes on the Knowledge of Latitudes and Longitudes in the Middle Ages,' *Isis* 5/1 (1923), pp. 75–98. I thank Tara Woolnough for this reference.

44 As already stated by G. de Callatāy, Ptolemy is the Brethren's classical authority on both astronomy and astrology. The *Almagest* is the ancient work referred to by far the most often in the *Rasā'il*. See de Callatāy and Halflants, *On Magic I*, p. 92, note 21.

to you the correctness of what we have said. In fact it has been said, 'In each art, ask for the help of its experts'.

And know that from the eternal succession of night and day around the Earth, the form of time comes to be produced in the soul of he who attentively examines it, just as the form of number comes to be produced in it [i.e., the soul] from the repetition of the one. In fact, all number — even and odd, whole and fractions, units, tenths, hundreds, and thousands — is only the sum of units that come to be produced in the soul of he who attentively examines them, as we explained in our epistle 'On Number' [Epistle 1],⁴⁵ and likewise, too, time is only the sum of months, years, days, and hours, the form of which comes to be produced in the soul of he who attentively examines them from the eternal repetition of night and day around the Earth.

These five [p. 19] things, of which we have given the explanation — matter, form, place, motion, and time — embrace each body; and he who is not experienced in the study of these things is not allowed to study the natural objects, because he cannot know them in the core of their knowledge; and he who is not experienced in the natural objects is not allowed to speak of the metaphysical objects, because he cannot know them in the core of their knowledge.

Chapter 14

Reflect on (fol. 146a) the discourses of the learned that we have recalled in this epistle, in order to understand what they have said and to represent to yourself how they described the meanings of these things. If you have a surplus of this [knowledge], inform us about it; if you deny something of what they said, explain it to us;⁴⁶ if something of what we reported is obscure to you, don't suspect us to have shortened the explanation or to have said what is not true.

45 See in particular *Rasā'il*, vol. 1, p. 50.3–5 (= p. 12.14–16, El-Bizri), translated in N. El-Bizri, ed. and tr., *On Arithmetic and Geometry: An Arabic Critical Edition and English Translation of Epistles 1 & 2* (New York–London: OUP–IIS, 2012), p. 68.

46 Here we find an allusion to the 'mutual help' that is at the basis of the Brotherhood.

Know that each art and judgement has its experts, that all experts of science and art have foundations on which they agree while they converse over their ramifications, and that, according to those foundations, they draw analogies regarding that over which they differ.

And know that the study of natural sciences is a part of the art of our eminent Brethren, may God help them through a spirit coming from Him, and that the natural objects are the bodies and the intrinsic or transitory accidents inherent in them. On these sciences we composed seven epistles, the first of which is this epistle where we have recalled matter, form, motion, place, and time, because these five things embrace all bodies. And in the epistle 'On Sense and Sensibilia' [Epistle 24] we recalled with a concise speech the things that are inherent in bodies. Then this epistle is followed by the one where we have recalled the heavens and the world, and where we described the composition and the number of the spheres, the extent of their diameters, the speed of their rotation, the magnitude of the stars, the kinds of their movements and characteristics, and the map of the constellations. Then this epistle is followed by the one where we have recalled generation and corruption and the quiddity of the four elements that are under the sphere of the Moon [namely, fire, air, water, and earth], and where we described how they are transformed into each other and how the generated beings come from them. Then the fourth epistle follows, where we have recalled the meteorological phenomena and the changes that occur in the air above our heads. Then the fifth epistle follows, where we have recalled the substances of minerals [p. 20] and described how they are generated in the interior of the earth, in the cavities of mountains, and in the depths of seas. Then the sixth epistle follows, where we have recalled plants and described their genera, species, properties, and benefits and harm. Then the seventh epistle follows, where, with a concise speech, we have recalled the genera of animals, their species, and the diversity of their natures.

And we composed five more epistles before these ones, namely, the propaedeutical epistles, the first of which is the epistle where we recalled number and its species and properties, and how it originates from the one that comes before the two. Then the epistle follows where we recalled geometry, the species of measures, and how they originate

from the point, which in the art of geometry is like the one in the art of number. Then the epistle follows where we recalled stars, described the spheres and the planets, and explained that their relation with the Sun is like the relation of number with the one and of geometrical measures with the point. Then the epistle follows where we recalled the arithmetical, geometrical, and harmonic proportions, and [we explained] that the origin of them all from the relation of equality is like the origin of number from the one and like the origin of geometrical measures from the point. Then (fol. 146b) the epistle follows where we recalled philosophical logic and described the ten categories, each of which is a *summum genus*, and where we explained the quantity of their species and their properties — that one of them is substance and the other nine are accidents, and that their connection in existence with substance is like the connection of number with the one that comes before the two.

The ancient wise men before us did already speak about these things and they recorded them in books. These books are in people's possession, but because of the fact that they were too prolix in their speeches and that the books were translated from one language into another by people who had not understood their meanings, such meanings remained locked to they who studied those books and the knowledge of their true natures was difficult for those who researched. Because of this we composed these epistles, and we summarized the discourse in them as an introduction and as premises, so that their comprehension might become more immediate to a learner and the study of them be made easier for beginners.

[p. 21] And know, O my brother, that if you are a lover of science and wisdom, then you have to tread the path of their experts — that is, to disregard earthly matters in favour of what is inevitable, to leave what is superfluous, and to put the most of your zeal and care in searching for knowledge [*ilm*], meeting its experts, and attending sessions with them for learning and investigation; and you have to train your soul according to the right conduct described in the books of the prophets, upon them be peace, and in the study of the sciences we recalled above — namely, those in which the children of the philosophers trained themselves and educated their pupils — so that your comprehension

becomes capable of contemplating the divine objects that are the utmost goal as regards knowledge [*ma'ārif*].

And know, O my brother, that the divine objects are forms abstracted from matter and that they are permanent, eternal substances in which neither corruption nor detriments are inherent as they are inherent in the physical objects. And know that your soul is one of such forms; make then every effort for the sake of its knowledge, and perhaps you will free it from the sea of matter, the abyss of bodies, and the prison of nature into which we fell because of the crime that came from our father, the first Adam, when he disobeyed, with the result that he and his progeny were chased from paradise, that is the world of spirits, and it was said to them, *Get ye down, with enmity between yourselves. On earth will be your dwelling-place and your means of livelihood — for a time.*⁴⁷ He said: *'Therein shall ye live, and therein shall ye die; but from it shall ye be taken out (at last).'*⁴⁸ And then the Trumpet shall be blown⁴⁹ and the tombs be withdrawn from you on the Day of Resurrection.⁵⁰ And it was said to them, *Depart ye to a Shadow (of smoke ascending) in three columns*⁵¹ — that is the world of bodies endowed with length, breadth, and depth.

Therefore, make every effort, O my brother, for the sake of the knowledge of these topics of enquiry and symbols that are found in the prophetic books, and perhaps you will be awakened from the sleep of carelessness and the slumber of ignorance, you will be revived by the spirit of the Lord's knowledge, and you will live through the life of the divine sciences and will be safe from the natural detriments. And know that the soul in its abstraction is not affected by pains, illnesses and

47 Qur'an 7:24. Cf. also 2:36: *'Get ye down, all (ye people), with enmity between yourselves. On earth will be your dwelling-place and your means of livelihood — for a time'*. These words also combine quotations of the first part of Qur'an 2:38: *'Get ye down all from here [...]*' and of the central part of Qur'an 20:123: *'Get ye down, both of you — all together, from the Garden, with enmity one to another [...]*'.

48 Qur'an 7:25.

49 The words *'nufikha fī'l-ṣūr'* recall a frequent expression in the Qur'an; see, e.g., 18:99.

50 The text distinguishes between *al-ba'th* (for which, cf. Qur'an 22:5 and 30:56) and *al-nushūr* (for which, cf. 35:9, 67:15).

51 Qur'an 77:30.

sorrows, hunger and thirst, heat and cold, nakedness, anxieties, griefs, and the vicissitudes of life, because [p. 22] all of these are inherent in it due to its conjunction with the body.

Indeed, the body is a physical mass capable of receiving detriments, corruption, transformation, and change, while the soul is a spiritual substance that is not affected by (fol. 147a) any of these detriments. And know that the knowledge of their souls escaped the majority of the people of science because they left aside the study of the science of soul and the search for the knowledge of its substance, as well as [leaving aside] interrogation of the learned who were acquainted with its science; and [this science escaped them] because of their scarce concern about the question of their souls, the search for its rescue from the sea of matter and the abyss of bodies, the salvation from the prison of nature, and the emergence from the obscurations of bodies; because of the strength of their inclination towards eternal permanence in this world, their immersion in the physical passions, their illusion for the bodily pleasures, and their familiarity with the natural objects of sense; and, finally, because of their carelessness with the grace of paradise described in the prophetic books, and with their repose and ease⁵² in the world of spheres. Indeed, their scarce desire for them⁵³ depends on their scarce consent to what is reported by the prophets, upon them be peace, and to what the wise philosophers hinted at — things for which any description is inadequate owing to the subtleness of the meanings and the intricacies of the secrets — and from which the endeavours of their souls turned away towards the concern [*li-amr*] for this body subject to transformation. They placed all their care in the wellness of life in this world, by gathering possessions, eating, drinking, [properly] dressing, riding animals, and having sexual intercourse; [all these things] made their souls slaves to their bodies [*ajsām*] and their bodies [*ajsād*] masters of their souls, and established the rule of human nature over the divine one, of darkness over light, and of devils

52 The Arabic reads '*al-rawḥ wa'l-rayḥān*', for which cf. the first part of Qur'an 56:89, which in its entirety says, '(There is for him) Rest and Satisfaction, and a Garden of Delights' (*jannatu na'im*; a key phrase in the *Rasā'il*).

53 Namely, paradise, and repose and ease in it.

over angels, and [thus] they entered the cohort [p. 23] of Iblis and of the enemies of the Merciful.⁵⁴

O my brother, may God help you and us through a spirit coming from Him, did you watch your soul, did you work for its righteousness, did you search for its rescue, did you open its prison, did you free it from the immersion in the sea of matter, the prison of nature, and the obscurations of bodies, did you relieve its burdens — the causes that hinder it from rising to the reign of heaven, entering the group of angels, journeying in the expanse of the world of the spheres, ascending in the grades of paradise, and breathing those sweet-smelling plants⁵⁵ mentioned in the Qur'an? Did you desire the companionship of your sincere Friends and of your noble Brethren who love you in their distinction and crave for your righteousness and your rescue in company of their souls — in fact, they already discharged their souls from the service of the children of this world and put their effort into the search for the grace of the hereafter?⁵⁶ Did you tread their path, did you share their purpose, did you open your heart [*tukhalliṣa sirraka*] in their company, did you follow their habits, and did you listen to their speeches in order to know their belief? And did you study their sciences in order to understand their secrets as well as the precious sciences, the true knowledge, the spiritual objects proper to intellection and the sensible objects proper to the soul that were displayed by them? In this case you will enter our spiritual school, you will live our angelic life, you will act according to our pure tradition and you will come to understand the rational law, and perhaps you will be helped by the spirit of life to view the Exalted Assembly⁵⁷ and live the life of the happy people, being joyful and delighted, permanently and eternally forever with your permanent, noble, luminous, and diaphanous soul, not with your dark, heavy body subject to change, transformation, corruption, and destruction.

54 On the addition found here in some of the MSS consulted, see Appendix A.

55 Here the words '*al-rawḥ wa'l-rayḥān*' are taken in their literal meaning (see above, note 52).

56 The expression '*dār al-ukhrā*' might recall '*dār al-ākhirā*', which often occurs in the Qur'an.

57 Cf. Qur'an 37:8; 38:69 (here translated by Yusuf Ali as 'the Chiefs on high').

May God give success to you, O brother, and to all (fol. 147b) our Brethren, in [achieving] the right way, and may He bring you and us into paradise⁵⁸ by His mercy and His favour — in truth, He has power over everything He wants.

The epistle 'On the Quiddity of Form and Matter' is completed. Praise be to God, Who alone deserves praise, and blessing and peace be upon His Prophet the chosen and His messenger the elect, Muhammad, and upon his family after him.

58 For the expression '*dār al-salām*' (Home of Peace), see Qur'an 6:127, 10:25. It is missing in the Şadir edition.

(Atif fols. 148a–b) [p. 24 Şâdir]

Epistle 16

On the Heavens and the World

[Being the second epistle from the second section of the *Epistles of the Brethren of Purity*, on the Natural Sciences]*

In the name of God, the Compassionate, the Merciful

Chapter 1

As we have finished recalling the Absolute Body, the qualities proper to it, constitutive of its essence with respect to matter, and the other intrinsic qualities that follow them, such as motion, rest, and the like, in the epistle named 'On Physics',¹ we want to recall in this epistle named 'On the Heavens and the World'² the universal, simple bodies that are the spheres, the stars, and the four elements (fire, air, water, and earth), because the Absolute Body is first divided into them and then, after them, into the particular, begotten bodies — animals, minerals, and plants.

Chapter 2

On the knowledge and meaning of the wise men's saying, 'The world is a macroanthropos'

Know, O my brother, that by saying 'world' the wise men mean the heavens, the Earth [*al-araḍīn*], and all the creatures of them, and they called it a 'macroanthropos' [p. 25] because they think that it is a single body with all its spheres, the strata of its heavens, the elements of its matrices and of the begotten beings [that come from these matrices], and they think that it has a soul, whose faculties are diffused in all parts of its body as the faculties of the soul of a single man are diffused in all parts of his body. So, we want to recall in this epistle the form of the world, and to describe how its body is composed, as the composition of the human body is described in the *Book of Anatomy*.³

* The title in Atif (fols. 148a1–b1) runs as follows: 'The Second Epistle from the Second Section on the Natural Sciences, on the Heaven and the World, among the Fifty-one Epistles of the Brethren of Purity, on the Purification of the Soul and the Rectification of Morals as a Part of a Sufi Discourse'. It is completed by the following eulogy: *In the name of God, the Compassionate, the Merciful. O Lord, give us success.*

1 The text refers here to Epistle 15; see above, pp. 120–123. The epistle is here named *Bi-sam' al-kiyān* by a title that exactly translates the Greek *Φυσικὴ ἀκρόασις*.

2 The epistle is named according to the mediaeval title given to Aristotle's work *On the Heavens* (*De Caelo*).

3 The title *Kitāb al-tashrīḥ* may refer to the Arabic translation of Galen's *Anatomy*. Cf. G. Bergsträsser, *Hunayn ibn Ishāq und seine Schule. Sprach- und literargeschichtliche Untersuchungen zu den arabischen Hippokrates- und*

Then we will describe in another epistle how it is, as well as the quiddity of the World Soul from the summit of the all-embracing sphere to the centre of the Earth. Then we will explain the kinds of its⁴ movements and the manifestation of its acts in the bodies of the world, one within another.

But let us now come back to the description of the body of the world, and say: the body is one of the existing beings that can be grasped by way of the senses through the mediation of its accidents, as we have explained in the epistle 'On Sense and Sensibilia'.⁵

All existing beings are substances and accidents, forms and matter, and that which is composed from both of them, as we have explained in the epistle 'On Matter and Form'.⁶ Form is of two species, constitutive and complementary, as we have explained in the epistle 'On Intellect and Intelligibilia',⁷ and length, breadth, and depth are the form constitutive of the essence of the body when they are found in matter that is a simple substance, capable of receiving forms.

The forms complementary to the body, which make it reach the highest of its states, are many; their number can be counted only by God, be He exalted. However, we mention something [*ṭarafan*] of them so that their meaning can be understood. Among the forms complementary to the body there is shape, and shapes are many, like the triangular, the square, the pentagonal, the circular one, and so on.

Among the complementary forms there is motion, too. Movements are of six species. One of them is translation, and it has two species, circular and rectilinear. Among the forms complementary to the body there is shape,⁸ and the noblest of the shapes is the spherical shape, as we explained in the epistle 'On Geometry'.⁹ The most distinguished

Galen-Übersetzungen (Leiden: Brill, 1913), p. 15, and G. Bergsträsser, *Hunayn ibn Ishāq über die syrischen und arabischen Galen-Übersetzungen* (Leipzig: Brockhaus, 1925), p. 19ff. (Arabic text).

4 That is, of the soul.

5 The text refers here to Epistle 24; *Rasā'il*, vol. 2, p. 397.5–6.

6 See above, p. 122.

7 The text refers here to Epistle 35; *Rasā'il*, vol. 3, pp. 234.10–236.19. On this reference, see Epistle 15 above, p. 111, note 5.

8 This translation comes from the emendation of *al-ṣafā'* once again into *al-shakl*, though shape is dealt with some lines above. The text may be corrupt.

9 The text refers here to Epistle 2. In this treatise, however, although 'circle' is

of movements is the circular one, as we explained in the epistle 'On Movements'.¹⁰ The most brilliant of lights is the essential one, and the purest of attributes is translucence, as we explained in the epistle 'On Qualities and Qualified Objects'.¹¹ So, the body of the world in its whole has a spherical shape, the movements of its spheres are all circular, the lights of all the stars of its heavens are essential, apart [p. 26] from [that of] the Moon, and the masses of all its globes are translucent, apart from that of the Earth; and we have already explained the cause of the state [*amr*] of the Earth and the Moon in the epistle 'On Causes and Effects'.¹²

Chapter 3

On the fact that the heavens are the spheres

(fol. 149a) Know, O my brother, may God help you and us through a spirit coming from Him, that the heavens are the spheres. The

mentioned at pp. 87–88, 102, 103, 108, and 'sphere' at pp. 93 and 95, no clear mention is made of the nobility of the circular shape. References can be found, e.g., in Epistle 33: 'On the Intelligible Principles According to the Ikhwān al-Ṣafā's Opinion', *Rasā'il*, vol. 3, p. 209.15–20, and in Epistle 40: 'On Causes and Effects', *Rasā'il*, vol. 3, p. 362.5–6.

10 The text refers here to Epistle 39. To the best of my knowledge, there is no explicit statement of the superiority of the circular motion in this treatise. Probably the Ikhwān hint at the description of the heavenly (circular) motion that is found in it; *Rasā'il*, vol. 3, p. 323.10–16.

11 This title does not belong to any of the treatises of the encyclopaedia as it is known to us, though the topic hinted might be connected to Epistle 11: 'On the Categories'. There, however, the only mention concerning light is as one example of simultaneity together with shadow; see Baffioni, *On Logic*, p. 98, corresponding to p. 74.3 of the Arabic text. The Ikhwān might have hinted at these ideas in Epistle 24: 'On Sense and Sensibilia', *Rasā'il*, vol. 2, pp. 408.22–409.5.

12 The text refers here to Epistle 40. For the spherical shape of the universe, see *Rasā'il*, vol. 3, p. 361.20–22; for the circular movements of its spheres, see *Rasā'il*, vol. 3, p. 362.4–7; for the fact that the lights of the stars are all essential apart from the Moon's, the reference may be to *Rasā'il*, vol. 3, p. 350.5, where light is said to be essential (*jawharī*) to the Sun. To the best of my knowledge, there is no explicit assertion in this treatise about the fact that the masses of all spheres are translucent, apart from that of the Earth, but this subject is hinted at in Epistle 24: 'On Sense and Sensibilia', *Rasā'il*, vol. 2, p. 399.10–12.

heaven is called 'heaven' for its loftiness, and the sphere 'sphere' for its circularity.¹³

And know that the spheres are nine: seven of them are the seven heavens, the first of which and the closest to us is the sphere of the Moon, i.e., the heaven of the low-world; then beyond it there is the sphere of Mercury, i.e., the second heaven; then beyond it, the sphere of Venus, i.e., the third heaven; then beyond it, the sphere of the Sun, i.e., the fourth heaven; then beyond it, the sphere of Mars, i.e., the fifth heaven; then the sphere of Jupiter, i.e., the sixth heaven; then the sphere of Saturn, i.e., the seventh heaven. Saturn is 'the piercing star', and it is called 'piercing' because its light pierces the vault of the seven heavens until it arrives at our sights; so al-Ḥusayn transmitted [this], on the authority of 'Abd Allāh ibn al-'Abbās, may God help you and us through a spirit coming from Him.¹⁴

As to the eighth sphere, i.e., the sphere of the fixed stars, the intermediate [sphere between the sphere of Saturn and the sphere]¹⁵ that embraces these eight spheres, it is the lofty throne that eight

13 Aristotle gives three etymologies for 'heaven' (οὐρανός) in his work *On the Heavens* I.9.278b9–21. The first of them corresponds to the one given by the Ikhwān, but the other two are also reflected in the content of the *Epistles*. In particular, the third (the universe in its entirety) might fit the context of Epistle 19, Chapter 1.

14 'Abd Allāh ibn al-'Abbās, called *al-Hibr*, the Doctor, or *al-Baḥr*, the Sea, because of his doctrine, is perhaps the greatest scholar of the first generation of Muslims. The Ikhwān's reference may be linked to the fact that he entered political life after 'Alī came to power. He was a (little-heeded) counsellor of 'Alī and of his son al-Ḥusayn; see L. Veccia Vaglieri, "Abd Allāh b. al-'Abbās", *EI2*, vol. 1, pp. 40–41. Mentioning al-Ḥusayn, the Ikhwān may here refer to the Shī'ī *ḥadīth* tradition, traced through 'Alī's family.

15 If we keep the Atif text, this emendation is necessary (see also the Atif marginal note reported in the critical apparatus, p. 75, note 1). Otherwise, we might emend the text according to the other MSS (see the critical apparatus, p. 75, notes 1–2), and in this case the translation would run approximately as follows: 'As to the eighth sphere, namely, the sphere of the fixed stars that extends over and embraces these <seven spheres, it is the throne [*al-kursiyya*, or other readings] that extends over the heavens and the earth [cf. Qur'an 2:255]. As to the ninth sphere, embracing these> eight spheres, it is the lofty throne [*'arsh*] [...]'. The other versions consulted (Arberry, Bausani, Bonelli, Chebel, Kasimirski, Kračkovskij, Masson) translate both *kursī* and *'arsh* with 'throne', but the context suggests 'foot-stool' to be a more suitable translation for *kursī*.

[angels] shall carry above them upon that [day], as God, be He exalted, mentioned.¹⁶

And know, O my brother, may God help you and us through a spirit coming from Him, that each of these seven spheres mentioned above is a heaven for that which is under it, and an earth for that which is above it. So the sphere of the Moon is the heaven of the Earth on which we are and an earth for the sphere of Mercury; the sphere of Mercury is a heaven for the sphere of the Moon and an earth for the sphere of Venus; and the rule that governs the other spheres is according to this analogy: each is a heaven for that which is under it and an earth for that which is above it, until one arrives at the sphere of Saturn, which is the seventh heaven.

[p. 27] **Chapter 4**
On the composition of the spheres and
the strata of the heavens

Know, O my brother, that the Earth on which we are is a single globe that comprises the mountains, seas, deserts, rivers, and the places inhabited and in ruin that are on it. It is motionless at the centre of the world, in the middle of [the sphere of] the Air, with all that is on it, God willing.¹⁷

[The sphere of] the Air embraces it from all its sides, as the albumen of an egg embraces its yolk. The sphere of the Moon embraces [the sphere of] the Air as the shell of an egg embraces its albumen. The sphere of Mercury embraces the sphere of the Moon in the same way. And the other spheres are according to this analogy, until one arrives at the sphere that embraces everything. God, may He be glorified and honoured, said, *all [the celestial bodies] swim along, each in its rounded*

16 Cf. Qur'an 69:17: *And the angels will be on its sides, and eight will, that Day, bear the Throne ['arsh] of thy Lord above them.* According to A. Bausani, it is the ninth heaven. See *L'enciclopedia dei Fratelli della Purità*, p. 101. As the Šādir edition, too, provides the reading *thāmin*, we may infer that either this reading is untenable (as is also confirmed by the reference to Qur'an 69:17), or we have to accept the addition provided by all the MSS consulted apart from [ط].

17 Cf. Aristotle, *On the Heavens* II.14.296b35–297a6.

course.¹⁸ (fol. 149b) And this is the likeness for the composition of the spheres and for the form of the vaults of the seven heavens, and it is the throne [*kursiyya*] that comprises heavens and the Earth.¹⁹

[p. 28] By this likeness it is clear that the whole world is eleven globes, two inside the sphere of the Moon — namely [the sphere of] the Earth and [the sphere of] the air, because earth and water are a unique globe, and air and ether are a unique globe — and nine globes beyond it, which embrace each other.

Chapter 5

On the fact that there is no void in the world

Know, O my brother, may God help you and us through a spirit coming from Him, that these globes embrace each other like the strata of an onion.²⁰ Between the embracing and the embraced surfaces there is neither void nor empty space, apart from an imaginary division common to both of them.

Many people of science thought that between the space of the spheres, the strata of the heavens and the parts of the matrices, there are void places, but the issue is not as they thought, because the meaning of 'empty space' is 'a void space in which nothing is established', and space is one of the qualities of the bodies that subsists only with the body and is found only with it.²¹

And know that light and darkness are also two of the qualities of the body, and it is not absolutely possible for us to conceive in the world a place neither dark nor bright, so whence might empty space exist? Know that he who spoke of the existence of an empty space thought that, as he saw some bodies moving and displacing from one place into another, he also should imagine that were it not for empty space, a body would not be able to move from its place, because fullness would hinder it from movement and translocation. And know that if

18 Second part of Qur'an 21:33.

19 Cf. Qur'an 2:255: *His Throne [kursi] doth extend over the heavens and the earth.*

20 Literally, 'the strata of the structure of an onion'.

21 See *Physics* IV.1.208b26–27. In *Physics* IV.1.209a6–7 (see Epistle 15, note 28) Aristotle also means that place cannot itself be a body. The non-existence of void is more generally stated in *Physics* IV.7.

bodies were all hard, with parts firmly connected together, like iron and stone, the issue would be as they thought, but as some bodies are loose, subtle, and liquid, like water and air, it is not impossible that some bodies move towards their parts, as a fish moves in water, a bird in air, and the other animals on the surface of the Earth.²²

[p. 29] **Chapter 6**

**On the fact that outside the world there is neither
empty nor full space**

Know, O my brother, may God help you and us through a spirit coming from Him, that these eleven globes are the whole world and the dwelling of all creatures. Many people prone to fancies think that beyond the [all-embracing] sphere there is another body and an infinite empty space, but both these propositions are a mistake without reality, because rational demonstration established that empty space does not exist absolutely, either outside or inside the world. In fact, the meaning of 'empty space' is 'a void space in which nothing is established', as we described above, and space is one of the qualities of bodies and it is an accident that subsists only in the body and exists only with it.²³

Whoever, [urged] by imagination that fancies it, alleges that outside the world there is another body, is requested to produce a proof for that. Know that imagination is one of the faculties of the soul that fancies [both] what has reality and what has no reality; hence one should judge whether its fancies are true or false only after one of the sense faculties has given evidence in favour of them, or after a necessary demonstration establishes them, or intellect decides on them. Know that the verdict of intellect is that in which (fol. 150a) all those who are in full possession of their mental faculties are unanimous [*yatasāwā*]; and all those who are in full possession of their mental faculties do not agree on the [purported claim] that outside the world there is another body, because neither does sensation grasp it, nor intellect decide in

22 Against the existence of void as the condition for motion, see *Physics* IV.8 and VIII.9.265b23ff.

23 Outside the universe ('*τοῦ οὐρανοῦ*', Aristotle says) there is neither body, nor void, nor time; *On the Heavens* I.9.279a11–12.

favour of it, nor demonstration establish it. Then, on what grounds [*qaḍiyya*] might one judge that here there is another body, other than from a fancy of false imaginations?

And if there were here another body as the alleger alleged, it would not be possible for something to be beyond it, because the body possesses a limit,²⁴ and the prophetic and philosophical views agreed on this. In fact, the prophetic view holds that each body is created and that each created being possesses a limit according to the first principles of the intellect, and the philosophical view holds that each body is composed by matter and form and that each composed being possesses a limit according to the first principles of the intellect.

[p. 30] **Chapter 7**

**On the fact that the place of the Sun is in
the middle of the world**

And know, O my brother, may God help you and us through a spirit coming from Him, that as in the [all-embracing] sphere the Sun is like a king on the Earth, and all the stars are like soldiers, helpers, and subjects, the spheres like climes, the constellations like countries, degrees like towns, and minutes like villages, by the necessity of divine wisdom the centre [of the sphere] is in the middle of the world, as the dwelling of a king is in the middle of his reign (namely, in the [capital] town) and his town is in the middle of the countries of his kingdom.

In fact, the place [*markaz*] of the Sun is in the middle of its sphere and its sphere is in the middle of the spheres, because — as this world in its whole is eleven globes, as we explained above, and five of them are beyond the sphere [of the Sun], embracing each other (namely, the globe of Mars, the globe of Jupiter, the globe of Saturn, the globe of the fixed stars, and the all-embracing globe), and five are under [the Sun] within their proper place [*markaz*] embracing each other, the first of them being the globe of Venus, under it the globe of Mercury, under it the globe of the Moon, under it the globe of the Air, and under it the globe of the Earth — according to this consideration, the place [of

24 This statement means that the universe is finite and, then, that nothing can exist beyond it.

the Sun] is in the middle of the world, as the place of the Earth is in the centre of the world.

Chapter 8 On the quiddity of the constellations

Know, O my brother, may God help you and us through a spirit coming from Him, that the constellations [of the zodiac] are twelve, as an imaginary partition on the surface of the sphere of the Sun, divided into twelve imaginary portions, all of them beginning at one point and ending at another point [longitudinally] opposite to it. So the surface of the globe is divided into twelve partitions, each of them being like a division²⁵ of a water-melon, called 'constellations', while the two points are called 'the two poles of the globe'. By moving during 365 days, the Sun draws an imaginary circle on the surface of its globe, as we will explain later. This circle divides the globe into two halves, and each constellation into two equal partitions, a portion of each constellation of that circle being a section of an arc measuring 30 parts out of the 360 of that circle. The rotation [p. 31] of the other spheres and stars is related to this circle and to its degrees, and by the movements of the Sun the movements of the stars in the ephemerides are explained, (fol. 150b) and by the states of the Sun the states of the stars in the nativities [i.e., 'natal horoscopes'] are explained.

Chapter 9 On the diameters and the thickness²⁶ of the spheres

Know, O my brother, that each of these globes has a diameter and a thickness, and that the thickness of each heaven is smaller than its

25 I emended the text according to Dieterici's reading *hazza*, literally, 'incision'. Such a reading is shared by the majority of the MSS consulted, though with a remarkable shift in the use of diacritics. The Şadir edition has *juz*'.

26 The word *samk* indicates both the thickness and the vault of a sphere. Dieterici translates with 'Breitenmesser' and 'Höhenmesser' respectively and explains the former as 'der grösste Durchmesser der Sphäre (Kugelschale)' and the latter as 'ihre Dicke oder die Differenz zwischen dem inneren und äusseren halbmesser'; *Die Naturanschauung*, p. 31.

diameter, except for [that of] the Earth. In fact, its diameter is equal to its thickness because it is not a hollow globe, while the thickness of the other globes, as they are hollow, are smaller than their diameters. So the diameter of the Earth is 2,167 *farsakh*,²⁷ and its circumference²⁸ is 6,800 *farsakh*.

The diameter of the [globe of the] Air²⁹ is $16\frac{1}{2}$ ³⁰ times the diameter of the Earth, that is to say 53,832³¹ *farsakh*. The diameter of this globe is twice its³² thickness, and it is double the diameter of the Earth.³³

The thickness of the globe of the Moon is equal to the thickness of the [globe of the] Air, its diameter is twice its thickness, and it is double the diameter of the [globe of the] Air.³⁴

The thickness of the globe of Mercury is 105 times³⁵ the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of the Moon.

The thickness of the globe of Venus is 915 times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of Mercury.

27 See Bausani, *L'enciclopedia*, p. 102, where he also explains, 1 *farsakh* = 3 miles. See also Dieterici: 'Die Wiener Handschrift hat 2177. – Nach der arabischen Gradmessung von al Aman war 1 Grad = $56\frac{2}{3}$ Meilen, wovon 3 eine Parasange ausmachten; danach wäre der Umfang der Erde 6800 Parasangen. Der Durchmesser der Erde ist danach 2164,5 Parasangen. Mit dem archimedischen Verhältniss des Umfangs zum Durchmesser von 22:7 kommt $2163\frac{1}{22}$ heraus; vielleicht wäre für 2167 also 2163 zu lesen'; *Die Naturanschauung*, p. 31, note 1. Cf. also L. E. Goodman and R. McGregor, *The Case of the Animals versus Man*, p. 308, note 546, where the *farsakh* is fixed at 3.5–4 miles (approximately 6km).

28 Literally, 'the biggest circle on its surface'. Dieterici, *Die Naturanschauung*, pp. 31–32: 'Ihr grösster Umkreis und ihre weiteste Ausdehnung'.

29 Ibid., p. 32: 'Der Höhenmesser der Luft'.

30 Bausani, *L'enciclopedia*, p. 103: '17 e $\frac{1}{2}$ '.

31 Dieterici has '35755 Parasangen'; *Die Naturanschauung*, p. 32. And at note 1, 'Die Wiener Handschrift hat 53322. – $16\frac{1}{2} \times 2163\frac{1}{22}$ ist 35700 und $2163\frac{1}{22} \times 16\frac{1}{2}$ ist 35764; woher die Zahl 35755 kommt ist nicht zu ermitteln'. Whereas Bausani has '37922,5'; *L'enciclopedia*, p. 103.

32 Bausani indicates that each diameter is equal to twice the diameter of the preceding star; *ibid.*

33 Dieterici, *Die Naturanschauung*, p. 32: '+ dem einmaligen Erddurchmesser'.

34 Ibid.: '+ dem einmaligen Breritenmesser der Luft'.

35 Bausani, *L'enciclopedia*, p. 103: '100 e $\frac{1}{5}$ '.

The thickness of the globe of the Sun is 100^{36} times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of the sphere of Venus.

The thickness of the globe of Mars is $7,656^{37}$ times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of the Sun.

[p. 32] The thickness of the globe of Jupiter is 5,527 times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of Mars.

The thickness of the globe of Saturn is $[7,605]^{38}$ times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of Jupiter.

The thickness of the globe of the fixed stars is approximately 12,000 times the diameter of the Earth, its diameter is twice its thickness, and it is double the diameter of Saturn.³⁹

Chapter 10 On the quantity of the number of the fixed stars and of the planets

The stars that can be perceived by observation are $1,029^{40}$ seven of which are planets, namely: Saturn, Jupiter, Mars, the Sun, Venus, Mercury, and the Moon; each of them has a proper sphere that embraces one another, as we explained above. The other stars are 1,022, in the same sphere, namely, the eighth sphere that embraces the sphere of Saturn and the other spheres inside it.

36 Dieterici, *Die Naturanschauung*, p. 32: 'ist = ...', and at note 2: 'Die Zahl ist im Pariser codex ganz ausgelassen, im Wiener steht 100, was ja auch ganz unstatthaft hier ist'.

37 Ibid., note 3: 'Beide Handschriften lesen hier 7656, was wiederum ganz falsch ist; ich möchte daher 3656 conjectutiren. Diese Zahl stände dann einigermaßen im Verhältniss'.

38 For this figure, see the critical apparatus, p.91, notes 19–20 and p. 92, note 1.

39 Dieterici, *Die Naturanschauung*, p. 32, note 4, remarks that it is not possible to identify the origin of these data, and that they differ from those provided by Ptolemy. He also reports, among others, the values provided by the renowned astronomer Abū 'Abd Allāh al-Battānī (d. 929).

40 Cf. Epistle 3: 'On Astronomy', *Rasā'il*, vol. 1, p. 115.3–4.

(fol. 151a) **Chapter 11**

On the measures of their diameters according to the judgement [ra'y] of the eye, and on the measures of these stars according to the judgement of the eye⁴¹

The diameter of the mass of the Sun, according to the judgement of the eye, is equal to 31', given that a degree is 60 minutes.⁴² The diameter of the mass of the Moon, when it is at the farthest distance [at its apogee],⁴³ is equal to the diameter of the Sun. The diameter of the mass of Mercury, when it is at the intermediate distance, is $\frac{1}{15}$ ⁴⁴ of the diameter of the Sun. The diameter of the mass of Venus is $\frac{1}{10}$ ⁴⁵ of the diameter of the Sun. The diameter of the mass of Mars is [p. 33] $\frac{1}{20}$ of the diameter of the Sun. The diameter of the mass of Jupiter is $\frac{1}{12}$ of the diameter of the Sun. And the diameter of the mass of Saturn is $\frac{1}{18}$ ⁴⁶ of the diameter of the Sun.

Chapter 12

On the relation of their diameters with the diameter of the Earth

The diameter of the mass of Mercury is $\frac{1}{28}$ of the diameter of the Earth.⁴⁷ The diameter of the mass of Venus is $\frac{1}{3}$ ⁴⁸ of the diameter of the Earth. The diameter of the mass of the Sun⁴⁹ is one part and $\frac{1}{5}$ of

41 Dieterici, *Die Naturanschauung*, p. 33: 'Ueber die scheinbaren Dimensionen der Wandelsterne'.

42 Ibid., p. 33: 'die Minute zu 60 Sekunden gerechnet'.

43 The apogee (Greek, ὀψος) is the farthest point of an orbit from the Earth. It is opposite to the perigee (Greek, ταπεινομα), the closest point to the Earth. See Epistle 3: 'On Astronomy', *Rasā'il*, vol. 1, p. 120.10; and de Callatay and Halflants, *On Magic I*, p. 93, note 24.

44 Bausani, *L'enciclopedia*, p. 107: ' $\frac{1}{25}$ '.

45 Ibid.: ' $\frac{1}{12}$ '; Dieterici, *Die Naturanschauung*, p. 34: ' $\frac{1}{15}$ '.

46 Bausani, *L'enciclopedia*, p. 107; and Dieterici, *Die Naturanschauung*, p. 34: ' $\frac{1}{28}$ '. At note 1 Dieterici adds: 'Die hier angegebenen Zahlen weichen von denen die al Batani giebt ab. Derselbe giebt für Merkur $\frac{1}{12}$, für Venus $\frac{1}{10}$, für Mars $\frac{1}{20}$, für Jupiter $\frac{1}{12}$, für Saturn $\frac{1}{15}$ an'.

47 Ibid., p. 34: 'Der Durchmesser des Mondkörpers und des Merkurkörpers beträgt $\frac{1}{28}$ vom Erddurchmesser'.

48 Ibid.: ' $\frac{1}{3} + \frac{1}{12} = \frac{5}{12}$ '.

49 I emended the text according to Dieterici, *ibid.*: 'des Sonnenkörpers', and to MSS

$\frac{1}{3}$ of the diameter of the Earth.⁵⁰ The diameter of Mars is one part and $\frac{1}{6}$ of the diameter of the Earth. The diameter of Jupiter is $4\frac{1}{16}$ ⁵¹ times the diameter of the Earth. And the diameter of Saturn is $4\frac{1}{2}$ times the diameter of the Earth.

Chapter 13

On the measures of the masses of these stars in relation to the mass of the Earth

The Moon is $\frac{1}{39}$ of the Earth. Mercury is $\frac{1}{22}$ of the Earth. Venus is $\frac{1}{37}$ of the Earth. The Sun is <like the Moon $\frac{1}{39}$ of>⁵² the Earth, 166 and a bit times.⁵³ Mars is $1\frac{1}{16}$ ⁵⁴ times the Earth. Jupiter is 95 times the Earth. And Saturn is 91 times the Earth.⁵⁵

Chapter 14

On the measures of the fixed stars

There are 1,022 stars. Fifteen of them are 108 times the Earth, the diameter of each of them being [p. 34] $4\frac{1}{8}$ times the Earth,⁵⁶ and according to the judgement of the eye it is $\frac{1}{20}$ of the diameter of the mass of the Sun. Forty-five stars are each 90 times the Earth. Two

[ط], [ز], [ر], [د], and [ل] (see the critical apparatus, p. 95, note 8).

50 Ibid.: ' $\frac{1}{3} + \frac{1}{15} = \frac{4}{15} = \frac{2}{3}$ ', and at note 2: 'Offenbar ist die Zahl 5 ausgelassen, denn aus dem körperlichen Inhalt ersieht man, dass es wohl $5\frac{2}{3}$ sein soll'. The Šādir edition adds here: 'the diameter of the mass of the Sun is five and a half times the diameter of the Earth', which is lacking in our MSS; it is the sole datum given by Bausani, *L'enciclopedia*, p. 110 as the 'diametro reale solare [...] che è impossibile se si pone la distanza media del Sole dalla Terra, come fatto prima, non a 1210 r.t. come faceva Tolomeo, bensì a 2202 r.t.'.

51 Dieterici, *Die Naturanschauung*, p. 34: ' $4\frac{1}{2} + \frac{1}{3}$ (W. $\frac{1}{6}$) = $4\frac{5}{6}$ '.

52 For this integration, see the critical apparatus, p. 96, note 7.

53 Dieterici, *Die Naturanschauung*, p. 34: 'die Sonne ist = 166 Erden + einem Bruch'.

54 Dieterici, *ibid.*: ' $= 1\frac{1}{2} + \frac{1}{3}$ (W. $\frac{1}{6}$)'.

55 Dieterici, *ibid.*, p. 34, note 3: 'Diese Zahlen stimmen, die letzte ausgenommen, mit den obigen nicht überein; streng genommen müssten die obigen Zahlen zur dritten Potenz genommen werden, um den Kubik-Inhalt zu ergeben. Die Venus ist $1\frac{1}{14}$ der Erde'.

56 Dieterici, *ibid.*, p. 34: ' $4\frac{1}{2} + \frac{1}{4}$ '.

hundred and eight⁵⁷ stars are each 72 times the Earth. Four hundred and seventy-four stars⁵⁸ are each 54 times the Earth. Two hundred and seventeen⁵⁹ stars are each 36 times the Earth. Thirty-three⁶⁰ stars are each 18 times the Earth.⁶¹

Chapter 15

On the variety of the rotation of the spheres around the Earth

Know that the all-embracing sphere is the First Mover, namely the Universal Soul⁶² that accomplishes, every 24 hours, exactly one complete turn around the Earth. As the starry sphere is within it, in touch with it from its interior, [the all-embracing sphere] makes it turn with itself (fol. 151b) in the direction towards which it turns; however, the movement [of the starry sphere] is a bit defective in relation to the speed of the movement of its mover, so, in correspondence with the parts [of the all-embracing sphere], it lags behind by 1° every 100 years.

And as the sphere of Saturn, too, is within this starry sphere, in touch with it from the interior, [the starry sphere] makes it turn with itself too, in the direction towards which it turns, and the sphere of Saturn follows it; however, its movement is also a bit defective in relation to the speed of its mover, so, in correspondence with the parts of the all-embracing sphere, it remains behind by 2' every day.⁶³

57 Dieterici, *ibid.*, p. 35: '208 (Par. 200)'.

58 One should perhaps read '494', with [ك], [ر], [د].

59 Dieterici, *Die Naturanschauung*, p. 35: '217 (Par. 227)'; Bausani, *L'enciclopedia*, p. 110: 227. Also [د], [ز], [ط], [ك], and [ل] have this reading.

60 Bausani, *ibid.*: '63' (and so Dieterici, *Die Naturanschauung*, *ibid.*, note 1). The sum would be 1,032 in Bausani; it is 992 in our text, but with the emendations proposed in notes 58 and 59 we would have 1,022.

61 Dieterici, *ibid.*, p. 35, note 1, remarks that these figures are not correct, and writes that according to Ptolemy (*Almagest* VIII.1) there are 15 stars of first magnitude, 45 of second, 208 of third, 474 of fourth, 217 of fifth, 49 of sixth magnitude, 9 dark stars, and 5 nebulae.

62 The text properly says, '*al-falak al-muḥīṭ huwa al-muḥarrik al-awwal a'nī al-muḥarrika al-ūlā allatī hiya al-naḥs al-kullīya*', due to the fact that *naḥs* is feminine in Arabic.

63 Bausani, *L'enciclopedia*, p. 110: 'quindi rivoluzione siderale di Saturno = 2' x 365 = 12,16° l'anno'.

And likewise is the rule that governs the sphere of Jupiter within the sphere of Saturn, every day being delayed by 5' in correspondence with the parts of the all-embracing sphere.

And likewise is the rule that governs the sphere of Mars within the sphere of Jupiter, delayed in correspondence with the parts of the all-embracing sphere in [its] rotation every day by 31'.

And likewise is the rule that governs the sphere of the Sun within the sphere of Mars, the sphere of Venus within the sphere of the Sun, and the sphere of Mercury within the sphere of Venus, each of them delayed, in correspondence with the parts of the all-embracing sphere every [p. 35] day by 59'.

As to the sphere of the Moon, it is delayed every day, in correspondence with the degrees it was [passing by] the day before,⁶⁴ by 13 and a bit degrees. It is clear, by this explanation, that each of these globes is moved by the globe that is above it and moves the globe that is under it, until arriving at the sphere of the Moon. The sphere of the Moon is the slowest in movement because of its distance from the First Mover (namely, the all-embracing sphere), on account of the multiplicity of the intermediaries between them, and for this reason the rotation of these globes around the Earth [occurs in] different times, and the movement of each of them is defective in relation to the speed of the movement of its mover.⁶⁵

Chapter 16

On the disparity of the times of their [spheres'] rotations

This is because the all-embracing sphere makes a complete turn around the Earth every 24 hours, the starry sphere [makes a complete turn] in a bit more time than that, and the sphere of Saturn in more [time]

64 Dieterici, *Die Naturanschauung*, p. 36: 'von dem Punkte, dem sie gestern entsprach'.

65 Bausani, *L'enciclopedia*, p. 111, adds here: 'L'Autore opera qui una ulteriore *contaminatio*, questa volta fra la teoria tolemaica degli eccentrici e degli epicicli e quella eudossiana (e aristotelica) delle sfere omocentriche, sostenendo che quando gli astronomi dicono che gli astri si muovono di 'moto secondo' da ovest a est si tratta di un modo di dire, ma in realtà esso è dovuto, come vedemmo, alla sempre maggior lentezza delle loro sfere concentricamente moventesi. Tutti in realtà si muovono solo da est a ovest'.

than that, namely, the measure of [24 hours and] $\frac{1}{450}$ of an hour. And likewise the sphere of Jupiter makes a complete turn around the Earth in 24 hours and $\frac{1}{180}$ of an hour. The sphere of Mars makes a complete turn around the Earth in 24 hours and $\frac{1}{29}$ ⁶⁶ of an hour, approximately. As to the spheres of the Sun, of Venus, and of Mercury, each of them makes a complete turn around the Earth in 24 hours and $\frac{5}{3}$ of an hour.⁶⁷ The sphere of the Moon, as it is the slowest one, makes a complete turn in 24 hours and $\frac{6}{7}$ of an hour.⁶⁸ [p. 36]

Chapter 17

On the rotation of the stars in the sphere of constellations

For this reason [that follows], the stars happen to rotate around the sphere of constellations in different times. The explanation of this is (fol. 152a) that when the Moon⁶⁹ faces a place of the Earth being in the first degree of Aries, that degree returns to the meridian [*samt*]⁷⁰ of that place exactly after 24 hours, and so it goes forever. The Moon returns to the azimuth of that place in the 13th degree of the constellation of Aries after $24\frac{6}{7}$ hours, approximately. On the third day, it returns in the twenty-sixth degree of the constellation of Aries after $1\frac{5}{7}$ hours. On the fourth day, it returns in the ninth degree of the constellation of Taurus⁷¹ after $2\frac{4}{7}$ hours. According to this explanation [*qiyās*], its facing that place is delayed every day by another degree,⁷² until, by

66 Dieterici, *Die Naturanschauung*, p. 36: '24 + $\frac{1}{2}$ + $\frac{1}{5}$ Stunden', and at note 1: 'Richtiger in 24 + $\frac{1}{36}$ + $\frac{1}{150}$ Stunden'.

67 This proposition is lacking in Dieterici, *ibid.*.

68 *Ibid.*: '24 + $\frac{1}{2}$ + $\frac{1}{5}$ Stunden', and at note 2: 'Die Wiener Handschrift hat $\frac{6}{7}$; das Richtige wäre $\frac{2}{3}$ '.

69 I have emended the text according to Dieterici, *ibid.*, p. 37: 'der Mond', and to MSS [ا], [ج], [ح], [خ], [د], [ر], [ز], [ط], [غ], [ف], [ك], [ل], and [ن] (see the critical apparatus, p. 104, note 8).

70 I.e., the reference point from which the azimuth is measured (cf. Dieterici's translation). *Samt*, pl. *sumūt*, means in astronomy also 'azimuth' or 'direction', usually applied to the direction of a celestial body measured on the horizon.

71 Dieterici, *ibid.*, has 'des Widders' again.

72 The Moon moves several degrees each day, but the Arabic has the singular, '*ma'a darajatin ukhrā*', probably indicating the global amount of its delay. All of the MSS consulted provide the plural.

this delay, a full turn is completed for it in the sphere of constellations every 27 days and $9\frac{1}{35}$ hours,⁷³ and 27 turns and a bit around the Earth are also completed for it in this period.⁷⁴

The rule for the Sun is the same, because when it faces a place of the Earth being in the first minute of the constellation of Aries, it returns to the azimuth⁷⁵ of that place in the fifty-ninth minute of that degree after $24\frac{1}{15}$ hours,⁷⁶ and on the third day it returns to the azimuth of that place in the fifty-eighth minute of the second degree⁷⁷ of the constellation of Aries, and likewise its returning to the azimuth⁷⁸ is delayed by another degree every day, until a full turn is completed for it in the sphere of constellations every 365 days and 6 hours, and in this period 365 turns and a bit around the Earth are also completed for it. And likewise 366 turns and a bit around the Earth are completed for that minute in this [p. 37] period [i.e., 365 days and 6 hours]; and the rule that governs Venus and Mercury is also thus.

As for Mars, when it faces a place of the Earth being in a certain minute of a certain degree, it returns on the second day in the thirty-first minute of that degree, and on the third day in another minute⁷⁹ of the following degree, until a full turn is completed for it in the sphere of constellations every Persian year, i.e., 10 months and 22^{80} days. In this period, 687 turns are also completed for it around the Earth. And likewise that⁸¹ minute [completes] 688 turns — that is, one turn more.

73 Dieterici, *Die Naturanschauung*, p. 37, has: '9 + $\frac{1}{3}$ + $\frac{1}{3}$ Stunden'. At note 1 he remarks, 'Die siderische Umlaufszeit des Mondes beträgt 27 Tage 7 St. 43 M.'

74 Dieterici, *ibid.*, adds: 'der erste Grad des Widders hat aber in derselben Zeit 28 Umschwünge + einem Bruch vollbracht'.

75 The Arabic is *musāmata*, here and later.

76 Dieterici, *Die Naturanschauung*, p. 37, has: 'nach 24 Stunden + $\frac{1}{3}$ + $\frac{1}{3}$ ', and at note 2 he remarks: 'Die Brüche sollten fehlen'.

77 Dieterici, *ibid.*, has: 'Am dritten Tage kehrt sie zum Meridian des Erdorts zweiten am Ende des 2ten (Par. 3ten) Grades'.

78 Again, the Arabic is *musāmata*, here and later.

79 I have emended the text according to Dieterici, *Die Naturanschauung*, p. 38: 'mit der ersten Minute', and to MSS [د], [ر], [ز], [ط], [ك], and [ل] (see the critical apparatus, p. 107, note 14).

80 *Ibid.*: '12 Tagen', and at note 1: 'Par. Handschrift giebt 22 Tage'; Bausani, *L'enciclopedia*, p. 111: '26th'.

81 That is, as clarified by Dieterici, *Die Naturanschauung*, p. 38, as the first minute of Aries.

As for Jupiter, when it faces a place being in a certain minute of a certain degree, it returns to the azimuth of that place in the (fol. 152b) fifth minute of that degree, and on the third day in the tenth minute, and so on forever until a full turn is completed for it in the sphere of constellations every 11 years, 10 months, and 26⁸² days, and 4,341⁸³ turns around the Earth are completed for it in this period, and for that minute 4,342 turns.

As for Saturn, when it faces a place, it returns on the second day in the beginning of the third minute, and on the third day in the fifth minute — a portion of 2 minutes every day, until a full turn is completed for it around the Earth in the sphere of constellations every 29 years, 5 months, and 6 days, and in this period 9,111⁸⁴ turns around the Earth are completed for it, and likewise for the minute 9,112 turns.

As for the fixed stars, when one of them is found at the azimuth of a place of the Earth, it returns to that azimuth in the second minute of a certain degree, so that a full turn is completed for it in the sphere of constellations every 36,000 years,⁸⁵ and the Earth completes many turns. And as the rotation of the all-embracing sphere from the east to the west above the Earth, and from the west to the east under the Earth, is clear to those who practise [astronomical] observation, as well as the rotation of the other spheres that follow it with their stars and the fact that their decans [*wujūhahā*]⁸⁶ are defective in relation to the speed of the movement [of the all-embracing sphere], delayed [p. 38] with respect to it every day by their own measure, every turn with reference to the rotation of the other ones —⁸⁷ thus [astronomers]

82 Dieterici, *Die Naturanschauung*: '20 Tagen', and at note 2: 'Wiener Hdschr. giebt 26 Tage'.

83 Ibid.: '4345' (and later 4346); Bausani, *L'enciclopedia*, p. 111: '4435 e fraz.'.

84 Ibid., note 3: 'Diese Zahlen in beiden Hdschr. sind falsch. Das Richtige wäre 10741, 42'.

85 On this and other cycles of the stars, see Goodman and McGregor, *The Case of the Animals versus Man*, pp. 143–144, note 139.

86 The decans (Greek δέκαβοι) are divisions of the zodiac of 10 degrees each, with each corresponding to the power of an old Egyptian deity. For this definition, bibliographical data, and religious sources, see de Callatay and Halflants, *On Magic I*, p. 128, note 139; cf. also Epistle 3: 'On Astronomy', *Rasā'il*, vol. 1, pp. 123.14–124.2.

87 Dieterici, *Die Naturanschauung*, pp. 38–39: 'sie auch gefunden haben, dass diese an Schnelligkeit der Bewegung geringer sind und täglich hinter jenem in dem

made calculations in the astronomical almanacs to know whatever time they wanted, their places and their distances from the sphere of constellations; and the truth about their places and distances from the sphere of the constellations was known.⁸⁸

And as also clarified to those who practise [astronomical] observation was what happens to the stars in respect to rotation in the sphere of constellations because of the slowness of the movement of their globes in reference to the speed of the all-embracing sphere, they called what happens to them with respect to the rotation in the sphere of constellations ‘movement from the west to the east’, so that there is a distinction in the denomination of their rotation around the Earth and of their rotation in the sphere of constellations.

Chapter 18

On the falsity of the discourse of he who says that they [the spheres] are moved from the west to the east

Many among those who study astronomy without being experienced in the geometrical and natural sciences have thought that these fixed stars are moved from the west to the east, in opposition to the rotation of the all-embracing sphere. However, the issue is not as they thought and imagined, because if it were as they thought, they would rise in the west and set in the east, just like the degrees of the all-embracing sphere rise in the east and set in the west.

They compared their rotation in the sphere of constellations in opposition to the rotation of the [all-embracing] sphere to the movements of ants on the surface of a millstone, advancing in their movements in opposition to the movements [of the millstone], even though the millstone, because of the speed of its movement, brings the ants back again. And if what they said were true, their movements would be only seven, because there are seven stars, but the matter is the opposite of this, because the experts in observation stated that there are 45 movements, as we will explain later.

Maasse, als der eine Umschwung unter dem andern stattfindet, zurückbleiben, wie wir dies dargethan haben’.

88 The text may be corrupt here; see the critical apparatus, p. 111, notes 9–10.

They also said that the Moon is the fastest of the stars in its movement, but if it were as they thought, the Moon would turn around the Earth in less than 24 hours, while (fol. 153a) we already explained that it turns in more [than that]. And if [p. 39] their movements were, by intention, contrary and opposed to the movement of the all-embracing sphere, their natures would necessarily be opposite and contrary to the nature of the sphere, and there should necessarily be 45 natures because there are 45 movements, but the issue is not as they thought and imagined.

On the contrary, the nature of all spheres and stars shares the circular movement, and their intention is the same, but the movement of the stars differs in fastness and slowness; and they differ because they are both moved and movers in the spheres. And because of the diversity of their rotations around the Earth, their rotations in the sphere of constellations also differ, as we explained. The diversity of their rotation around the Earth can be compared to the diversity of the rotation of those who perform the *ṭawāf* around the Ka'ba.⁸⁹

Chapter 19

On the likeness of their [stars'] rotation to the rotation of those who perform the *ṭawāf* around the Ka'ba

This is because the Ka'ba in the middle of the Sacred Precinct, the Sacred Precinct in the middle of Ḥijāz, and the country of Ḥijāz in the middle of the countries of Islam can be compared to the Earth in the middle of the globe of the Air, to the globe of the Air in the middle of the globe of the Moon, and to the sphere of the Moon in the middle of the spheres; and those who perform the *ṣalāt* from the remote regions directed towards the Ka'ba can be compared to the stars in

89 The Ikhwān ground their speech on a comparison with the *hajj* (the ritual pilgrimage to Mecca, the fifth pillar of Islam), a religious duty (occurring from the 8th to the 12th day of *Dhū'l-ḥijja*, the 12th and last month of the Islamic calendar) that must be carried out at least once in a lifetime by every Muslim who can manage to do so. In the same way that the *hajj* is seen by Muslims as a commandment for an eternal movement in a certain direction, so the whole world moves according to a similar eternal movement. The Ka'ba, housed in the *masjid al-ḥaram*, is the focal point of prayer for all Muslims.

the spheres and to the places of incidence of their rays towards the centre of the Earth.

The rotation of the spheres with their stars around the Earth can be compared to those who perform the *ṭawāf*⁹⁰ around the Ka'ba.

The diversity of their rotations around the Earth can be compared to the diversity of the rounds of those who perform the *ṭawāf* around the Ka'ba.⁹¹ In fact, you see those who perform the *ṭawāf* around the Ka'ba: some of them walk unhurriedly and some of them rush, some of them hasten and some of them move quickly, so their rounds differ according to this, but all of them, in their *ṭawāf*, are directed towards the same direction [p. 40] or the same intention. However, when he who walks arrives at the 'Iraqi corner,⁹² he who rushes will have arrived at the Syrian corner, he who hastens at the Yemenite corner, and he who moves quickly at the corner of the Black Stone. For this reason, when on performing his *ṭawāf* he who walks makes one round, he who moves quickly will have made many rounds of *ṭawāf*, but the intention of those who perform the *ṭawāf* — even though their rounds differ because of the fastness and slowness of their movements — is one alone towards the same direction, and likewise is the rule that governs the spheres and their stars when they rotate around the Earth. And as those who perform the *ṭawāf* around the Ka'ba begin from the gate and meet there again after seven completed rounds around the Ka'ba, so it is said that all stars begin their movements in correspondence with the first minute of the constellation of Aries, which is like the gate of the sphere, then they turn around the Earth, then, after that, their procession in the degrees of constellations differs according to

90 *Tawāf*, i.e., walking counter-clockwise seven times around the Ka'ba, is the first ritual of the *ḥajj*. Pilgrims may also kiss the Black Stone (*al-ḥajar al-aswad*) on each circuit. If that is not possible, they may simply point towards the Stone with their right hand. In each complete circuit a pilgrim says, '*Bism Allāh Allāhu akbar, Allāhu akbar, Allāhu akbar wa-li'llāh al-ḥamd*' ('In the name of God, God is Great, God is Great, God is Great, praise be to God'). During *ṭawāf* eating is not permitted, but the drinking of water is allowed.

91 Men are encouraged to perform the first three circuits of their *ṭawāf* at a hurried pace, followed by four times, more closely, at a leisurely pace.

92 The Iraqi corner is the first one, quite close to the Zamzam well. As part of *ḥajj* rituals, the pilgrims also drink water from this well, located within the *masjid al-ḥaram*, 20m east of the Ka'ba.

their fastness and slowness, as we explained. And when all these will have met, after many rotations, in correspondence with the minute from which they began, resurrection will happen and the rotation will recommence.

Chapter 20

On the likeness of their rotations

Know, O my brother, that the Indian wise men made a likeness for the rotation of these stars around the Earth, so that its comprehension might become more familiar to learners and its representation be made easier for those who attentively examine it.

They recalled that a king (fol. 153b) had built a city whose circumference was 60 *farsakh*, and that he had sent seven people to walk around it at a different pace: one of them circulated 1 *farsakh* every day, another 2 *farsakh* every day, the third 3 *farsakh* every day,⁹³ the fourth 4 *farsakh* every day, the fifth 5 *farsakh* every day, the sixth 6 *farsakh*, and the seventh 7 *farsakh*. He said, 'Turn around this city, and [p. 41] begin from the gate; when you have convened at the gate after your rotations, come and let me know how many turns each of you made.' He who understands the computation of the rotation of these persons around that city and is able to represent it, can understand the rotation of these stars around the Earth, and after how many turns they will convene at the beginning of the constellation of Aries, just where they had started at the beginning.

As to the computation of those persons, after 60 days six of them will convene at the gate, and the first one will have accomplished 1 turn, the other 2 turns, the third 3 turns, the fourth 4, the fifth 5, and the sixth 6 [turns]. But he who walks 7 *farsakh* every day will have accomplished 8 turns and 4 *farsakh*,⁹⁴ so these persons have to recommence to turn, and after 120 days they will convene a second time at the gate and each of them will have accomplished his first amount [of turns] another time, but the seventh will have turned 17 times and 1 *farsakh*,⁹⁴ so

93 On this and the following values see the Introduction, pp. 38–39; de Callatay, *Annus Platonicus*, p. 147: '8 revolutions plus $\frac{1}{7}$ of the parasangs of a revolution'.

94 Ibid.: '17 (revolutions) plus $\frac{1}{7}$ of the parasangs of a revolution'.

they have to recommence to turn; and after 180 days those six persons will convene a third time, and each of them will have accomplished his first amount [of turns] for the third time, but the one who walks 7 [*farsakh*] will have made 25 turns and 5 *farsakh*,⁹⁵ so they have to recommence to turn with him; and after 240 days they will convene for the fourth time, but the one who walks 7 [*farsakh*] will have made 34 turns and 2 *farsakh*,⁹⁶ so they have to recommence to turn; after 300 days they will convene at the gate for the fifth time, but the one who walks 7 [*farsakh*] will have made 42 turns and 6 *farsakh*,⁹⁷ so they have to recommence to turn; and after 360 days they will convene for the sixth time, and each of them will have accomplished his first amount [of turns] for the sixth time, but the one who walks 7 [*farsakh*] will have made 51 turns and 3 *farsakh*,⁹⁸ so they have to recommence to turn with him, and after 420 days all of them will convene at the gate, and the first of them will have accomplished 7 turns, the second 14 turns, the third [p. 42] 21 turns, the fourth 28 turns, the fifth 35 turns, the sixth 42 turns, and the seventh will have accomplished 60 turns.

This is the comparison given by the Indian wise men for the rotation of the spheres and of the stars around the Earth, because the Earth can be compared to that city built [by the king], whose circumference was 60 *farsakh*, the seven planets and their rotation around the Earth can be compared to those seven persons, (fol. 154a) the diversity of their movements in fastness and slowness is like the diversity of pace of those persons, and the king is the Creator, high be His praise and sanctified be His names.

Chapter 21

The retrograde motion, rectilinear motion, and station that are seen in reference to them

Know, O my brother, that five among these planets — namely, Saturn, Jupiter, Mars, Venus, and Mercury — are described as being now in

95 Ibid.: '25 revolutions plus $\frac{3}{4}$ '.

96 Ibid.: '34 revolutions plus $\frac{2}{3}$ '.

97 Ibid.: '42 revolutions plus $\frac{6}{7}$ '.

98 Ibid.: '51 revolutions plus 3/(7) of the parasangs (of the revolution)'.

'retrograde motion',⁹⁹ now in 'rectilinear motion', and now in 'station', but this is not the truth.

Indeed, they appear [like this] to the vision of the eye, because the mass of each of those planets travels on a small globe — [all of these globes being] called 'epicycles' — and each of them also travels on one of the big spheres mentioned above. Each is submerged in the thickness of the vault of the other, so that one side of them is adjacent to the upper surface of the other, and the other side is adjacent to the lower surface of the other, and each of them is also eternally turning in its place with regard to the sphere that supports it.

So, when each planet travels on this sphere, sometimes it happens to rise towards the highest surface of its sphere and to go far from the Earth, sometimes it happens to descend from there and to get close to the Earth; and when it is at the highest of its summits, it is seen as if it were moving consecutively in the constellations, from the first one to the last one; and when it is at the lowest point of its sphere, it is seen as if it were moving from the last of the constellations towards the first one; and when it is ascending or descending, it is seen as if it were still, but it is neither [p. 43] still nor returning, but always in rotation; however the experts in observation gave these names as denominations for [these movements].

Chapter 22

On the specification of the forty-five movements

Know, O my brother, that each of these seven planets has six movements towards six different directions. One of them is the movement east-west, another [the movement] west-east, another south-north, another north-south, another up-down, and another down-up. So there are, in total, forty-two movements. And for them — that is, for the fixed stars — two movements occur, and for the all-embracing sphere one movement, then the [total of them] is forty-five movements.

⁹⁹ In Epistle 22: 'On Animals', the Ikhwān introduce the retrograde motion of the planets as a sign of imperfection, as they are not divine. See Goodman and McGregor, *The Case of the Animals versus Man*, p. 124, note 81.

Their movement east–west is according to the first, true intention, while the other ones are by accident, not by [the first, true] intention. We already explained in the chapter written above the [movement] that occurs west–east. The [movements] that occur up–down and down–up come from the epicycles and from the eccentric spheres. The [movements] that occur south–north and north–south come from the inclination of the sphere of the constellations with respect to the equator and to its nodes. Their explanation is long, so he who wants [to know] this science in depth should study the book of [Ptolemy's] *Almagest* or certain summaries on the composition of the spheres.

Chapter 23

On the explanation of the two [kinds of] obscuration existing in the world

(fol. 154b) Know, O my brother, that the world as a whole is completely illumined thanks to the passage of the Sun and of the stars, and that only two kinds of obscuration are in it: the shadow of the Earth and the shadow of the Moon. They have a shadow because they are neither luminous nor translucent. As to the light that [p. 44] is seen on the face of the Moon, it comes from the illumination of the Sun on the surface [*sath*] of its mass and from the reflection of its rays, and it appears like the light that comes from the surface [*wajh*] of a mirror when it is faced by the Sun.

As to the other bodies that are in the world, some of them are luminous and have an essential light (namely, the Sun, the stars, and the fire of our [world]), while the other bodies are all translucent (namely, the spheres, air, water, and some earthen bodies like glass, crystal, and the like).

The luminous bodies are those that have an essential light, while the translucent bodies are those that have neither essential light nor natural colour,¹⁰⁰ but when they are faced by a luminous body, its light is effused in all their parts instantaneously, because light is a spiritual form, and a property of the spiritual forms is that they are effused in

100 Dieterici, *Die Naturanschauung*, p. 45, has: 'eine [...] von Natur eigene Farbe'. Text emended in Atif; see the critical apparatus, p. 129, note 4.

bodies instantaneously, and slip away from them instantaneously in no time; and when an opaque body comes between luminous and translucent bodies, it hinders the light of the luminous body from being effused in the translucent body.

So, light in the mass of the Sun and the stars is essential to them, while it is accidental for the masses of the spheres, of air, and of water. As to the mass of the Earth and of the Moon, as they are neither luminous nor translucent, they have a shadow, because light is not effused in them as it is effused in the translucent bodies; but the surface [*saṭḥ*] of the mass of the Moon is polished and reflects light as does the surface [*wajh*] of a mirror, while the surface of the mass of the Earth is not polished, and this is the difference between them.

Chapter 24

On the cause of eclipses

Know, O my brother, may God protect you, that as the mass of the Earth and the mass of the Moon are, each of them, smaller than the mass of the Sun, the form of their shadows is conic — and the form of a cone is that whose beginning is thick and its end thin, until it is intersected because of its thinness.

So, the shadow of the Earth begins from its surface, stretches into [the sphere of] Air as a cone until it arrives at the sphere of Mercury,¹⁰¹ and it also stretches in its thickness until it is intersected [p. 45] there,¹⁰² and its length from the surface of the Earth until it is intersected in the sphere of Mercury is 130 times the diameter of the Earth. Sixteen and a half parts of it penetrate into the [sphere of] Air, the same amount penetrates into the sphere of the Moon, and 97¹⁰³ parts of it penetrate into the sphere of Mercury, until it is intersected; and the diameter of this shadow at the distance of the Moon at the time of its opposition to the Sun is 23/5 times the diameter of the sphere of the Moon. And when the Sun happens to pass by one of the two [lunar] nodes that

101 Ibid., p. 46, has: 'des Mondes'. No MS has this reading.

102 Ibid.: 'bis er in die Sphäre des Merkur gelangt'.

103 Ibid.: '97 Theile (Mns. 67)'; Bausani, *L'enciclopedia*, p. 112: '67%'.

are called the 'Head' and the 'Tail' [of the Dragon],¹⁰⁴ and the light of the Sun is prevented from [reaching the Moon by] the passage of the Moon inside the shadow,¹⁰⁵ [the Moon] is seen as eclipsed, until it comes out from the other side and reappears.¹⁰⁶

As to the shadow of the mass of the Moon, it begins from the surface of its mass, stretches like a cone into the thickness of its sphere, and the rest of it stretches (fol. 155a) into the thickness of the [sphere of] Air, and intersects it until it reaches the face [*wajh*, here and later] of the Earth. The diameter of its circumference on the surface of the Earth has the measure of 150 *farsakh*, more or less, according to the distance and the closeness of the Moon in relation to the Earth, this [being calculated] at the time of its conjunction [*ijtimā'*] with the Sun. So, if their conjunction happens to be at one of the nodes, with the Moon coming before our sights and before a part of the Sun, the light [of the Sun] is prevented [from reaching] us and we see it as eclipsed.

And when the Moon is in a different place from these ones (namely, from conjunction and opposition) but one of these places is closer, if it is closer to the conjunction, the top of its cone is in the thickness of the [sphere of] Air, and if it is closer to the opposition, the top of the cone of its shadow is in the thickness of its sphere or in the thickness of Mercury. As to the top of the cone of the shadow of the Earth, its degree is opposite to the degree of the Sun, whatever constellation it is in, and it will always turn in opposition to the Sun; and if [the Sun] is above the Earth, the shadow of the Earth is under it, while if it is under the Earth, the shadow of the Earth is above it; if it is in the east, the shadow of the Earth will pass westwards, while if it is in the west,

104 They correspond to the points of the sphere in which the Moon crosses the ecliptic from the south to the north and from the north to the south respectively. The revolution of these points plays a crucial role in the determination of eclipses, as the Ikhwān state in Epistle 3: 'On Astronomy', *Rasā'il*, vol. 1, pp. 142.16–143.13. Cf. de Callatāy and Halflants, *On Magic I*, p. 91, note 17, with further bibliography. On the nodes, see also pp. 120.13–121.6.

105 Dieterici, *Die Naturanschauung*, p. 47: 'so findet ein Durchgang des Mondes durch die Tiefe des Schattens statt'; Bausani, *L'enciclopedia*, p. 113: 'e la Luna passa nello spessore dell'ombra terrestre'.

106 The treatment of eclipses in Chapter 24 of Epistle 16 has little in common with Aristotle. See, e.g., *On the Heavens* II.11.291b21–23, II.13.293b23ff., II.14.297b24ff.

the shadow will pass eastwards. This is their way always; they both happen around the Earth and are the night and the day.

[p. 46] **Chapter 25**

On the fact that the sphere is a fifth nature

Know, O my brother, may God help you and us through a spirit coming from Him, that when the wise men say that the sphere is a fifth nature, they mean that the heavenly bodies [*ajrām*] are not subject to generation and corruption, change and transformation, and increase and diminution (as are the bodies [*ajsām*] that are under the sphere of the Moon), and that their movements are all circular.

And know that bodies have many qualities, some of which are shared by all bodies, namely, length, breadth, and depth only.

And know that qualities are forms put in matter, so that matter is qualified by them; and among these forms that are called 'qualities' some are essential and constitutive of the body, like its existence (namely, its length, breadth, and depth), because when they vanish from the body the existence of that body vanishes; and among the forms, some are complementary to the body, bringing it to the noblest of its states, and these forms are proper to some bodies and not to others, and sometimes they are shared by numerous bodies.

Among the complementary forms, some are shared by the heavenly and the natural bodies, like shape, motion, light, translucence, and dryness, that is, the cohesion of the parts. Among those proper to the natural bodies are heat and cold, weight and lightness, moisture, change and transformation, rectilinear motion, and the like; and among those proper to the heavenly bodies is the negation of all those ones — and because of this they are said to be a fifth nature, because they are neither warm nor cold, nor wet, neither heavy nor light, (fol. 155b) nor are they transformed one into the other so that something else comes from them, nor does anything increase or diminish in their measures, because the Creator, high be His praise, originated them all and invented them as complete and perfect; so they remain permanent in their states till the moment when their Creator wants to annihilate them as He wills, just as [p. 47] He originated, invented, informed and

composed them, put them in motion, and made them turn, blessed be God, the best of creators.

Chapter 26

On the absurdity of the explanation of those who imagine what is not the truth

Know, O my brother, that many people of science thought that the wise men's saying 'The sphere is a fifth nature'¹⁰⁷ means that it is opposed to these natural bodies in every quality, but the issue is not as they thought, as the eyes refute them. In fact, the Moon is one of the heavenly bodies, but a difference is seen in it in its reception of light and darkness, as it is seen in the earthly bodies: it has a shadow like their shadows, and it is not translucent, like the Earth, while all spheres share translucence with water and air, glass and crystal, the Sun and the stars share luminosity with fire and air, and all of them share dryness with earth.

By this it is clear that, speaking of a 'fifth nature', they intend only circular motion and that [the heavenly bodies] receive neither generation and corruption, nor increase and diminution, as natural bodies do.

107 The idea of a 'fifth nature' — notably widespread in late Hellenism, which became the *quinta essentia* of Latin Middle Ages — may have had its origin in Plato's *Epinomis* 981b–e, where he mentions a 'fifth body' (πέμπτον σῶμα) also called 'ether' (αἰθήρ). In the *Timaeus*, which was also very influential in Islamic thought thanks to Galen's *Commentary*, Plato spoke of five solids (20.55a–c): because of their structures, the cube was associated with earth, the octahedron with air, the icosahedron with water, the tetrahedron with fire, and the dodecahedron with 'the whole' (τὸ πᾶν, 55c). More particularly, the dodecahedron is considered to be a 'fifth combination' (πέμπτη σύστασις, 55c), which on the basis of the *Epinomis* should be identified with ether. Ether, however, is in this dialogue denied to be an element, being simply considered as the purest part of air (24.58d). A hint at this problem and at its mathematical counterpart can be found in Plato, *Timeus*, tr. C. Giarratano (into Italian) in *Opere*, 2 vols. (Bari: Laterza, 1966), vol. 2, pp. 514–515, note 113. The doctrine of the five elements was then developed by Aristotle, who postulated that the heavens were made of ether (different from the fifth body stated by Plato, and called τὸ πρῶτον σῶμα, πρώτη οὐσία, or even τὸ θεῖον σῶμα). On the different conception of ether held by Aristotle, see *On the Heavens* I.3.270b20–25.

Chapter 27

On the fact that they are neither heavy nor light

Know, O my brother, may God help you and us through a spirit coming from Him, that it was said that the heavenly bodies are neither heavy nor light, because they are inseparable from the places proper to them.

In fact, when the Creator, high be His praise, created the Absolute Body, distinguished its parts through complementary forms, and disposed them to embrace each other, as we explained, He assigned to each of them a place that was the most suitable for it. So, each body in its proper place is neither heavy nor light, because weight and lightness are inherent to some bodies on account of their emerging from the places proper to them towards an extraneous place.¹⁰⁸

And know that the Earth in its place — that is, the centre [of the universe] — is not heavy, [p. 48] nor is the water above it heavy, nor is the air above the water light, and not even the fire above the air is light, because they are in the places proper to them, and weight and lightness are inherent to their parts [only] when they emerge in extraneous places. In fact, the parts of earth inside water and air are extraneous, and they want to reach their proper place [*al-laḥūq bi-markazihā*] and what is of their genus, and when something hinders them, there is reciprocal pushing and shoving, and that is called 'weight'.

Likewise is the rule that governs the parts of water inside air, and the rule that governs the parts of air inside water, and the parts of fire inside air: each wants to reach its world, its proper place [*markazihā*], and what is of its genus. However, those among them that are turned towards the centre of the world are called 'heavy' and those that are turned towards (fol. 156a) the all-embracing sphere are called 'light'.

The proof of the fact that each body in its proper place and space is neither heavy nor light is that their parts in their whole are neither heavy nor light. The explanation of this comes from experiment and from reflection. The way of experiment is that we fill two jars, one with water and the other with wind (namely, with air). Then both of them

108 In *Physics* VIII.3.253b33–35, Aristotle says that 'it is a natural necessity that earth or anything else should rest in the place proper to it and only move out of it under force'.

are thrown into a full pool. You will see that the jar filled with water plunges inside the water, and that in which there is wind floats on the water. And when the jar that is filled with water is supported in the water, it has no weight because water in water is not heavy; but when it floats [ṣāra] on the water, it is sensed as being heavy. As to the jar that is filled with air, when it is immersed in the water, you will find in it a strong resistance, because air in air is light and inside water it is heavy,¹⁰⁹ while when it is carried in the air, that resistance does not exist for it, because air in air is not heavy.

And know, O my brother, may God help you and us through a spirit coming from Him, that when a certain quantity of water is taken from a pool full of water, and it is then returned to it, [that water] comes to a standstill¹¹⁰ when returned; and likewise, when an animal inhales air so as to refresh the innate heat, then returns it outside by breathing, that air comes to a standstill when returned (like dust, when it is taken from the earth and then returned to it, comes to a standstill when returned — in fact, no impulse is any longer inherent to it, absolutely).

[p. 49] **Chapter 28**

**On the fact that the heavenly bodies are neither
warm nor cold nor humid**

Know, O my brother, may God help you and us through a spirit coming from Him, that it was said that they [i.e., the heavenly bodies] are neither warm, nor cold, nor humid, due to the fact that heat arises in fluid and soluble bodies when they are in motion, because their parts come apart from their reciprocal closeness and are transformed by ebullition (namely, by heat). And as the heavenly bodies are firmly connected in their parts, owing to their strong dryness, they do not come apart from the reciprocal closeness of their parts, so ebullition (namely, heat), does not occur in them. As for coldness, it occurs when they are at rest, but the heavenly bodies are always in motion and in rotation, and they do not come to a stop, so [they do not] become cold.

109 Dieterici, *Die Naturanschauung*, p. 51, note 1, remarks, 'Richtiger wäre leicht, da die Lufttheile im Wasser dem Himmelskreise zu, nach oben streben'.

110 Dieterici, *ibid.*, 'so verbleibt dieses zurückgethane Wasser da stehen'.

Humidity occurs in bodies when some of their parts are in motion and others are at rest, but the heavenly bodies have no rest. And know that the heavenly bodies are strongly connected [within their parts] owing to their strong dryness, and that their strong dryness comes from forceful movement and rotation. In fact, motion generates heat and heat generates dryness, and when dryness attains the highest degree, it extinguishes heat.

And know, O my brother, may God help you and us through a spirit coming from Him, that the heavenly bodies are preserved in their order and are permanent in their individuals as long as their rotation lasts, and when they stop from their rotation and their movements come to rest, (fol. 156b) rest generates cold, cold generates humidity, outbreak [of diseases arises] from humidity, outbreak, and waste¹¹¹ corrupt order, and from the corruption of order come ruin and annihilation.

Chapter 29

On the meaning of resurrection

The rotation of the [all-embracing] sphere lasts as long as the Universal Soul remains linked to it, and when the Universal Soul is separated from it, the Great Resurrection occurs, because the meaning of ‘resurrection’ [*qiyāma*] derives from ‘rising’ [*qiyām*], and when the soul is separated from the body it subsists [*qāmat*] in itself, and that is its resurrection, as the Messenger of God, God bless him and give him peace, said, ‘He who has died [p. 50] already has his resurrection’¹¹² — in fact, he meant the resurrection of the soul, not of the body, because the body has no resurrection at the moment of its death, but it falls and is not yet risen.¹¹³

111 I prefer to maintain Atif's readings. Different readings are at the basis of Dieterici's translation, *ibid.*, p. 52: ‘aus der Feuchtigkeit entsteht zuletzt die Bewölkung und Verfinsterung; diese beiden verderben die Ordnung...’. For further readings, see the critical apparatus, p. 147, notes 6–7.

112 As it goes back to the Prophet directly, it is a *ḥadīth marfūʿ*. See the Introduction, p. 33.

113 Dieterici, *Die Naturanschauung*, p. 52: ‘denn der Körper erhebt bei dem Tode nicht, sondern er fällt und steht nicht wieder auf’. Then he continues as follows: ‘es sei denn, dass die Seele ihm wiedergegeben werde. Der Auferstehungen giebt es aber zwei, die kleine, welche ist die Trennung der Einzelseele vom

Then, O brother, awake from the sleep of carelessness and the slumber of ignorance, make provisions for your travel, and prepare yourself for the day of resurrection before your resurrection occurs, before [the time] that this built temple, filled with the signs of wisdom, is taken away from you forcibly while you are unwilling, and before your soul lingers unhappy without listening or seeing or smelling or tasting or touching, empty and void, wandering in the abyss of the *barzakh*¹¹⁴ till the day when it will be awakened again.

Hurry up then, and set to work briskly and endeavour to acquire, through the mediation of this physical temple, a spiritual temple, and through the mediation of these physical senses rational senses, so that your soul can return from the world of bodies to the world of spirits.¹¹⁵

And know, O my brother, may God help you and us through a spirit coming from Him, that when the soul is separated from this temple, among the tokens of this body only the divine knowledge, the good angelic habits, the sound opinions, and the pious and pure deeds [the soul] has acquired remain with it and are its companions. In fact, these things remain formed in [the soul's] essence as it was habituated to them, in that they are a spiritual, luminous, brilliant form. Every time the soul views that form in itself, it will rejoice at it and will be replete with joy, gladness, and pleasure. Similarly, its reward and blessing will consist in what it put aside in bygone days. And if its habits are evil, wicked, and ugly, its opinions corrupted, its deeds¹¹⁶ destined to ruin, and its ignorance accumulated, it remains blind to the vision of the true realities, and these things remain in its essence, represented in a shameful and loathsome form. Every time [the soul] views its essence and looks at its substance, it will see the evil it committed and the desire of fleeing from [that evil] will increase, but where might it escape from itself?

Consider then, O my brother, meditate, and attentively examine what I have recalled to you, and do not be dazzled by the comfort of

menschlichen Körper, und die grosse, welche ist die Trennung der Allseele von der Welt'.

114 Dieterici, *ibid.*, p. 53 explains: 'im Schlunde des Zwischenraumes d. i. zwischen Himmel und Hölle [...]'.
115 Here the addition in [ف] begins; see Appendix B.

116 Here the addition in [ح] begins; see Appendix B.

life [p. 51] and the health of body which you are in, or by the intimacy with your physical fellows and corporeal friends that want you to co-operate with them for the wellness of the matters of their bodies [*ajsādihim*] and the permanence of their bodies [*ajsāmihim*]. If you fail to co-operate with them, they will hate you; if you oblige them,¹¹⁷ they will resent you; if your state is low, they will dislike you, and they will want you (fol. 157a) only for the wellbeing of their condition and the satisfaction of their needs.

Come then, O my brother, may God fortify you, to intimacy with your psychic brethren and the companionship of your spiritual fellows¹¹⁸ that want for you and to you[r advantage] what they want for themselves and to [their own advantage]. They will help you and purify you from that into which you fell; then, crave for their companionship, listen to their discourses, understand their doctrine, study their books, know their way and their sciences, act according to their tradition, and follow their path, perhaps you will be rescued with them by closeness to them, who are neither touched nor grieved by evil.¹¹⁹

117 Dieterici, *Die Naturanschauung*, p. 54: 'übertriffst Du sie'.

118 This distinction recalls the Gnostic threefold division of humans into Hylics, Psychics, and Pneumatics. According to Gnosticism, man, the highest being in the lower world, participates in both the psychic and the hylic (material) nature. His goal should be to free his higher, spiritual nature. So, humanity comprised beings completely bound to matter, spirits linked to matter, and souls completely free from matter. The Pneumatics (from the Greek πνεῦμα, spirit, breath), might correspond to '*aqrān rūhāniyyīn*' of our text (which also explains my translations of this and the other phrasings). In Gnosticism, they succeeded in escaping the doom of the material world through secret knowledge. They were the only ones worthy of attaining gnosis, and hence allowed to return to the divine Pleroma. Psychics (from the Greek ψυχή, soul) might correspond to '*ikhwān laka nafsāniyyīn*'. They reached a lesser form of salvation. To these people, Hylics (from the Greek ὕλη, matter; also called Somatics from the Greek σῶμα, body), who correspond to '*aqrān laka jasadāniyyīn, aṣḍiqā' laka jismāniyyīn*' were opposed. They were human in form, but since their entire focus was on the material world, such as eating, sleeping, mating, and creature comforts, they were thought to be incapable of understanding and hence destined to perish. (Matter, the material world, was in fact considered to be evil in the Gnostic view.) One of the first relevant developments of this doctrine is due to the Christian Gnostic theologian Valentinus of Rome (d. 160 or 161 CE). There are evident similarities, in terminology and in doctrine, with the views expressed by the Ikhwān in their *Rasā'il*.

119 Dieterici's translation here (*Die Naturanschauung*, p. 54) is quite different; it

May¹²⁰ God give you success, O pious and merciful brother, in achieving rectitude, may He lead you and us on the right path, and may He make us attain with you the world to come with the pious, as He has power over everything He wants.

The epistle named 'On the Heavens and the World' is completed, praise be to God the Lord of the worlds, and blessing be upon Muhammad the chosen and on his family; God alone suffices for us, what an excellent mandator He is!

must follow another version.

120 Here the additions in the other MSS begin.

(Atif fols. 157a–b) [p. 52 Şādir]

Epistle 17
**On the Explanation of Generation
and Corruption**

[Being the third epistle from the second
section of the *Epistles of the Brethren of Purity*,
on the Natural Sciences]*

In the name of God, the Compassionate, the Merciful

Chapter 1

As we have finished mentioning the heavenly bodies, and we explained the quantity of their spheres and the quality of their disposition, the measures of their distances, the variety of their rotations, the speed of their movements and the quiddity of the natures of their substance in the epistle named 'The Heavens and the World' [Epistle 16], we want to recall in this epistle, named 'On Generation and Corruption', the natural bodies that are under the sphere of the Moon, the quantity of their number, the quality of their disposition, the variety of their natures, the way in which they are transformed one into another owing to the influences of the heavenly bodies on them, and the quantity of the genera of the generated beings begotten from them.

Chapter 2

And know, O pious and merciful brother, may God help you and us through a spirit coming from Him, that the bodies that are under the sphere of the Moon are of seven genera; four of them are fire, air, [p. 53] water, and earth, and three of them are the begotten particular beings, namely, animals, plants, and minerals.

So let us begin first by describing the universal 'mothers', and say that each of the 'mothers' is composed of matter and form.

The matter of them all is the [Absolute] Body and their forms are those by which each of them is distinguished from another, and they are the forms constitutive of the essence of each of them.

And as forms are of two species, constitutive and complementary, we need to describe them so that the difference between them is known, so we say [the following]: the forms constitutive of the essence of a thing are those that, when they are separated from their matter, the existence of that thing vanishes. Complementary forms are those that

* The title in Atif (fols. 157a10-b1) runs as follows: 'The Third Epistle from the Second Section on the Natural Sciences, on the Explanation of Generation and Corruption, among the Fifty-one Epistles of the Brethren of Purity, on the Purification of the Soul and the Rectification of Morals as a Part of a Sufi Discourse'. It is completed by the following eulogy: *In the name of God, the Compassionate, the Merciful. O Lord, bring me science.*

bring matter to the noblest of the states it can reach, and when they are separated from their matter, the existence of the matter does not vanish. Examples of this are shape [*al-shakl*] and motion; in fact, when both of them are separated from the body, the existence of the body does not vanish; but when length, breadth, and depth are separated from matter, the existence of the body vanishes.

Chapter 3

Know, O my brother, may God help you and us through a spirit coming from Him, that every form constitutive of the essence of a thing is followed by another, complementary form; that each antecedent form is constitutive and acts on the other subsequent to it, and that they follow each other like number, [where] the even [numbers follow] the odd ones, and the odd [numbers follow] the even ones, infinitely.

For example, the form that follows in the mass of fire, constitutive of its essence, is the movement of ebullition, and the complementary form subsequent to it is heat, that [form which] follows it is dryness, and that [form which] follows it is the cohesion of parts. And if it were not for the humidity of the air that embraces the fires that are in our world, which prevents [parts] from being excessively dry in [these fires], their parts would be kept together and would dry out as does the fire of a thunderbolt, and if dryness and desiccation affected them, the advantage [brought by these fires], namely, their ultimate goal, would be reduced.

(fol. 158a) And know, O my brother, that air is a noble substance, with many virtues and wonderful properties, among which [is the fact] that by its humidity fires are prevented from drying and desiccating, just as by its fluidity sounds are prevented from persisting for a long time so that the advantage brought by them would be reduced and the damage coming from them increased. In fact, sounds should remain in the air only for the duration in which [*qadra mā*] a listener can catch their measure [*ḥaẓẓahā*], then they have to be extinguished, and if sounds remained in the air for a long time, [p. 54] the air would be filled with sounds and noise, so that words and discourses that should be listened to could not be heard. And likewise, too, if fires became

dry and their parts were kept together and desiccated, they would not penetrate into bodies and would not ripen them, and things that should be ripened would remain raw, unripe, and stringy [*ghalīza*].

And observe, O my brother, may God help you and us through a spirit coming from Him, and reflect upon the wisdom of the Creator, high be His praise, when He established fires to remain according to the will of he who uses them, so that when he has no more need of them, he returns them to not-being with the easiest effort; while if they remained in their condition, their damage would be huge and the advantage brought by them would be reduced.

Chapter 4

And among the forms complementary to the essence of fire there is rarity [*laṭāfa*]¹ that generates heat, and the [capability of] penetrating quickly into bodies follows it.

Among the forms complementary to the essence of fire there is light, too, and illumination follows it. In the mass of fire numerous forms are assembled together, all complementary to it, namely, motion, heat, dryness, thinness, and light. Thanks to each of them fire accomplishes an act different from the one it accomplishes thanks to another; in fact, thanks to motion it makes bodies boil, thanks to heat it warms, thanks to dryness it dries, thanks to thinness it penetrates into bodies, thanks to light it illuminates what is around it, and thanks to heat and motion [together] it transforms bodies into their [elementary] essence.

Chapter 5

As to the forms constitutive of the essence of earth, they are [as follows:] rest² that is the contrary of ebullition. Coldness is subsequent and

1 Usually, I translate *laṭāfa*, *ghilaz*, and related terms with 'thinness' and 'thickness', but with reference to the elements 'rarity' and 'density' are more suitable. As is known, elements are arranged by Aristotle from the most dense to the most rarified (Greek: πυκνόν and ραρόν respectively). See, e.g., Aristotle, *On Generation and Corruption* II.3; *Physics* IV.9.217b12; *On the Heavens* III.5.303b24.

2 Obviously, in this context, as distinguished from other types of rest.

complementary to it. Dryness is subsequent to coldness, and cohesion of parts is subsequent to it. Among the forms complementary to it there are the density [*ghilaz*] of its substance and the cohesion of its parts, too, and from the cohesion of its parts the persistence of generated beings on its surface — minerals, plants, and animals.

And know, O my brother, that dryness is of two species, one subsequent to heat, which is noble, and the other subsequent to coldness, which is base. In fact, dryness [*al-yubūsa*]³ subsequent to heat is digested and ripe, while what is subsequent to coldness is unripe and immature.

Chapter 6

An example of this is the dryness of hyacinth [*yāqūt*], of crystal, and the like; in fact, the heat of a mine ripened them [i.e., substances like hyacinth and crystal] through concoction, so that they are noble and they neither are transformed [p. 55] nor change. As to [the dryness] following coldness, an example is the dryness of snow, of ice, of salt, and so on. Being unripe, thick, and immature, they are base and subject to transformation and change. Due to this, the heavenly bodies are not subject to generation and corruption, change and transformation, because their parts are kept together owing to the strength [*shidda*, here and later] of their dryness, and their dryness is generated from the heat of their motion, then dryness prevails in them and their heat is extinguished, as we explained in the epistle (fol. 158b) 'On the Heavens and the World' [Epistle 16].⁴ The terrestrial bodies, as their parts are kept together from the base and immature dryness generated from the coldness generated from rest, are subject to transformation and change and decay.

Chapter 7

Know, O my brother, may God help you and us through a spirit coming from Him, that [one of] the forms constitutive of the essence of both

³ Or, better, 'dry things'.

⁴ See above, pp. 165–166.

water and air is the humidity generated from the mixture of the parts in motion and in rest. In fact, as dryness is generated from the strength of the movement of all parts of matter, or from the absolute rest of them all,⁵ as we explained above, and as humidity is contrary to it, this is a proof of the fact that it is generated from the mixture of the parts in motion as well as of the parts in rest.

As [one of the] forms complementary to the essence of water is the paucity in it of the parts that are subtle and in motion, and the multiplicity of the parts that are thick and in rest, it is similar to earth in coldness, and its proper place [*markaz*, here and later] is adjacent to the place of earth. And as [one of the] forms complementary to the essence of air is the multiplicity in it of the parts that are subtle and in motion, and the paucity of the parts that are thick and in rest, it is similar to fire in heat, and its proper place is adjacent to the place of fire.

[p. 56] Chapter 8

Know, O my brother, may God help you and us through a spirit coming from Him, that as the form constitutive of the heavenly bodies is the strength of the dryness generated from the fierce speed of [their] motion, while the form constitutive of the terrestrial bodies is the dryness generated from the strength of the coldness that is⁶ contrary to motion, the terrestrial bodies are similar to the heavenly bodies only in dryness, but contrary to them in motion; and as their motion is around the centre, their rest is in the centre, because contrary flees from its contrary toward the place farthest from it, and the farthest place from the all-embracing [sphere] is the centre [of the universe, that is the Earth].

Chapter 9

As the form constitutive of water and air is the humidity generated from the mixture of the parts in motion and in rest, and as humidity is

5 Literally, 'from the violence of the rest of all of them'.

6 Obviously, in this context, as distinguished from other types of coldness.

contrary to dryness, their place is between the all-embracing [sphere] and the centre [of the universe, that is the Earth].

As the form complementary to the essence of water is the multiplicity in it of the parts that are thick and in rest, it is similar to earth in coldness, and its proper place is adjacent to the place of earth. As the form complementary to the essence of air is the multiplicity of the parts that are subtle and in motion, it is similar to the fire in heat, and its proper place is adjacent to the place of fire.

By this commentary it was explained that some bodies are similar to others in some nature, and contrary in another nature. Owing to the contrariety of their natures, their proper places [*marākizuhā*, here and later] are distinct, and owing to their similarity their proper places are contiguous.

Chapter 10

As these bodies are disposed according to their proper dispositions, each of them is motionless in its proper place, with neither clinging nor support, [being] neither heavy nor light.

They emerge from their places only owing to an accident overpowering for them, and when [one of them] is released [from that accident], it returns to its proper place [*mawḍi'ihī al-khāṣṣ bihī*, here and later]. When an obstacle hinders them, struggle occurs between them.

If the inclination is towards the centre of the world, it is called heavy, while if it is towards (fol. 159a) the all-embracing [sphere], it is called light.

As the globes are disposed [according to their disposition], and each of these elements is motionless in its proper place, they embrace each other, [being all] circular apart from water. In fact, the divine providence and wisdom of the Lord prevented it from embracing the Earth from all sides, because if the globe of water embraced the globe of Earth from all [p. 57] sides, it would have hindered the generation of animals and plants on the surface of the Earth. However, swamps were placed on Earth for waters, namely, the seas.

We have already recalled in the epistle 'On Geography' [Epistle 4] the form of the Earth and the quantity of the seas, mountains, rivers, climates, and countries. However, we have to recall here, of these things, those that it is necessary to recall.

Chapter 11

Know, O my brother, may God help you and us through a spirit coming from Him, that the Earth is a unique globe with all the seas, mountains, rivers, inhabited sites, and ruins that are on it, and it is motionless at the centre of the world in the [globe of the] Air, and air embraces it, encircling it from all its sides;⁷ that the place of the ocean [*al-baḥr al-a'zam*] is under the circle parallel [*madār*]⁸ to Aries, outstretched from east to west.

As to the other seas, reefs, and gulfs, they take their origin from the ocean and stretch northwards. These are the seven seas: the Mediterranean Sea, the Red Sea, the Persian Gulf, the Indian Sea, the Chinese Sea, the Sea of Gog and Magog, and the Caspian Sea.

Between all these seas there are islands, deserts, inhabited sites, mountains, marshes, and rivers that begin from mountains and finish at seas.

The bases of mountains are anchored in the earth and their tops are towering and lofty in the air. Between these mountains there are low-lying valleys, and in the interior of mountains there are caverns and abysses.

The depth of the earth has many cavities and its surface has different soils: good, briny, sandy soils, pebbles and hard stones, and various [kinds of] places. The cause of the diversity of all of them is to be sought in the stars they face, in the places where their rays fall, and in their passages across the degrees of the sphere in correspondence

7 These topics are also dealt with in Epistle 4: 'On Geography'. For the Earth as a unique globe at the centre of the world, see *Rasā'il*, vol. 1, pp. 158.18–159.1 (cf. also pp. 160.16–161.9); for the place of the ocean, see p. 163.3–8; for the seven seas, pp. 163.14–164.9. See also Epistle 16, Chapter 4, p. 139.

8 For this translation, see Abu'l-Rayḥān Muḥammad ibn Aḥmad al-Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, tr. R. Ramsay Wright (London: Luzac & Co., 1934), p. 65.

with those places. Through them generation and corruption occur in these bodies that are under the sphere of the Moon.⁹

Chapter 12

Know, O my brother, may God help you and us through a spirit coming from Him, that these four elements are transformed into one another, so water becomes now air and now earth. Likewise is the rule that governs air; in fact, it becomes now [p. 58] water and now fire. And likewise with fire; in fact, when fire is extinguished and dies, it becomes air, when air thickens, it becomes water, and when water solidifies, it becomes earth; and on the contrary, when earth rarefies and becomes subtler it becomes water, when water liquefies it becomes air, when air becomes hot it becomes fire; but fire cannot become subtler so as to become something else, and nor can earth become thicker so as to become something else.

However, when the parts of these elements are mixed with each other, the begotten beings subject to generation and corruption are formed from them, namely, minerals, plants, and animals.

The root of all these beings is vapours and juices when they are mingled with each other. (fol. 159b) Vapours are what rise in the air from the subtle parts of the water of seas, rivers, and marshes because of the warming of the Sun and of the stars with the projection of their rays on the surface of seas, rivers, and marshes. Juices¹⁰ seep into the depth of the earth from rain waters, are mixed with the parts of earth, and thicken, and the warmth hidden in the depth of the earth ripens them.

Chapter 13

Know, O my brother, may God help you and us through a spirit coming from Him, that the first thing into which the four elements

9 In other words, the generation and corruption of the sublunar world is determined by the celestial bodies. These topics are properly dealt with in the epistle 'On Minerals'. See below, pp. 229–230.

10 I have emended the text according to the majority of the MSS consulted, as well as to Dieterici. Atif has *al-bukhārāt* (see the critical apparatus, p. 174, note 1).

are transformed are these two mixtures, namely, vapour and juice. These two mixtures become matter¹¹ for the other beings subject to generation and corruption that are under the sphere of the Moon.

In fact, when the Sun and the stars warm water, irradiating the surface of the Earth as well as seas, rivers, and marshes, waters rarefy and the parts of earth become subtler and become vapour and smoke. Vapour and smoke become clouds, clouds become rains, and when rains moisten the soil and the parts of earth are mixed with those of water, juices are formed from them.

And juices become matter¹² for the generated beings — minerals, plants, and animals. We devoted a single epistle to each of their species, where we explained how they are generated from them, the how of their composition, origin, completeness, perfection and attainment of the highest of their goals, and the utmost of their limits, and then [we explained] the how of their corruption, rottenness, transformation, and return to these four elements from which they were generated at the beginning.

And know that generation and corruption are two contraries that cannot coexist in the same thing [p. 59] at the same time, because generation is the acquisition of a form in matter while corruption is its removal from it; and when one of those things decays, something else comes to be, because when a form is removed from matter, it vests another one. And if the [new form] in which matter is vested is nobler than the former, it is spoken of as 'generation', while if it is lower, it is spoken of as 'corruption'.

An example of this is that earth and water become a plant, plants become seeds and fruits, fruits and seeds become nourishment, nourishment becomes blood, flesh, and bones, and animals are generated from this. Corruption, instead, is when plants are burnt and become ashes, or animals die and become earth.

11 Here the text uses both the terms for 'matter', *hayūlā* and *mādda*.

12 Here, again, the text uses *mādda* and *hayūlā*.

Chapter 14

Know, O my brother, may God help you and us through a spirit coming from Him, that your body, by which your soul is characterized,¹³ is one of the beings subject to generation and corruption, and it is related to your soul only like a house dwelt in or a dress worn, and your highest resolution and greatest care are not [capable of] embellishing this house or making this dress softer; you know that each abode goes inevitably to ruin, and that each dress inevitably becomes shabby.

However, devote part of your time to the study of the question of your soul, and search for the knowledge of its substance, of its beginning and of its return, as it is a permanent substance existing forever, even though it passes from one state into another, as it is related in the *khavar*¹⁴ that ‘Umar ibn al-Khaṭṭāb,¹⁵ may God be pleased with him, said in a discourse of his: ‘You were created for eternity, but you move from one house to another, from (fol. 160a) loins to wombs, from wombs to the terrestrial world, from the terrestrial world to the *barzakh*, from the *barzakh* to paradise or hell’.¹⁶

[p. 60] And know that paradise is the world of spirits that are all a spiritual form not [immersed] in any physical matter, but [having] a pure life, pleasure, rest, joy, and happiness, in which neither generation nor corruption occur, neither change nor deterioration, because paradise is the abode of life — if they but knew!¹⁷

And as the abode is life, what do you think, O brother, may God help you, how is the state of the inhabitants of the abode? Any description [that might be given] of them would be defective [in expressing their nature and state], unless in an abridged form, as God, praise Him, recalled through the language of His Prophet, God bless him and give

13 In this passage, ‘soul’ is masculine.

14 *Khavar* is a synonym for *ḥadīth*, either going back to the Prophet, or to his Companions or Successors.

15 The second caliph, r. 634–644.

16 See the Introduction, p. 33.

17 These words echo Qur’an 29:64: *What is the life of this world but amusement and play? But, verily, the Home in the Hereafter — that is life indeed, if they but knew.*

him peace, and said, [...] *there will be there all that the souls could desire, all that the eyes could delight in: and ye shall abide therein (for aye).*¹⁸

And know, O my brother, may God help you and us through a spirit coming from Him, that hell¹⁹ is the world of the bodies that are under the sphere of the Moon, that is always in generation and corruption, in change, transformation, and deterioration; indeed, its inhabitants *as often as their skins are wholly burned, they will be dressed in other skins, that they may taste the chastisement.*²⁰ Then renounce, O my brother, may God help you and us through a spirit coming from Him, the illusion of this world, as did the prophets of God, His saints, the philosophers, and the wise men — in fact, they knew well that it [earth] is not the *Holy Site*²¹ — and prepare yourself for the journey and the passage²² by your choice, and not forced or compelled, before the annihilation of life and the approach of the instant of the death.

And know, O my brother, may God help you and us through a spirit coming from Him, that these things will be equal to you only after you will have known the superiority of the hereafter over this world with a sound knowledge without doubt or servile imitation, because in the innate disposition of man [there is an inclination] not to renounce the temporal present and to crave for the unseen future, except after knowledge of the superiority of the unseen future over the temporal present.

So endeavour, O my brother, may God help you and us through a spirit coming from Him, in the search for what the prophets of God, God's blessings be upon them, hinted at in the books revealed in their languages, whose meanings were taken from angels, upon them be peace, with regard to the description of the grace of the Holy Gardens and the happiness of their inhabitants, and to the quality of the Fire [i.e., hell] and the unhappiness of its inhabitants; and [endeavour also in the search] for what the philosophers and the wise men hinted at, too, in their symbolic tales with regard to the description of the world

18 Second part of Qur'an 43:71.

19 Here the text uses both *al-Nār* and *Jahannam*.

20 Central part of Qur'an 4:56, where *albasu* substitutes the *baddalnahum* ('we shall give them in exchange') in the verse. *Albasu* is not found in the Qur'an.

21 We find the expression '*dār al-maqāma*' in Qur'an 35:35.

22 To the other world, according to the *khavar* quoted above.

of spirits and the praise of its inhabitants, and [with regard] to their blame of the world of bodies and their disregard for its inhabitants. Perhaps you will be able to conceive with your intelligence what they represented, [p. 61] and you will experience in the purity of your substance what they experienced in the purity of their substance.

Awaken then your soul from the sleep of carelessness and the slumber of ignorance, and you will live the life of the learned and rise in knowledge, and they will elevate your determination in the realm of heaven, and you will be in the hereafter among the happy ones.

May God give success, O pious and merciful brother, to you, to us and to all our Brethren, whatever country they are in, in achieving the rectitude, and may He help you and us through a spirit coming from Him in achieving the right way, because He is benevolent with His servants.

And as we have finished recalling the four elements that are under the sphere of the Moon — fire, (fol. 160b) air, water, and earth; describing the forms proper to each of them, those constitutive of its essence, as well as the complementary forms that bring it to the noblest of its states; explaining how they are transformed into one another; and reporting that the first thing resulting from them was vapours, that from vapours juices coagulated, and that from juices the generated beings were formed — minerals, plants, and animals; we close this epistle and begin mentioning the vapours ascending in the air and describing how the atmospheric phenomena come from them in another epistle named 'On Meteorology and the Atmospheric Phenomena' [Epistle 18].

The epistle named 'On Generation and Corruption' is completed, praise be to God the Lord of the worlds, and His blessings be upon His Prophet the chosen, Muhammad, and upon all his family.

(Atif fols. 161a–b) [p. 62 Şādir]

Epistle 18

On the Explanation of Meteorology

[Being the fourth epistle from the second section of the *Epistles of the Brethren of Purity*, on the Natural Sciences]*

In the name of God, the Compassionate, the Merciful

Chapter 1

As we have finished recalling the four elements (namely, fire, air, water, and earth), describing the form constitutive of the essence of each of them, explaining the form complementary to them and how they are disposed [*kayfiyya marātibihā*] in their proper places [*marākizihā*], and informing of the fact that they are transformed into each another, that their parts are mixed and mingled, and that from them¹ the beings subject to generation and corruption come (namely, animals, plants, and minerals), in the epistle named 'On Generation and Corruption' [Epistle 17], we want to recall in this epistle named 'On Meteorology' the atmospheric phenomena and the changes in the air, and to describe how they occur from the influences of the heavenly individuals on them.²

However, as many people endowed with understanding [*uqalā*] think that rain comes down from heaven from a sea that is found there, and that hail falls down from mountains, then they even cite as a witness for the soundness of their assumptions God's saying, praise be to Him, be He exalted, *and We send down pure water from the sky*,³ and His saying, *And He sends down from the sky mountain masses (of clouds) wherein is hail*,⁴ while they neither know the meanings of His discourse, may He be glorified and honoured, nor do they consider the verses of His Book, we need to recall a part of them,⁵ so that doubts and uncertainty may be removed.

[p. 63] And know, O my brother, may God help you, that the meaning of 'heaven' in the Arabic language is 'everything surpassing

* The title in Atif (fols. 161a1-b1) runs as follows: 'The Fourth Epistle from the Second Section on the Natural Sciences, on the Explanation of Meteorology, among the Fifty-one Epistles of the Brethren of Purity, on the Purification of the Soul and the Rectification of Morals as a Part of a Sufi Discourse'. It is completed by the following eulogy: *In the name of God, the Compassionate, the Merciful, O Lord, give us success.*

1 The dual is used here, probably referring to the constitutive and the complementary forms.

2 Cf. Aristotle, *Meteorology* I.1.

3 Second part of Qur'an 25:48.

4 Central part of Qur'an 24:43.

5 That is, the atmospheric phenomena.

tops',⁶ and that rain comes down from rain clouds,⁷ that clouds [*saḥāb*, here and later] are called 'heaven' because of their elevation in the air, and, also, that clouds are called 'mountains' because of their accumulation upon each other, just as the bases of mountains are accumulated and their extremities are above each other, as is seen on spring and autumn days, as if they were mountains of carded cotton [*quṭn mandūf*], accumulated upon each other.

Chapter 2

On the quiddity of nature

As the wise men and philosophers who speak of the events and of the generated beings that are under the sphere of the Moon link all these influences and acts to nature, even though some of the learned deny its acts, and [others] deny even nature absolutely, we need to recall what they mean when they speak of 'nature', and to explain that the [real] meaning of 'nature' escaped those who have denied its acts. They did not know it, and because of that they denied its acts.

And know, O my brother, may God help you and us through a spirit coming from Him, that nature is one of the faculties of the heavenly Universal Soul, spread from her⁸ into all bodies that are under the sphere of the Moon, effused in all their parts, called in the legal [*shar'ī*] terminology 'angels charged with the preservation of the world and with the disposition of creatures', God willing, be He exalted, and called in philosophical terminology 'natural faculties'.⁹ They act in all these bodies, the Creator willing, honoured be His majesty.

(fol. 162a) And the meaning of this denomination escaped those who denied the action of nature; in fact, they thought that it was to referring to the body, but the body, in that it is a body, has absolutely

6 This etymology has been already explained above, at the beginning of Chapter 3 of Epistle 16.

7 I translate thus, here and always in this treatise, unless explicitly noted otherwise, the word *saḥāb*, which properly indicates 'clouds from which rain comes'; E.W. Lane, *Arabic-English Lexicon*, 2 vols. (Cambridge: Islamic Texts Society, 1984 — lithographic reproduction of the London Edition, 1863–1893), s.v.

8 I use the feminine pronoun (*nafs* is feminine in Arabic) in reference to the Universal Soul only, in that it is considered a hypostasis.

9 This issue is extensively dealt with in Epistle 20.

no act by agreement of the two factions,¹⁰ [an agreement reached] through sound proofs and valid demonstrations.

Know that those who denied the act of nature say that an act is admissible only from a being endowed with life and power. This is a sound statement, but they think that a being endowed with life and power is nothing else than a body, as it has a proper structure and accidents that, according to their claim, are inherent to it, [p. 64] such as life, power, science, and the like. They do not know, however, that with this body there is another substance, spiritual and invisible, namely, the soul, and that the [entities] they described by 'accidents inherent to the body' are that which becomes manifest in [the body] thanks to [that other substance] — namely, [that they are] the soul with its act in the body.

And know that the science of the soul escaped those who denied the act of nature, and its knowledge remained hidden to them, because they tried to grasp it by the senses, did not find it, and so denied its existence.

As to those who acknowledged the soul, and grasped its existence, they recognized that through the acts stemmed from it in bodies: they considered the states of the body, and found that it, taken in itself, has no act absolutely, nor [have acts] the accidents inherent to the body. Indeed, all actions [belong] to the soul; as for the body and its accidents, they are for the soul like the tools and instruments for an artisan, through which and in which he makes his acts manifest, as can be seen of human artisans, who through physical tools make their arts manifest in things.

For example, a carpenter makes his acts manifest in wood — that is, a natural body — through instruments and tools such as an axe, a saw, a bradawl, and similar objects that are all artificial bodies.

10 By 'the two factions', the Ikhwān mean here those who deny acts of nature, and those who deny nature itself. The former deny acts because they think that natural acts belong to a body, but are aware, just like the latter, that a body has no act. According to another interpretation, the Ikhwān might here hint at philosophers and *kalām* theologians. Note the use of the term *ijmā'*, considered to be the third source of Islam after the Holy Qur'an and *ḥadīth*, and before *qiyās*.

Artisans can also [use] natural bodies, which are an instrument and a tool for their souls, through which [the souls] make their art and acts manifest, as we have explained in the epistle 'On the Composition of the Body'¹¹ and in the epistle 'On the Practical Arts'.¹²

As we have explained what nature is, that it is one of the faculties of the heavenly Universal Soul, that there is no act unless [it belongs] to a soul, that [the soul] accomplishes its acts in bodies through its power, and that all bodies are instruments and tools, all destined to be acted upon [*maf'ūlāt*], then let us return now to the mention of the simple bodies that are under the sphere of the Moon.

We say that they are matter subject to nature, that nature accomplishes in [these simple bodies] shapes and forms, that among the works [of matter]¹³ there are animals, plants, and minerals, and that the heavenly individuals are for [nature] like tools for an artisan.¹⁴ This is because the [celestial] sphere, by continuously accomplishing one turn around the Earth every twenty-four hours, by putting its stars in motion [*taḥrikāt kawākibihā*], by causing the projection of their rays [*maṭāriḥ shu'ā'ātihā*] in the vault of the [sphere of the] Air and on the surface of the seas and of the Earth, [p. 65] and by heating [*iskhānihā*]

11 The text refers here to Epistle 23; *Rasā'il*, vol. 2, pp. 384.16–385.1.

12 The text refers here to Epistle 8; *Rasā'il*, vol. 1, pp. 279.8–13; 280.3–6; 293.2–3; cf. pp. 282.15–283.10.

13 This explanation is demanded by the masculine pronoun in *ṣanā'i'ahu*.

14 This statement looks strange, because in this case immaterial beings seem to be considered tools, whereas bodies are usually tools. In Chapters 1 and 2 of Epistle 20, spheres and stars will be said to be tools of the Universal Soul (see pp. 287–288), whereas in the present case the issue concerns nature. However, the same inconsistency can be observed at the beginning of Chapter 9 of Epistle 20 (see p. 304), where the Ikhwān refer to the conception of the world as a macroanthropos. The possibility should not be excluded that such statements may be related to the hierarchical vision of the universe, according to which the 'heavenly individuals' might be the atmospheric phenomena addressed in this treatise, which are intermediate between the heavenly and the earthly beings. This way, both the heavenly and the earthly worlds would be under the command of nature, and the intermediate beings could well be considered to be its 'tools'. Such a vision will be developed by the later Ismaili thinker and *dā'i* Ḥamīd al-Dīn al-Kirmānī (d. after 1020). See D. De Smet, *La quiétude de l'intellect. Néoplatonisme et gnose ismaélienne dans l'œuvre de Ḥamīd al-Dīn al-Kirmānī (Xe/XIe s.)* (Leuven: Peeters, 1995), pp. 319 and 343–345. On the 'inconsistencies' of the Ikhwān on this point, see also the Introduction above, pp. 43–46.

(fol. 162b) them [the seas and earth], dissolves waters and makes them become vapour, and reduces the parts of earth and makes them become smoke. Then they are mixed together, and various types of mixtures derive from them, as well-formed objects derive from artisans. Later, the faculties of the Universal Soul effused in all bodies and called 'nature' carve out, shape, and fashion from those mixtures and blends the genera of existing beings — animals, plants, and minerals — God willing, may He be glorified and honoured.

Chapter 3

And as the first blending and mixture that occur in these elements are the changes in air and the atmospheric phenomena, because [air can] be easily affected and quickly transformed, we need to recall the state of air first, then the state of waters, then the state of the places of earth, and we say: we have already explained in the epistle 'On the Heavens'¹⁵ that the sphere of the air embraces the sphere of the Earth from all its sides, and that its thickness [*sumk*] from the external surface of the Earth to the lowest [part] of the sphere of the Moon is 16½ times the diameter of Earth. In fact, the diameter of the Earth is 2,167 *farsakh*, and the thickness of the [sphere of the] Air is 35,755 *farsakh*.¹⁶

Chapter 4¹⁷

Know, O my brother, may God help you and us through a spirit coming from Him, that the thickness of the [sphere of the] Air is divided into three distinct natures, one adjacent to the sphere of the Moon, another adjacent to the surface of the Earth, and the third intermediate between them.

15 By this shortened title, the text refers here to Epistle 16; see Chapter 9 above, pp. 143–145. Bausani refers to his values in that treatise; *L'enciclopedia*, p. 117.

16 The measure reported here corresponds to the one proposed by Bausani as correct; the value in the Şâdir edition, to which Bausani refers as reported in the text, is 35,758; it is the same in Dieterici, *Die Naturanschauung*, p. 70.

17 This description of the structure of the universe corresponds to Aristotle, *Meteorology* I.2–3.

In fact, the [part of the sphere of] the Air adjacent to the sphere of the Moon is hot fire at the extreme of heat, called 'Ether',¹⁸ the intermediate one is cold at the extreme of coldness, called 'Zamharīr',¹⁹ and the one adjacent to the surface of the Earth has a balanced mixture in some of its places [*fī mawḍi' dūna mawḍi'*], called 'Nasīm'.²⁰

The cause of the diversity of these three natures is that the [part of the sphere of the] Air that touches the sphere of the Moon, as far as it rotates with it with a quick movement, becomes fiercely hot, until it becomes hot fire, then, the closer it approaches the bottom [of the part of Ether], the slower is its motion, and the lesser is its heat; and whenever heat diminishes, cold prevails. [The process] continues that way until it comes to the strong cold that is called 'Zamharīr'. The vault of the globe of Ether is related to the globe of Zamharīr only slightly. If it were not for the fact that the rays of the Sun, of the Moon, and of the stars fall on the surface [p. 66] of the Earth, reflected in the air, and heat it, the air touching the external surface of the Earth would be much colder than the rest, as happens under the northern pole.

There, it is always night for six months, so air is fiercely cold, waters solidify, air [*al-jaww*] becomes dark and thick, and animals and plants perish. As to the place opposite to this, adjacent to the southern pole, in these six months it is always day, so the Sun's shining is continuous on those places, the reflection of its rays arrives in the air, and it

18 On the equation of ether with fire attributed to Anaxagoras, see Aristotle, *Meteorology* I.3.339b21ff.

19 Dieterici, *Die Naturanschauung*, p. 70, makes the word explicit as 'die Zone der Eiskälte'.

20 Dieterici, *ibid.*, p. 70, makes the word explicit as 'die Zone des Windes'. See also Aristotle, *Meteorology* I.3.340a17–22: 'It is clear therefore that neither air nor fire fills the space between earth and the outermost heaven. It now remains for us to discuss and give our solution of two problems — what positions these two, that is air and fire, occupy in relation to that of the first element, and what is the cause of the heat that reaches the places in the neighbourhood of the earth from the stars in the upper region.' And 340b6–10: '[...] the celestial region as far down as the moon is occupied by a body which is different from air and from fire, but which varies in purity and freedom from admixture, and is not uniform in quality, especially when it borders on the air and the terrestrial region.' I quote, here and later, from Aristotle, *Meteorologica*, tr. H. D. P. Lee (London–Cambridge MA: Heinemann–Harvard University Press, 1952). On the dimensions of Ether, Zamharīr and Nasīm, see Goodman and McGregor, *The Case of the Animals versus Man*, pp. 309–310.

becomes warm and fiercely hot, until it becomes hot fire that burns animals and plants.

Another cause is that the Sun, in the time it is at the azimuth²¹ of these places, is close to the Earth, because its perigee is at the end of [the constellation of] Sagittarius. And when it is in the northern constellations, under the northern pole, for six (fol. 163a) months it is always day; however, those places do not become as hot as the places that are under the southern pole, because [the Sun] is far from the Earth, high in the sphere, as its apogee is at the end of [the constellation of] Gemini.

And know, O my brother, that between its remoteness at the apogee and its closeness at the perigee there is a distance equal to 100 times the diameter of the Earth, namely, 216,755 *farsakh*.²² Because of this, the inhabited part of the Earth is the northern quarter, from the equator to some fifty degrees,²³ namely, from [the place] where the beginning of [the constellation of] Aries passes by the zenith to [the place] where Beta Cassiopeiae passes by the zenith.²⁴

This quarter is constituted by the seven climes, as we have explained in the epistle 'On Geography',²⁵ and we have described in it the towns, mountains, seas, and rivers in each clime.

And know, O my brother, that at the azimuth²⁶ of these climes the greater part of the air [called] 'Nasīm' burns,²⁷ and in these countries natures are balanced. We want to recall that which is the highest elevation of the vault of the globe of the clouds [*al-ghaym*] and of Nasīm; in fact, now it increases in its thickness and elevation, and now it decreases, according to the [different] angles [formed by] the rays

21 Dieterici, *Die Naturanschauung*, p. 71: 'über den Horizont'.

22 Dieterici, *ibid.*: '216700 Parasangen'.

23 Dieterici, *ibid.*: 'bis zum 66sten Grade der Breite', but at note 3 he remarks: 'Wiener Hdschr. Einige 50 Grad'.

24 The Arabic reads *al-kaff al-khadib*. Dieterici, *ibid.*: 'die Hand des Gefärbten', and at note 4 he remarks: 'Die gefärbte oder verstümmelte Hand waren bei den Arabern die fünf Sterne der Cassiopea, die eine Abweichung von 66 Grad haben'.

25 The text refers here to Epistle 4; *Rasā'il*, vol. 1, pp. 165.6–166.18.

26 Dieterici, *Die Naturanschauung*, p. 71: 'Ueber dem Zenit'.

27 Dieterici, *ibid.*, translates: 'herrscht grösstentheils der Wind'. According to Lane, *Arabic-English Lexicon*, s.v., this verbal form also indicates the passing, or blowing, of the winds.

reflected at the two extremes of the day and at midday, and on winter and summer days — also according to the elevation of the Sun [p. 67] and of the stars from the face of the Earth at the meridian [*samt*] of that place.

Chapter 5²⁸

And know, O my brother, that the angles formed from the reflection of the rays of the stars and of the Sun by the face of the Earth are of three species: acute, perpendicular, and obtuse.

[The rays from] all these angles heat waters, earth, and air, and move them, but the acute angles are those that heat more fiercely, then the perpendicular ones, then the obtuse ones. As some obtuse angles are more open than others, and some acute angles are more acute than others, while the right angles are all equal, we need to explain when angles are obtuse, when perpendicular, and when they are acute, so we say: when the Sun or the Moon or whatsoever star begins [appearing] at the horizon, and shines on the surface of the Earth and of the seas, the angles of their rays are all reflected [forming] an obtuse angle at the maximum of its aperture, then as far as they rise, the aperture of the angle is progressively reduced and diminishes, so that when the elevation arrives at forty-five degrees, the angles of reflection of all rays in that place are perpendicular. And when the elevation increases, the angles decrease, diminish, and come to be acute, and as far as they rise, and their elevation increases, the angles progressively increase in acuteness, until the stars are at the azimuth of that place. Then the angles close and the sides [of the triangle formed by the reflection of the rays] meet together. And when [the motion of stars] advances westwards, the sides [of the triangle] are disjoined, and the acute angles open at the maximum of acuteness, and as far as the Sun, or whatsoever star, declines, the angles progressively increase in aperture, until the elevation on the western side arrives at forty-five degrees for the second time, and all angles become perpendicular another time. And when elevation decreases from forty-five degrees, all angles become obtuse. And (fol. 163b) as far as stars decline westwards, angles progressively

28 Cf., for different perspectives, Aristotle, *Meteorology* I.6 and III.3 and 5.

open till sunset time, and they all arrive at the maximum of [their] opening, as it was at early morning. Because of that, midday is much warmer than the extremities [of the day], because the angles [p. 68] at early morning and by evening are obtuse, at midday are acute, and between these two times are perpendicular. The heat is intermediate between fierceness and tepidity, and as the elevation of the Sun in winter does not reach forty-five degrees, hibernal midday is not so fiercely hot as was summer midday.

And as we have finished recalling what we needed to recall, we say that the highest point of elevation of the vault of the globe of Nasīm in the Air is 16,000 cubits, and that the lowest point coincides with the surface of the Earth. A proof of the fact that the highest point of the vault of the globe of Nasīm has this measure is that the elevation in the air of the top of the highest mountain on the Earth does not surpass this measure, [another is] that the elevation of clouds [*al-ghuyūm*]²⁹ does not reach the tops of the majority of these mountains, and [another is] that the strength of the extreme cold there hinders this, because that which raises clouds in the air are [i] the heat of the air [*al-jaww*] resulting from the fact that stars heat it with their rays [*bi-maṭāriḥ shu'ā'ātihā*], and that those rays are reflected from the surface of the Earth and of the seas forming acute angles, as we have explained above, and [ii] the increasing acuteness of the angles on the surface of the Earth.

As to what [happens] in the air, as far as [a star] rises, the sides of those angles become more open and wider, and warming diminishes there, the action [of the stars] weakens, and their influences at high altitude [*fī'l-'uluww*] vanish, with the result that cold prevails there.

And know, O my brother, that the first changes and transformations air undergoes are [due] to light and darkness, and to heat and cold, then, [it undergoes] what happens to it from the diversity of winds and from the multiplicity of ascending vapours and of spreading smokes, followed by hurricanes, haloes, blizzards, clouds, thunder,

29 I translate thus, here and always in this treatise unless explicitly noted otherwise, the words *ghaym* and *ghuyūm*, which properly indicate 'an expanse of clouds covering the sky', when the Sun is not seen; Lane, *Arabic-English Lexicon*, s.v.

lightning, thunderbolts, and strong rains [*haddāt*],³⁰ then by rains, drizzle, damp, frost, snows, hail, rainbows, shooting stars, comets, and subsequent [phenomena], such as agitation of seas, and rise and ebb in seas and rivers.

And know, O my brother, that as some of these changes that happen [*takūnu*] in air occur in the vault of the globe of Nasīm, others in the vault of the globe of Zamharīr,³¹ others [p. 69] in the vault of the globe of Ether, and others in the surfaces common to them, we need to distinguish [them] one by one, and to begin first by explaining the state of the surfaces.

In fact, surfaces are of two species, contiguous [*mushtaraka*] and intermingling [*mutadākhila*]. A contiguous [surface] is like the surface of water and air, and [like] the surface between oil and water; in fact, between the two bodies there is only a common section [*faṣl*] that parts one from the other in an insubstantial [*wahmiyan*] way only. As to the intermingling surface, it is like the surface of water that stays in clay or in sand: the parts of earth [*al-arḍiyya*] intersect the parts of water and the parts of water intersect the parts of earth [*al-turāb*], and between them there is no common section that parts them. And know, O my brother, may God help you, that some surfaces are proximate (fol. 164a) to the nature of the two tangential bodies, and some are not, like the lowest part of the surface of the air that is adjacent to water. In fact, its parts are thicker than the other parts of the air that are adjacent to the upper [element]. Likewise, the parts of the surface of the water that are adjacent to the air are thinner than the other, lower parts, which are adjacent to the earth. Likewise, the surface of the air that embraces the terrestrial fires is warmer than its other parts far from fire. And likewise, the surface of the fire adjacent to the air that embraces [it] is less hot than all its other parts. As to the surfaces of hard bodies, such as iron, wood, stone, and the like, when they have a common border, this description does not fit them.

As we have finished recalling what we needed to recall, we say that the surface of the globe of Ether adjacent to the sphere of the Moon is

30 I deduce this meaning from Lane, *Arabic-English Lexicon*, s.v. *hadda*.

31 This follows the addition in the majority of the MSS consulted; see the critical apparatus, p. 202, notes 12–13.

contiguous, not intermingling, and so are the surfaces of the globes of the spheres and of all the stars. Many a naturalist thought that between the globes of Zamharīr and of Ether there was an intermingling, and not a contiguous, surface. The issue, however, is not as they have thought, but it is as we will explain later. As to what is between the surface of the globe of Nasīm and the globe of Zamharīr, it is clear that it is not contiguous, but intermingling, like the surface of fire and air and [the surface] of water and earth. As to the surface of the globe of Nasīm adjacent to the Earth, it is clear that it intersects with the depth of the earth, according to the rarefaction of the parts of earth up to a certain limit, then it stops and does not enter more [parts of earth].

A proof of that is what happens to those who excavate mines down to the bottom, to the point [p. 70] that sometimes they need some ventilation there through bellows and pipes, in order that they [might] inhale fresh air from them, and that their lamps [might] be brightened by it there. And when that fresh air is blocked owing to some accident, their lamps are extinguished, and those who are in the mine suffocate and die. And it is not possible that animals survive [*yakūnu*] in places where fresh air does not circulate, as we have explained in the epistle 'On Animals'.³²

Chapter 6

And know, O my brother, that the air is [like] a still sea, with thin parts, light movement, and a fast flow, [which is] easily receptive to changes and phenomena [occurring in it].

We have already explained in the epistle 'On Sense and Sensibilia'³³ how it receives light and darkness, sounds, and smells, and [we have

32 The text refers here to Epistle 22. The passage referred to in particular might be in *Rasā'il*, vol. 2, p. 190.8–17 and the related conclusions at pp. 191.7–10 and 193.4–8 (= pp. 19.8–18; 20.12–16; 23.11–15 of the Arabic in Goodman and McGregor's edition, translated in *The Case of the Animals versus Man*, pp. 83, 84, and 86–87 of the English).

33 The text refers here to Epistle 24; the passage hinted at might be *Rasā'il*, vol. 2, pp. 407.16–408.5.

explained] how it receives heat and cold in the epistle 'On Generation and Corruption'.³⁴

We want to describe in this chapter how winds are formed, how many their species and directions are, the variety of their alterations, and what the cause is that moves them at one time and not at another, and in one country and not in another. We will also explain how clouds are convened from seas to deserts, wastelands, and mountain tops, and how rain clouds are prepared so as to bring and pour down rain.

However, before that, we need to recall the states of the Moon, and to describe its mansions and its conjunctions³⁵ with the planets that necessitate the arising of vapours and smokes, as well as the heating that necessitates the formation of winds, so we say: the Moon in the sphere has twenty-eight (fol. 164b) mansions, as God, be He exalted, mentioned by His saying through the tongue of His Prophet Muhammad, the chosen, God bless him, *And the Moon — We have measured for it mansions (to traverse) till she returns like the old (and withered) lower part of a date-stalk.*³⁶

And know, O my brother, that these mansions have peculiarities with evident influences on these four elements,³⁷ and on the beings generated from them when [the Moon] comes over them [*'inda nuzūlihi*], day by day, and night by night.

The Sun and the planets [have influences] as well, and [the Sun] has conjunctions [*ittiṣālāt*] with the planets, as well as [the planets] with each other, which empower their action and influences on them [i.e., the elements and the generated beings], the explanation of which would be long. They are mentioned in the books on the decrees of the stars.³⁸

34 The text refers here to Epistle 17, see above, pp. 177¹⁷⁸.

35 *Ittiṣālāt*, namely, the union of the Moon with the Sun; al-Bīrūnī, *The Book of Instruction*, p. 65. In the *Almagest*, it is the conjunction of the Sun and the Moon at the end of the month; al-Bīrūnī, *The Book of Instruction*, p. 152.

36 Qur'an 36:39.

37 The words 'on these four elements [...] and influences' are added by the majority of the MSS consulted, and may have fallen from Atif due to homoioteleuton. For details, see the critical apparatus, p. 207, note 13.

38 The words '*aḥkām al-nujūm*' (cf. the Latin literal translation *judicia astrorum*) indicate judicial astrology.

However, we will recall in this chapter what of them is necessary to recall, because the acts of some of those mansions empower the arising of vapours from seas, rivers, and reed-beds, the acts of others empower the arising of smokes from the face of the Earth and from deserts, the act of others empowers the cooling of air and the increase of water, and the acts of others empower the heating of the air and the decrease of waters, [p. 71] in particular when the Moon happens to find itself in a mansion and its conjunctions are with a planet, the action of which is similar to the peculiarity of that mansion.

Chapter 7

On the quiddity of winds³⁹

Know, O my brother, that wind is nothing other than an oscillation of the air while it moves towards the six directions, as sea waves are nothing else than the movement of water and the reciprocal pushing of its parts towards the four directions. In fact, water and air are two still seas, with the difference that the parts of water are dense and heavy in movement, while the parts of air are rare and light in movement.

And know that one of the causes of the movement of the air is the rising of the two vapours, because, when the Sun passes on the meridian⁴⁰ of some seas, deserts, and wastelands, it makes humid vapour arise from the seas, and dry smoke from the deserts, makes them rise by its heat in the air, and the parts of air vie with each other in the various directions, so that the space [available] for the rising vapours is enlarged. If there is more dry smoke, winds are formed from that, because when those parts rise to the highest of the globe of Nasīm, they become cold, and the cold of Zamharīr hinders them from rising

39 This issue is addressed by Aristotle in *Meteorology* I.13; II.2 and 4–5. Another source for atmospheric phenomena is Theophrastus (ca. 372/370–287 BCE). See E. Wagner, ed., *Der syrische Auszug der Meteorologie des Theoprast*, rev. P. Steinmetz (Wiesbaden: Verlag der Akademie der Wissenschaften und der Literatur in Mainz in Kommission bei F. Steiner Verlag, 1964). The chapter on winds (their origin, formation, oblique motion, strength, duration, temperature, and humidity) is incomplete. See its translation at pp. 30–32, commentary at pp. 57–58.

40 The Arabic is *musāmitatan*; Dieterici, *Die Naturanschauung*, p. 77: 'Oberfläche'.

up to there, then they incline, returning towards the bottom, and air is pushed in the four directions, so that various winds come from them.

And know that winds have many dispersions in the six directions, but there are in all fourteen species, four of which are known to the majority of people, namely, the *ṣabā*, the *dabūr*, the *jirbī*, and the *taymī*. In fact, when [air] oscillates from the east westwards, it is called *ṣabā*. If it oscillates from the west eastwards, it is called *dabūr*. If it oscillates from the south northwards, it is called *taymī*. And if it oscillates from the north southwards, it is called *jirbī*.⁴¹ That which pushes [the air] in an intermediate direction between them is called *nakbā*, and it is of eight species.⁴²

Hurricanes come from the [air] that rushes upwards from below, and they are two winds that meet together and rise, as water is met in a vortex [*kirdāb*],⁴³ or when it goes down in drains and holes.⁴⁴

[p. 72] Icy gale comes from the [air] that rushes downwards from above, which destroyed the 'Ād: (fol. 165a) the enemies of their houses blew against them from the interstices of clouds from the globe of Zamharīr that is above the globe of Nasīm for eight days and eight nights as God, praise Him, be He exalted, recalled.⁴⁵

As we have informed about the quiddity of winds, the quantity of their species, and the directions they blow from, we want to mention the cause of their dispersions in the various directions, and what the

41 Dieterici, *ibid.*: 'Ostwind, Westwind, Südwind, Nordwind'. I have not found the terms *al-jirbī* (vocalized by Atif as *al-jiribī*) and *al-taymī* listed in the lexica I have examined. D. A. Brafman, 'The Arabic De Mundo: An Edition with Translation and Commentary' (Ph.D. Dissertation, Duke University, 1985), p. 182, translates *ṣabā* by 'gushing wind', *dabūr* by 'tail-wind', then he explains *shamāl*, the arctic wind, as the air rushing '*min al-jirbī*', and *janūb*, the antarctic wind, as the air rushing '*min al-taymī*'. On the various names of winds in the Greek tradition, see Aristotle, *Meteorology* II.6.

42 Lane, *Arabic-English Lexicon*, s.v. *ankabū* 'an *al-ḥaqq* indicates four *nakbā*: the north-west wind named *jirbiyā*, the east-south wind named *azyab*, the south-west wind named *al-hayf*, and the east-north wind named *ṣābiya*.

43 The Persian form of the word is *girdāb*.

44 Aristotle's more accurate explanation of hurricanes is found in *Meteorology* II. 6.365a3-6.

45 This tribe is frequently mentioned in the Holy Book. The story in the form mentioned here is recalled in Qur'an 69:6-8; see also Qur'an 41:15-16, 54:18-21. For further details, see F. Buhl, 'Ād', *EI2*, vol. 1, pp. 168-169.

purpose of that is, because one of the goals of their dispersion is that they transport clouds from sea-shores towards the far countries and deserts towards which they are directed.

And also, one of the purposes of the tall, high mountains towering⁴⁶ on the surface of the Earth on the east, the west, the south, and the north is also to hinder winds from conveying clouds and rain clouds towards countries and deserts other than those [to which] they should be directed. In fact, these steady mountains are there to hinder winds from dispersing in all directions rather than towards the direction they are directed, like a border, or dams, ditches,⁴⁷ rivers, and irrigation canals that hinder waters from flowing other than towards the farms and the places [to which] they should be directed. In fact, many countries and deserts are far from sea-shores, and if it were not for these high and tall mountains that hinder winds from conveying clouds [to places other than those they should go to], rain clouds and rains would not reach those countries and deserts, just as if rivers and irrigation canals did not have dams and ditches, water would flow towards reed-beds, reefs, and stagnant waters, where their advantage would be small, whereas they reach far countries only through artificial rivers and ditches.⁴⁸ And for these tall mountains there is another purpose, because in their depths there are wide caves and chasms [*ahwiya*], and when in winter-time rains and snows fall [*ḥaṣala*] on their tops and melt, waters recede into those caves and chasms, and there they remain as if stored.

And in the lowest parts of those mountains there are narrow passages from which those waters stored in those caves and chasms emerge — sources — and from them creeks stream and gather with each other, and from them wadis and rivers flow that stream among villages, cities, and arable lands, irrigate [them], and return to seas, passing through crops, trees, and places with herbage and pasture; their [p. 73] surplus part is poured into seas, reed-beds, and pools, the Sun

46 According to Dieterici's reading, *al-muṭawwada*. Atif's reading and emendation make no sense. See the critical apparatus, p. 211, note 9.

47 I translate thus the Arabic *barandāt*, as a metaphorical use of the *birand*, 'sword'. Dieterici, *Die Naturanschauung*, p. 78: 'So wie man Dämme und Rinnen zieht für Strömlein und Giessbäche'.

48 The text literally says: 'only through excavated [*tuhqaru*] rivers and constructed [*tu'malu*] ditches'.

makes it thinner, and lifts it in form of vapour, and once again clouds and rain clouds come from that, and winds convey them towards their proper places, as had happened the preceding year, and this is their way forever. This is the decree of the Mighty, the Omniscient.

Look then, O my brother, at this providence of the Lord, and at this divine, wise administration, reflect on them, and consider their states: perhaps your soul will be awakened from the sleep (fol. 165b) of carelessness and the slumber of ignorance, and the eye of mental vision will be opened for it. Look then, with the light of the intellect, at this wise Artisan who disposed these things [*umūr*], as you looked, with your physical eye, at these products we have mentioned, and you will be among the witnesses whom God, be He exalted, mentioned in His book, and He said, may He be glorified and honoured, *only he who bears witness to the Truth, and they know (him)*,⁴⁹ and He said, be He blessed and Exalted, *and made them testify concerning themselves, (saying): 'Am I not your Lord (who cherishes and sustains you)?' — they said: 'Yea, we do testify!'*,⁵⁰ then He said, glorified be He who said, *There is no god but He: that is the witness of Allah, His angels, and those endued with knowledge, standing firm on justice. There is no god but He.*⁵¹

Chapter 8

As we have finished recalling winds, let us recall clouds, rains, damp, ice, blizzards, drizzle, rain clouds, thunder, lightning, and hail, because their matter [is constituted by] ascending vapours, as we have recalled above.⁵²

And know, O my brother, that when vapours rise in the air and push the air in the various directions, [when] it is pushed more towards one direction, and in front of it there are tall mountains that hinder [its passage], the cold of Zamharīr hinders it from above, and beneath the matter of the two vapours is continuous,⁵³ [under these conditions] the two vapours do not cease increasing and thickening in the air, and

49 Final part of Qur'an 43:86.

50 Central part of Qur'an 7:172.

51 Qur'an 3:18, apart from the last two words.

52 See Chapter 5 above.

53 Note that [ج] and Dieterici provide here a different reading: '*mutaṣā'ida mutalāṣiqa*'

the parts of the two vapours penetrate into each other, so that [the air] becomes compact, and clouds [*saḥāb*, here and later] are formed in it, suspended, and accumulated.⁵⁴

Indeed, as far as clouds rise, the parts of the two vapours become cold, and the parts [p. 74] of the humid vapour are closely packed with each other, what was dry becomes moist, then those watery parts are connected to each other, and become rain. They become cold and heavy, and begin to fall once again from above downwards, and that is called 'rain'.⁵⁵

If the rise of that humid vapour happens by night, and the air is violently cold and hinders those vapours from rising in the air, but solidifies them little by little and brings them close to the face of the earth, then [in that case] damp, frost, and drizzle come from them.⁵⁶

(ascending and sticking together); *muttaṣila*, continuous, is omitted in Dieterici; see the critical apparatus, p. 215, notes 10–11.

54 On this, see Aristotle, *Meteorology* I.9.346b32–33: 'The exhalation from water is vapour; the formation of water from air produces cloud'. In *Meteorology* I.3 Aristotle deals broadly with the issue, 'why are no clouds formed in the celestial region?' (see 340a25ff.).

55 See Aristotle: '[...] when water falls in small drops it is called drizzle, when in larger drops, rain'; *Meteorology* I.9.347a11–12, and: 'For rain is the result of the cooling of a large body of vapour, which owes its quantity to the length of time during which and the size of space in which it collects. Dew, on the other hand, is produced by small quantities of vapour, which collect for a day only and over a small area, as is shown by the rapidity with which it forms and its scanty quantity'; *Meteorology* I.11.347b18–22. On atmospheric precipitations in Theophrastus (clouds and rain, the relative highness of clouds in the sky) see Wagner, *Der syrische Auszug der Meteorologie*, translation at pp. 22–23, 28–29, commentary at pp. 34–37, 50–53; on lightning and their formation, on the possibility of thunder without lightning, and on the precedence of lightning to thunder, see the translation at pp. 23–24, commentary at pp. 37–41; on thunderbolts, their formation, their frequency in spring and on mountains, and why they destroy coins in a wallet without destroying the wallet, see the translation at pp. 24–28, commentary at pp. 41–50. The extant part of the work about dew and fog can be read at p. 30, commentary at p. 56.

56 See Aristotle, *Meteorology* I.10.347a13–16: 'Any moisture evaporated during the day that does not rise far because the amount of the fire raising it compared to the amount of water that is being raised is small, falls again when it is chilled during the night and is called dew or hoar-frost'. As for Theophrastus, the chapter of the formation of ice and frost is lost (but see Wagner, *Der syrische Auszug der Meteorologie*, commentary at pp. 56–57).

If those vapours rise a little in the air, and cold catches them, they become thin clouds [*saḥāban*].

If the cold is excessive, it solidifies the small [drops of] rain in the interstices of the clouds, and from that ice and snows come; in fact, when cold solidifies the parts of water together with the parts of air, and makes them come down gently, because of that they do not fall on the earth with violence, as do rain and hail.

If air is warm, vapours rise to the heights, and from that rain clouds accumulate in strata above each other.

If the cold of Zamharīr catches them from above, the vapour thickens and becomes water, the parts are closely packed and become drops, they gain weight, and begin dropping from the upper [part of the] vault of rain clouds, then those small drops accumulate and connect to each other, until, (fol. 166a) when they come out from the lower [parts of the rain clouds], they become big drops.

If an excessive cold catches them on their way, they solidify and become hail before reaching earth, and their [part] coming from the highest rain clouds is what becomes hail, while their [part] coming from the lowest rain clouds is rain mixed with hail.⁵⁷

He who likes to know the truth of our discourse, and to represent to himself the manner of the rising of the two vapours we have described, how rain clouds are composed by them, and how drops fall down, should examine the sublimation [*taṣ'īdāt*] and distillation of waters, and the way in which their experts operate with them, for example, the sublimation of rose water, sublimated vinegar, [p. 75] and the like. And [he should examine], for example, the vapours that rise in baths,⁵⁸ and how water drops from their roofs, because when the surface of the globe of Zamharīr — that is adjacent to the globe of Nasīm — and the tall mountains around seas hinder the two rising vapours from which

57 Ice, snow, and hail are broadly dealt with by Aristotle in *Meteorology* I.11–12. As for Theophrastus, snow, its matter and colour, are dealt with at pp. 29–30, commentary at pp. 53–55; for hail (and why hailstones are round) see the translation at p. 30, commentary at pp. 55–56.

58 See H. J. Drossaart Lulofs and E. L. J. Poortman, *Nicolaus Damascenus De Plantis. Five Translations* (Amsterdam-Oxford-New York: North-Holland Publishing Company, 1989), Arabic translation, II.1.148 (pp. 176–177) and II.3.175 (186–187).

rain clouds and rains come from scattering or spreading, they play the same role as the walls and the roofs of baths when they hinder the vapour that rises in them from scattering and spreading. They also function like alembics and gourds in the sublimations and distillation of liquids. With procedures like these, alchemists [*aṣḥāb al-ṣanʿa*] prepare their drugs, by sublimating their humid components [*ruṭūbātihā*] and distilling their watery components [*miyāhihā*].

As to lightning and thunder, they occur at the same time, but lightning arrives in sight before sound arrives to ears, because one of them is a spiritual form — namely, light — and the other is a physical form — namely, sound — as we have explained in the epistle ‘On Sense and Sensibilia’.⁵⁹ As to the cause of their formation, it is the two rising vapours when they are mixed in the air: the humid vapour encircles the dry one — namely, smoke — and the cold of Zamharīr embraces the humid vapour and exerts pressure on it, so that the dry vapour is confined inside the humid vapour, and looks for an instantaneous exit; the humid vapour is pierced and bursts out from the heat of the dry smoke, just as wet objects burst all at once when fire embraces them. From that, a gust occurs in the air, and pushes in every direction, and we have explained in the epistle ‘On Sense and Sensibilia’⁶⁰ how that sound is. And from the exit of that dry, smoky vapour a light appears, called ‘lightning’, just as occurs from the smoke of an extinguished lamp, when it comes close to a burning lamp, and then it dies down.⁶¹

59 The text refers here to Epistle 24, but in this treatise both light and sound are considered to be spiritual (‘As to the senses of hearing and sight, they catch the sensible [object]s proper to them through a decidedly spiritual perception’; *Rasāʾil*, vol. 2, p. 407.1–2), unlike the senses of touch, taste, and smell, which are corporeal (ibid., pp. 403.2–3 and 406.20–21). A graduation only is introduced between them, as the visual faculty is the last one to be considered (ibid., pp. 408.9–409.21).

60 Again, the text refers here to Epistle 24, but thunder is only mentioned in this treatise, whereas it is extensively dealt with in Epistle 31: ‘On the Causes of the Diversity of Languages’.

61 Aristotle explains thunderbolts and lightning as follows: ‘[...] these phenomena are produced not by combustion but by projection under pressure, since naturally all heat tends to rise upwards. When therefore formation takes place in the upper part of this region, the phenomenon is produced by combustion of the exhalation; when in the lower, by ejection consequent upon the condensation and cooling of the more humid exhalation, which inclines downwards when it condenses and

Sometimes that humid vapour melts and becomes wind, it moves in circle inside a rain cloud, and wants [p. 76] to come out, then a rumbling roar is heard from that, as is heard from a cavity filled with air. And sometimes rain clouds crack all at once, and from that a terrific sound comes, called a 'thunderbolt', as it comes out from an inflated skin when a heavy stone falls (fol. 166b) on it, and tears it.⁶²

Chapter 9

And know, O my brother, that if it were not for the providence of the Lord and for the mercy of the Creator, be His name honoured, who placed the vault of the globe of Nasīm in the high [region], and the place proper to [*markaz*] rain clouds in an elevated [position], far from

as it contracts propels the heat and causes it to be shot downwards'; *Meteorology* I.4.342a14–21. 'But any of the dry exhalation that gets trapped when the air is in the process of cooling is forcibly ejected as the clouds condense and in its course strikes the surrounding clouds, and the noise caused by the impact is what we call thunder [...] similarly the windy exhalation in the clouds produces thunder when it strikes a dense cloud formation. Different kinds of sound are produced because of the lack of uniformity in the clouds and because hollows occur where their density is not continuous. This, then, is what thunder is and this is its cause. As a rule, the ejected wind burns with a fine and gentle fire, and it is then what we call lightning, which occurs when the falling wind appears to us as it were coloured. Lightning is produced after the impact and so later than thunder, but appears to us to precede it because we see the flash before we hear the noise[...]' ; *Meteorology* II.9.369a25–b10. 'The windy exhalation causes thunder and lightning when it is produced in small quantities, widely dispersed, and at frequent intervals, and when it spreads quickly and is of extreme rarity'; *Meteorology* III.1.370b4–7. 'If a large quantity of wind of fine texture is squeezed out in the cloud itself, the result is a thunderbolt'; *Meteorology* III.1.371a17–19. As to the relation between thunder and lightning, Aristotle only criticizes his predecessors' theories: 'Some, however, say that there is fire in the clouds. This Empedocles supposes to be some of the sun's rays trapped in the clouds, Anaxagoras to be a part of the upper aether which he calls fire and which has descended into the lower atmosphere. Lightning they then suppose to be this fire flashing through the clouds, thunder the noise of it hissing when quenched; so the apparent order of the two is the real order and lightning precedes thunder'; *Meteorology* II.9.369b11–19. As to noise, he says: 'Thunder also splits things, not by its noise, but because a single wind is produced which deals the blow and causes the noise; this is if it strikes an object and splits it but does not burn it'; *Meteorology* III.1.371b11–14.

62 For the formation of thunderbolts and their noise in Theophrastus, see note 55 above.

the Earth by the necessary measure, who made rain clouds of such a nature that, when they are pierced, vapour searches to rise upwards, and who made the air gust of such a nature that, when it occurs, it moves upwards — had it not been so, thunder would damage the ears of feeble animals, and would kill them, as does happen in certain moments.

In fact, when rain clouds accumulate and press each other, at the point that some of them exert pressure on others downwards, and these approach the earth, thunderbolts are formed, and rain clouds are torn from the bottom, air blows and pushes towards the face of the Earth, and that forms a terrific sound, namely, a thunderbolt, and it kills many of the animals nearby, and people too, as it happened with the people of Shu'ayb and Šālih, upon them be peace.⁶³

And so is the rule that governs lightning too, because it is of the nature of fire to move upwards, and when the accumulated rain clouds stop it, it returns descending towards the earth, and burns the animals and plants it comes over. However, the soft bodies it burns are few, because it is a subtle fire that penetrates in their pores. As to hard bodies, because of the reciprocal squeezing and resisting of their parts, [fire] prevails on them, melting and burning them.

Chapter 10

As to the halo that comes to be around the Sun and the Moon, it indicates rain and the humidity of air, because it is formed in the highest [part] of the surface of the globe of Nasīm at the time when the vapour rises up there, and clouds begin to be assembled from it. The cause of that is that when the two shining bodies⁶⁴ shine on that surface, their rays are reflected from there upwards, [p. 77] and from that reflection a circle is formed, as it occurs when they shine on the surface of water. The outline of that circle is translucent under those subtle clouds, as crystal and glass are translucent [with reference to

63 Shu'ayb and Šālih are two of the prophets mentioned in the Qur'an. See A. Rippin, 'Shu'ayb', *EI2*, vol. 9, p. 491, and, 'Šālih', *EI2*, vol. 8, p. 984. The story of Shu'ayb as hinted at in this passage is told in Qur'an 7:85–93, 11:84–95, and 26:176–191; the story of Šālih is told in Qur'an 7:73–79, 26:141–159, and 27:45–54 (see also Qur'an 51:44 and 69:5).

64 The dual *al-nayyirāni* indicates the Sun and the Moon.

an object located] beyond them, and the centre of that circle faces the place passed by it perpendicularly [*bi-masqaṭ al-ḥajar al-khārij*] from the centre of the shining body to the centre of the Earth. So for everyone who looks at it, the passage of that shining body at its zenith is the same, and he who is found outside from under it, towards one of the sides,⁶⁵ sees its centre on the side opposite to his place.⁶⁶

The diameter of this circle is always double the thickness of the globe [formed from] the vapour, be that thickness small or big, and its maximum amount is 32,000 cubits, because highest [value] of the thickness of the globe of Nasīm is 16,000 cubits, as we have explained above.⁶⁷

Chapter 11

A rainbow⁶⁸ occurs in the vault of the globe of Nasīm when the air is saturated with (fol. 167a) humidity; its position [can] be vertical and perpendicular only; and its curvature [bends] upwards in the vicinity of the surface of the globe of Zamharīr, and its two extremities [bend] downwards in the adjacency to the face of the Earth. It [can] occur only at the two extremities of the day in the side opposite to the place of the Sun, be it rising or setting, and only less than its semi-circumference can be seen of it, unless the Sun is at the horizon, because at that moment a semi-circumference can be seen,⁶⁹ so the rainbow is seen [to be] vertical, perpendicular, and regular.

65 That is, not directly below it.

66 Cf. Aristotle, *Meteorology* I.8.346a5–6: 'we maintain, the appearance of a halo when the constitution of the air is suitable'. See also III.3, III.2.371b22ff., and III.6.377b34–388a1.

67 See above, Epistle 16, Chapter 9, p. 144, where the diameter of the globe of the air is said to be 16 and 1/2 times the diameter of the Earth. See also Chapter 3 above, where the thickness from the external surface of the Earth to the lowest part of the sphere of the Moon is said to have the same value.

68 Aristotle deals with rainbows and their colours in *Meteorology* III.2, 4, and 5.

69 All the MSS examined add the following: 'because the line that comes out of the mass of the Sun passes adjacent to the face of the Earth and the centre of this circle [...]' (see the critical apparatus, p. 225, note 3). Dieterici, *Die Naturanschauung*, p. 84, translates these lines as follows: 'denn die Linie, welche aus dem Mittelpunkt der Sonne hervorgeht, berührt die Erdoberfläche und den Mittelpunkt dieses Bogens (des Regenbogens) [...]'.

When the Sun is high in the sky, less than a semi-circumference is seen, and as far as its elevation increases, the bow becomes smaller [*aqall wa aṣghar*], because the bow is inclined and declining towards the side opposite to the place of the Sun. And know, O my brother, that between the chord [*watar*] of this bow and the diameter of the circumference of the halo mentioned above there is a relation of equality.

The cause of the formation of this bow is also the irradiation of the Sun on the parts of that humid vapour that is in the air, and the reflection of its rays [p. 78] from them towards the Sun.

As to its colours that are seen, they are four, correspondent [i] to the four qualities, namely, warm, cold, wet, and dry; [ii] to the property of the four elements — fire, air, water, and earth; [iii] to the four seasons of the year — summer, autumn, winter, and spring; [iv] to the resemblance of the four humours [*akhlāt*] — yellow bile, black bile, blood, and phlegm; and [v] to the likeness of the flowers of plants and trees. In fact, when this bow occurs, its colours are differentiated, and indicate the humidity of the air, the multiplicity of herbage and pasture, the growth [*zakāʾ*] of the fruits of trees and of the seeds of plantations. So, their apparition and vision are like an announcement sent in advance by nature to animals and humans, like a warning about the productivity and fertility of lands in that time. As to what common people say, that its redness indicates bloodshed in that year, its yellowness indicates diseases, its blueness indicates sterility, and its greenness indicates fertility, and [that] their indication is according to their smallness and bigness, this is a sign [*dalīl*] for him who foretells the future [*zājir*]⁷⁰ of the root and ramification [of his art].⁷¹ We have already explained that in the epistle ‘On Magic and Physiognomy’.⁷²

70 That is, he who practises *zajr*. On *zajr*, see above, p. 115, note 11 to Epistle 15.

71 Note again the use of the terms *aṣl* and *farʿ*. Dieterici, *Die Naturanschauung*, p. 85: ‘davon wir das Wie in der Abhandlung über die Wahrsagerei und Physiognomik dargethan haben’.

72 The text refers here to Epistle 52: ‘On Magic’, but to the best of my knowledge there are no references to that issue. As to the title of the treatise, the word *firāsa* is not found either in the Ṣādir version, or in the new edition by de Callataÿ and Halflants. See *On Magic I*, p. 5.4–8 (Arabic text).

As to the disposition of its colours, red is always above yellow and yellow under it, green is under it, and blue under green. And if you find another bow under it, these colours are disposed in the inferior bow in reverse [order],⁷³ and the explanation of that is long, because only those who are trained in geometrical figures, natural objects, and harmonic proportions can understand it.

Chapter 12

We have already explained in what we stated above⁷⁴ that clouds do not rise from the face of the Earth into the air [*al-jaww*] more (fol. 167b) than 16,000 cubits, and that the closest ones are in touch with the face of the Earth, although that is rare, [occurring] at certain times, and in certain countries [only], because if clouds were in touch with the face of the Earth at every time and in every country, animals and plants would be damaged from that, as well as the possessions of humans, as can be seen in a day of blizzard and in countries close to sea-shores, such as Baṣra, Anṭākiya, and Ṭabaristān, because of their closeness to sea.

That is seen [even] by the most inattentive people, [because, when] some rain, drizzle, [p. 79] and blizzard arrive, [one's] chest constricts and breathes with difficulty [*ya'khudu bi'l-nafs*], and dresses and properties become damp. And also, if all clouds were close to the face of the Earth, thunder and lightning would damage the sight and ears of living beings; and if they were far, and so high in the air as to be invisible, rains, snow, and hail would arrive suddenly, humans and animals would not pay attention to them, they would not be prepared to guard against them, and in that there would be enormous damage.⁷⁵

Look then, O my brother, at the action of nature, and reflect on this divine wisdom and on the providence of the Lord, how these things were raised in the air to the necessary extent, neither excessively far

73 Cf. Aristotle, *Meteorology* III.4.375a30–32: 'The same cause accounts for the double rainbow and for the colours in the outer bow being dimmer and in the reverse order'.

74 See above, p. 208.

75 On Theophrastus' explanation of why clouds have a certain height in the sky, see above, note 55.

nor too close, as in both cases there would be damage for humans, animals, and plants.

Chapter 13

On the cause of the abundance of rains in winter and of their paucity in summer, and of the constant rise of the two vapours without interruption, though in summer they are greater than in winter⁷⁶

Know, O my brother, that every generated being under the sphere of the Moon has four causes without which no generated being comes to be. The first of them all is the material cause, the second [*al-ukhrā*, here and later] the formal cause, the third the efficient cause, and the fourth the final cause.

The material cause of rain clouds, and of the rains that follow it, are the two ascending vapours, as we have described above.⁷⁷ The formal⁷⁸ cause is the juncture and compactness of the two [vapours]. The efficient cause of that is the cold of the air [*al-jaww*]. And the final cause is rains, in such a way that the face of the Earth may get moistened, and plants may grow, so that animals may be nourished by them.

[p. 80] And when the Sun comes to be in the northern constellations for six months, and gets close to the azimuth of these countries, heat fiercely warms air, so that vapour becomes slack and spreads about, and the northern winds push it southwards, because the Sun is far from the azimuth of those places owing to the cold of the air [*jaww al-hawā*], [then] it is winter there, and rains, clouds, and subsequent

76 Aristotle deals with this issue under various perspectives in *Meteorology* I.14.352b11ff. and II.4.360a2ff. See also I.12.348b8–349a9.

77 See above, Chapter 8.

78 Before this one, Atif gives another definition, as follows: 'Their efficient cause is the Sun and the stars with the place where their rays fall, as mentioned above' (in this case, the closest reference for these words would seem to be Chapter 2). I have omitted the entire phrase, following [أ], [ج], [غ], and [ف] (see the critical apparatus, p. 229, note 9), because the efficient cause is explained again later, according to the succession of causes given in this context (material, formal, efficient, and final). It should be noted, however, that Dieterici, *Die Naturanschauung*, p. 86, keeps both the definitions of efficient cause.

atmospheric events occur. And when, after six months, the Sun passes to the southern constellations, close to the azimuth of those countries, and gets far from the northern countries, here it is winter and there it is summer, and such is their cycle, the cycle of winter and summer [with regard to] clouds and the rains and the subsequent events that follow, mentioned above. All these events happen in the vault of the globe of Nasīm, under the globe of the sphere of Zamharīr.

Chapter 14

The events that happen in the vault of the globe (fol. 168a) of Zamharīr are shooting stars [*al-shu'ab*] and falling stars [*inqiḍāḍ al-kawākib*], which can be seen by night.⁷⁹

Sometimes they are numerous, and sometimes few. Their hyle, or matter, is the subtle, dry smoke that rises from mountains and deserts. When that matter, during its rise, reaches the point at which the globe of Zamharīr and the globe of Ether are in contact [*al-faṣl al-mushtarak*], it becomes round there, assumes its shape, and the fire of Ether flares up in it, as the fire of a lamp flares up in the smoke of that lamp while it is extinguished, as the fire of lightning flares up in the dry, oily vapour that is found in the interstices of clouds [*al-saḥāb*], and as fire flares up in white naphtha,⁸⁰ then it quickly annihilates it, and it is extinguished. Among that which proves that their matter is dry smoke, there are the numerous [facts] that can be seen in the years of barrenness.

As to how [*ammā kayfiyya*] the shape of these smokes is when they rise up there and fire flares up in them, when they are examined with [attentive] reflection, they are found sometimes [*tāratān*] as if they were like conic columns, [p. 81] with their basis perpendicular and adjacent to the globe of fire and their cone adjacent to the face of the Earth. This is because, when fire flares up in them, they are seen with huge shapes, then they become smaller and smaller, plunge headlong into [the Earth], and diminish until they are extinguished, and those

79 Aristotle deals extensively with shooting stars in *Meteorology* I.4 and 7. On falling stars, see Goodman and McGregor, *The Case of the Animals versus Man*, p. 81, note 82.

80 '*Al-naft al-abyaḍ*' indicates the fuel commonly used for lamps.

who look at them fancy that they are a fire that, moving, comes down from heaven. And when it is considered this way, it is thought that between the globe of Zamharīr and the globe of Ether there is a surface with parts intermingling with each other, not a contiguous [surface].⁸¹

Another time [*tāratān*] its movement is seen from the south during its descent, as if it were a small globe that rolls on the surface of a big globe, and that [happens] because from time to time [*aḥyānan*] we see that, while it descends and flares up, its movement begins from the east, then passes by our zeniths westwards.

And sometimes [we see that it goes] from the west eastwards; sometimes it begins from the south and passes by our zeniths northwards; and sometimes [it goes] from the north southwards.

And sometimes it diverts from these directions, and then to those who look at it, it appears as if it were a globe of cotton in which fire flared up, and then was thrown into the air. And as far as the action [*ukla*] of fire consumes it, its sparks are scattered, and it becomes smaller until it annihilates and extinguishes [itself]. It can be compared to the ball illusionists play with by night; in fact, they take a ball soaked in sandarac⁸² and other drugs, set fire to it, and take it in their mouths; and when they dance and pause for breathing, you see fire coming out from their mouths and nostrils, and they continue doing so until that matter annihilates [itself] and that fire is extinguished.

81 See the distinction made above, in Chapter 5.

82 The term *sandurūs* probably indicates here red arsenic sulfide. It should be noted, however, that Dieterici, *Die Naturanschauung*, p. 88, seems to consider *sandurūs* to be the resin obtained from a small tree growing in North Africa, as he translates: 'Sandarak und anderen aromatischen Kräutern'. According to ancient authors such as Dioscorides (see, e.g., V.105; III.89.2) or Pliny, sandarac is surely a mineral (later, it will be known as 'mineral sandarac'), red in colour and stinky, of scarce use in picture because of its instability and toxicity. It was long debated if it was minium, lead salt oxide (Pb_3O_4), or arsenic bisulfide (As_2S_3), also called realgar or sulphur ruby. In the Muslim world, another 'sandarac' seems to have superimposed to the former, as the word indicates also a yellow — and perfumed — vegetal resin (see, e.g., Ibn al-Bayṭār, d. 1248). The Latin Middle Age considers both the mineral and vegetal sandarac — sometimes calling the former 'sandaraca', and the latter 'sandracca'. I am indebted to Paola Carusi for these last remarks and sources.

[p. 82] **Chapter 15**

Many people think that the descent of these shooting stars is [the result of] stars that fall and are thrown from heaven in the air towards the Earth, and they demonstrate the soundness of their supposition by God's saying, glorified be He who said, *And We have, (from of old), adorned the lowest heaven with Lamps, and We have made such (lamps) (as) missiles to drive away the Evil Ones.*⁸³

But in this verse there is no proof of the [fact] that stars throw themselves [towards the Earth], because when you say, 'I took this bow to shoot at enemies and unbelievers with it', your speech is not a proof of the fact that you shoot with the bow itself, but of the fact that you shoot arrows from it, and so is the meaning of His saying, be He Exalted, *and We have made such (lamps) (as) missiles to drive away the Evil Ones*, who are shot from them⁸⁴ (fol. 168b) by the shooting stars, because these shooting stars occur in the air only thanks to the irradiation of the stars and of their rays in the air, as we have explained above; and we have commented on the meaning of this and similar verses in some of our epistles.⁸⁵

Chapter 16

Know, O my brother, that astronomers agree on the fact that these fixed stars are situated in the eighth sphere beyond the sphere of Saturn, namely, the encompassing throne, as we have explained in the epistle 'On the Heavens and the World'.⁸⁶ Indeed, God, be He exalted, stated that they are the adornment of the lowest heaven [*samā' al-dunyā*], because the inhabitants of the Earth see them only under the sphere of the Moon, which is the lowest heaven.

And among the proofs of the fact that these shooting stars occur near the Earth, and far from the sphere of the Moon in the speed of

83 First part of Qur'an 67:5, a part of which is quoted also later.

84 That is, the stars, as is clarified later.

85 Perhaps the Ikhwān hint here at the verses quoted in Epistle 19; see below, pp. 280.

86 Here the Ikhwān hint at Qur'an 2:255, quoted in Epistle 16; see above, pp. 138 and 140.

their movement, is that in a moment they pass from the east westwards, and from the west eastwards, and if they were close to the sphere of the Moon, you would not see their movement because of its speed.

And know, O my brother, that when they occur, they pass approaching the observers, and cross their zeniths towards the other side, disappearing from view at the horizon after their passage. So, those who look at them fancy [that it is] as if they had already fallen to Earth, but the issue is not like that, because they are a light matter [*mādda khafīfa*] that searches for height, and their flare up increases only a bit [*khaffatan*].

As to those among them that fall to [p. 83] Earth, they are those that occur in the globe of Nasīm, on which clouds [*sahāb*, here and later] exert pressure and [which they] reject downwards, like the fire of a lightning-bolt on which clouds exert pressure downwards from above.

As to the cause of the fact that that matter becomes round [*istidāra*], it is because fluid bodies by their nature assume spherical [*kuriya*] shapes when nothing hinders that, as a drop becomes round in the air, because the spherical shape is the noblest among shapes, as we have explained in the epistle 'On Geometry'.⁸⁷

As to the cause of their movement in the air in one direction and not in another, it is due to that which pushes them from the opposite side, and it is not wind, because they move faster than wind, and we have explained their movement in the epistle 'On Movements'.⁸⁸

Chapter 17

Look at, O brother, and reflect on this divine wisdom, and on the providence of the Lord, how they placed and disposed the globe of Ether under the sphere of the Moon, and [how] they made it as a fire without brightness so that, by moving, it did not burn the thick smoke rising into the air, but the rotten and dense vapour became thin, so that air [*al-jaww*] might be always pure and transparent [*shaffāfan*].

87 The text refers here to Epistle 2; on this statement see above, Epistle 16, p. 137, note 9.

88 The text refers here to Epistle 39. The motion of the falling stars (*shu'ab*) is mentioned at *Rasā'il*, vol. 3, p. 322.24; for the modality of their motion, see pp. 324.7–8 and 325.6–9.

And [the divine wisdom and providence] did not make that fire luminous because, had it been as luminous as the fires that are on the Earth [*indanā*], it would have hindered living beings [*al-ḥayawān*], and especially man, from the view of the world of the spheres and stars, because, although generation is hindered, view and observation of [that world] is not, so that the soul may yearn for rising up there, as He promised and said, be He exalted, *To Him mount up (all) Words of Purity: it is He Who exalts each Deed of Righteousness*,⁸⁹ meaning by that, the believer's soul. And on the hindrance [met by] the unbeliever's soul, He said, be He exalted, *no opening will there be of the gates of heaven, nor will they enter the Garden, until the camel can pass through the eye of the needle*.⁹⁰

And also, the divine wisdom placed Zamharīr as a veil between the globe of Nasīm and the globe of Ether, so that by its cold it hindered the blaze of Ether from reaching animals and plants, and it cooled (fol. 169a) vapour and coagulated it in the form of clouds, so that, by that, rains may grant life to countries.

And [the divine wisdom and providence] made the globe of Nasīm [endowed with] a balanced mixture, and as its cause is the reflection of the rays of the stars, as we have explained above,⁹¹ and the greatest and firmest of them is the Sun — now they made it setting and cooling air [*al-jaww*], and now rising so as to warm air [*al-hawā'*]; and if it were eternally rising, warming would last forever, and heat would be excessive, and from that general corruption would come. And likewise, [p. 84] if it were eternally sinking in relation to us, air [*al-jaww*] would become cold, waters and moistures would congeal, and animals and plants would be destroyed by cold.

And likewise, [the divine wisdom and providence] made [the Sun] inclined now northwards, so that it is summer there and winter in the south, and now inclined southwards, so that it is summer there and winter in the north. This is the decree of the Mighty, the Omniscient, and this is one of the graces of God, be He exalted, to His creatures, and that is His saying, *Say: 'See ye? If Allah were to make the Night*

89 Central part of Qur'an 35:10.

90 Central part of Qur'an 7:40.

91 See above, Chapter 4.

perpetual over you to the Day of Judgment, what god is there other than Allah, who can give you enlightenment? Will ye not then hearken?' Say: 'See ye? If Allah were to make the Day perpetual over you to the Day of Judgment, what god is there other than Allah, who can give you a Night in which ye can rest? Will ye not then see?' It is out of His Mercy that He has made for you Night and Day — that ye may rest therein, and that ye may seek of His Grace — and in order that ye may be grateful.⁹²

And by analogy with that [*alā hādhā'l-qiyās*], if summer or winter were eternal, that would be of ruin and corruption to the order [*nizām*] [of the world], and likewise if it always rotated on a single azimuth.

And He said, be He exalted, *He created the sun, the moon, and the stars, (all) governed by laws under His Command*,⁹³ now rising and now setting, now inclined northwards and now inclined southwards, now rising in the air and now descending in the perigee, now above the Earth and now under it, now parallel to the fire zodiacal signs⁹⁴ and now to the earth zodiacal signs,⁹⁵ now to the air zodiacal signs⁹⁶ and now to the water zodiacal signs,⁹⁷ now to the mobile zodiacal signs⁹⁸ and now to the fixed zodiacal signs⁹⁹ and to [the zodiacal signs] endowed with two bodies,¹⁰⁰ now in conjunction¹⁰¹ and now scattered [*mutafarriqa*],

92 Qur'an 28:71–73.

93 Central part of Qur'an 7:54.

94 The fire zodiacal signs are Aries, Leo, and Sagittarius.

95 The earth zodiacal signs are Taurus, Virgo, and Capricorn.

96 The air zodiacal signs are Gemini, Libra, and Aquarius.

97 The water zodiacal signs are Cancer, Scorpio, and Pisces.

98 The mobile, or cardinal (*munqaliba*, 'variabili' in Bausani, *L'enciclopedia*, p. 42), zodiacal signs are Aries, Cancer, Libra, and Capricorn. They are so called because they indicate the mobility of the states of the inhabitants of the world. See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.5, 141.6, 142.13.

99 The fixed (*thābita*, 'stabili' in Bausani, *L'enciclopedia*, p. 42) zodiacal signs are Taurus, Leo, Scorpio, and Aquarius. They are so called because they indicate the fixity of the states of the inhabitants of the hereafter. See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.6, 141.6, 142.14.

100 The zodiacal signs endowed with two bodies, or those called 'mutable', are Gemini, Virgo, Sagittarius, and Pisces. They are so called because they indicate that worldly and hereafter issues depend on each other. See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.7, 141.6, 142.14–15. Note that only [J] has *al-jasadayn*, all other manuscripts have *al-ajsād*.

101 *Mujtami'a*. Al-Bīrūnī, *The Book of Instruction*, pp. 259–260, speaks of conjunct (*mujtami'*) planets when they are in aspect in the same zodiacal sign, but the

now in aspect¹⁰² with each other and now inconjunct,¹⁰³ now conjoint¹⁰⁴ and now in separation,¹⁰⁵ now becoming stationary¹⁰⁶ and now turning retrograde,¹⁰⁷ now eastern and now western, now burning by their light,¹⁰⁸ now in their domiciles,¹⁰⁹ and now away from them, now in

term *ijtimā'* also indicates conjunction of the Moon with the Sun. Al-Bīrūnī, *The Book of Instruction*, p. 64.

102 *Nāzira*. 'Aspect' (*munāzara al-kawākib*), indicates the relative positions of stars and planets, thought to influence events on Earth. On the 'aspect' see also de Callatay and Halflants, *On Magic I*, p. 101, note 47.

103 *Sāqi'a*. See al-Bīrūnī, *The Book of Instruction*, p. 225.

104 *Muttašila*. The term *ittiṣāl*, here 'application', refers to the formation of aspects between the planets, dependent on the signs. When two planets are in the same sign or in two signs in aspect to each other and at the same degree, they are said to be conjoint, and the one whose orbit is lower is said to apply itself to that whose orbit is higher, because the lower one is swifter and constantly overtakes the slower one; al-Bīrūnī, *The Book of Instruction*, p. 303. For other meanings of *ittiṣāl* see above, note 35.

105 *Munṣarifa*. The term *inṣirāf*, separation, refers here to the withdrawal of planets from aspects, dependent on the signs. Of two planets in aspect, when the degrees of the inferior one are less than those of the superior planet, the inferior one is said to be proceeding in conjunction and when greater to be separating from the superior; al-Bīrūnī, *The Book of Instruction*, p. 303.

106 *Wāqī'a*, here a synonym for *wāqif*. On the *wuqūf* of the planets see Epistle 16, Chapter 21 (pp. 157–158 above).

107 *Rāji'a*. The term *rujū'* indicates the retrograde movement of the planet with respect to the epicycle; al-Bīrūnī, *The Book of Instruction*, p. 61. On the *rujū'* of the planets see Epistle 16, Chapter 21 (pp. 157–158 above).

108 *Muḥtariqa*. 'Combustion' refers to a planet when it comes into conjunction with the Sun, the expression being due to the comparison of the Sun with fire, and to the non-appearance of the planet when it enters the Sun's rays, suggesting its combustion or destruction; al-Bīrūnī, *The Book of Instruction*, p. 64.

109 See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.17, 120.1–6, 136.9–22, 147.15, 150.6. Not to be confused with houses (also *buyūt*), the division of the zodiac into twelve unequal parts from a particular time (see al-Bīrūnī, *The Book of Instruction*, p. 149, and later, Epistle 19, p. 236, note 46), the domiciles express the relations of the planets to the zodiacal signs (*ibid.*, p. 256). On domiciles, see also de Callatay and Halflants, *On Magic I*, p. 128, note 138. The signs opposite to the domiciles of the planets are said to be their detriments (*wabāl*, cf. Persian *Bityāra*); al-Bīrūnī, *The Book of Instruction*, p. 257. On detriments, see also Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.17, 150.7, 151.8.

exaltation,¹¹⁰ now in fall¹¹¹ and now in decadence.¹¹² All this is [a part] of [the stars'] descriptions and states, and all that is for purposes well described and moments [*ājāl*] well determined, which only He knows, *Nowise did Allah create this but in truth and righteousness.*¹¹³

The experts in astronomy and in the whole creation embrace of His knowledge [*ilmihī*] regarding only what He wants, *His Throne doth extend over the heavens and the earth.*¹¹⁴

We have already recalled a part of this kind of knowledge in the epistle 'On Cycles'¹¹⁵ as a sample and a suggestion, so look at it, O brother, and reflect on what has been mentioned. Perhaps your soul will be awakened from the sleep of carelessness [p. 85] and the slumber of ignorance, it will live (fol. 169b) the life of the learned, and will enjoy the life of the happy people with the pious in the hereafter,¹¹⁶ eternally blessed, pleased, joyful, and delighted, and you will not be with the careless people in the lowest [part] of the world of generation and corruption. Prepare [your soul] for the departure before time expires, and make provisions — indeed *the best of provisions is right conduct.*¹¹⁷

110 *Sharf*, exaltation, is the noblest place of the stars in the sphere. See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.18, 120.7 and 9, 147.19, 150.7, 151.3. On exaltation see also al-Bīrūnī, *The Book of Instruction*, p. 258, and de Callatāy and Halflants, *On Magic I*, p. 93, note 25.

111 *Hubūt*, i.e., fall, is the contrary of exaltation. See Epistle 3: 'On Astronomy'; *Rasā'il*, vol. 1, pp. 119.18, 120.7 and 10, 150.7, 151.10. On fall see also al-Bīrūnī, *The Book of Instruction*, p. 258, and de Callatāy and Halflants, *On Magic I*, p. 103, note 49.

112 *Inhiṭāt*, i.e., depression (also *inkhifād*), refers to the arc between the body below the horizon and the horizon; complement (*tamāmāhumā*) of the depression is the arc between the body and the nadir; al-Bīrūnī, *The Book of Instruction*, p. 132.

113 Central part of Qur'an 10:5.

114 These words quote a part of Qur'an 2: 255: '[...] *Nor shall they compass aught of His knowledge except as He willeth. His Throne doth extend over the heavens and the earth[...]*'.

115 The text refers here to Epistle 36: 'On Revolutions and Cycles' in its whole. See *Ikhwān al-Ṣafā'*, *Les révolutions et les cycles (Épîtres des Frères de la Pureté, XXXVI)*, tr. G. de Callatāy (Beirut-Louvain-la-Neuve: Al-Bouraq Éditions-Academia-Bruylant, 1996).

116 Arabic: *dār al-qarār*, mentioned in the final part of Qur'an 40:39: *it is the Hereafter that is the Home that will last*.

117 This is a quotation from the last part of Qur'an 2:197, here quoted in Yusuf Ali's translation. *Taqwā* indicates the fear of God.

Chapter 18

As to the comets that appear in some moments before the rise of the Sun or after its setting, they occur only in the globe of Ether close to the sphere of the Earth, and a proof of that is their rotation with the sphere of the Moon, now preceding the succession of constellations, like the journey of the planets, and now following it, like their return.¹¹⁸

As to their matter, of which they are formed, it is the pure, balanced¹¹⁹ smoke and vapour that rise up there; then they knit together thanks to the power of Saturn and Mercury, and [comets] become translucent like crystal when the Sun shines on it, and from the other side they are translucent, and continuously rotate with the sphere, rising and setting until they decrease and vanish.

All these events that are seen in the air [*jaww al-hawā'*] are either announcements from God, be He exalted, of inexpensiveness, fertility, health, and peace for humans and animals, or warnings and scaring from adversities, barrenness, famine, rise in prices, earthquakes, epidemic, plague, disgraces [*khusūf*], wars, and riots, so that the people who are obliged to observe the precepts of religion [*al-'ibād al-mukallafūn*] may consider them, be prevented from disobedience to Him, submit to His obedience, and they may present invocation, supplication, repentance, and regret through fasting, prayer, alms, and sacrifices in temples, mosques, churches, and [other places of] prayer, and all that may be an instruction from fathers to children and from the learned to the ignorant, an awakening for the careless, [p. 86] and a guide for them towards Him, as He said, praise Him, be He exalted, *and moreover, when ye are touched by distress, unto Him we cry with groans.*¹²⁰

Look then at, and reflect on the reign of heavens and Earth, on what is in the remotest regions [*al-āfāq*] and in the souls from His verses, and say, *'Our Lord! Not for naught hast Thou created (all) this! Glory to Thee! Give us salvation from the Penalty of the Fire,*¹²¹ and be a witness

118 *Rujū'*, on which see above, note 107.

119 All the MSS propose the reading *laṭīf*, 'thin'; see the critical apparatus, p. 243, note 2, and Dieterici, *Die Naturanschauung*, p. 93, who translates 'feiner'.

120 Second part of Qur'an 16:53.

121 Second part of Qur'an 3:191.

with them, as He recalled, and said, *There is no god but He: that is the fitness of Allah, His angels, and those endued with knowledge, standing firm on justice,*¹²² and do not be among the careless that cross them and turn away from our Signs,¹²³ and they are those of whom He said, *I called them not to witness the creation of the heavens and the earth, nor (even) their own creation, He does propound to you a similitude, do ye not understand?*¹²⁴ May God protect us against this carelessness, ignorance, and blindness, and may He give us success in that which leads and guides.¹²⁵

The epistle 'On Meteorology' is completed. Praise be to God alone, and His blessings be on Muhammad, the chosen, and on his family after him. God alone suffices for us — what an excellent helper, supporter, and mandator He is!

122 First part of Qur'an 3:18.

123 This is an allusion to the last part of Qur'an 21:32: '[...] yet do they turn away from the Signs which these things (point to)!'

124 Here the first part of Qur'an 18:51 is quoted, with the addition of the first words from 30:28 and the final words of 2:76.

125 The words '*waffaqanā li'llatī arshadu wa-ahdā*' are to be understood as a hope that God help the Brethren in following the rules that lead and guide to salvation.

