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# Introduction

## *Knowledge of the Natural World and the Understanding of Nature in Arabic Textual Culture between the 2nd/8th and 9th/15th Centuries*

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### 1 Looking at Nature and the Natural World in the Islamic Civilization Retrospectively

Contemplating nature as part of God's creation; putting human beings in relation with their surroundings on earth and to the entire cosmos; classifying animals, plants, minerals; describing or representing nature in all its manifestations and oddities; reflecting on the first principles and the elements of nature in all physical forms are some of the many concerns that have spanned the entire human history from its earliest beginnings. Nature has been and still is part of the life experience of the beings that inhabit the world. Thus, cultural, philosophical, and physical encounters with nature have touched and still concern the most intimate and complex dimension of the senses and the feelings of human beings of all times and latitudes.

Among the various themes of medieval or pre-modern culture, that of nature has occupied, in recent decades, a particularly prominent place in scholarly reflection. This is indeed a vast and complex theme, one would say, and therefore the subject of wide-ranging and diverse investigations, both on the historical side as well as on that of the understanding of nature by men from late antiquity to the scientific revolution.<sup>1</sup>

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1 There is an enormous bibliography that refers to nature/natural world. I merely refer to some general reference works that have similar aims to those of this monographic issue or that have been particularly useful in developing some background reflections. See Catapano and Grassi (eds.), *Rappresentazioni della natura nel Medioevo*; Curry, Jardine, Secord, and Spary (eds.), *Worlds of Natural History*; Koyama (ed.), *Nature in Medieval Thought*; Jones, *The Medieval Natural World*; Ridyard and Benson (eds.), *Man and Nature in the Middle Ages*.

Nature has been a fertile subject also with regard to Islamic civilisation. Indeed, an enormous amount of descriptions, reflections, suggestions involving the natural world is scattered over a large and very different variety of texts written in Arabic between the 2nd/8th and 9th/15th centuries.<sup>2</sup> As Meyssa Ben San Saad noted in the conclusions of her contribution to this special issue, “la nature, en tant que notion, concept, élément constitutif d’un savoir scientifique (naturaliste, écologique, bio/géologique) soulève de nombreuses interrogations scientifiques et philosophiques, épistémologiques et même sociologiques et anthropologiques. Son acception au Moyen Âge et dans la culture scientifique arabe reste à définir. Les grands cadres théoriques, épistémologiques de l’étude du vivant méritent d’être étendus à de nombreux textes encore inexplorés et appréhendés sous le prisme de la tradition scientifique, de la circulation et de la transmission des savoirs”.<sup>3</sup>

This thematic issue of *Quaderni di Studi Arabi* stems from a broader research project aimed at exploring such a wide and varied knowledge of the natural world in the various ways in which it has been articulated through the Arabic textual culture between the 2nd/8th and 9th/15th centuries. More specifically, it aims to focus not so much on nature as an object, but rather on the way it has been represented and transmitted in such a culture in order to offer examples of views of the natural world that would help to shed light on its reality. The twelve contributions in this issue therefore examine different cultural expressions of what we can regard as nature. In each of these expressions, the representation or the description of nature in its entirety or of particular constituents of the natural world has been a way or means of looking at that object, engaging with it, in some cases representing it, or in some other cases misrepresenting its vision.

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Alongside this type of bibliography, I suggest reading essays with a more philosophical slant, such as Vidali, *Storia dell’idea di natura*.

- 2 In the contributions to this issue, the adjectives “Arabic” and “Islamic” are used in different ways or with variable meanings depending on the traditions, works, and themes referred to by the authors. On a general level, Arabic essentially concerns the language in which these texts were written. However, the development of notions and concepts relating to the nature, as well as the emergence, development and circulation of the so-called Islamic sciences more generally is due to scholars of different linguistic, ethnic and religious backgrounds, but has always taken place in the urban centres of the Islamic civilisation and essentially in the Arabic language.
- 3 Quotations from the contributions to this issue are placed in inverted commas but without any specific reference to the pages. The reader is referred to the article in its entirety for a better framing of each author’s opinion. As is natural, not all authors share the same understanding.

Before discussing the contents of this issue in detail, I would like to briefly outline some terminological and methodological issues that arise when dealing with this theme. They concern both the very meaning of the word ‘nature’ in Islamic civilization and the way it was studied and referred to in the Arabic texts circulating in the period under analysis. In connection with this, I would also like to discuss some related questions concerning the works that deal with nature or provide representations on the natural world. The variety of genres and types of text undoubtedly leads to a shift in focus from the more strictly scientific to the more literary.

### 1.1 *Methodological Issues*

The theme of this issue is nature and the natural world. The Arabic term for nature, *ṭabīʿa* (pl. *ṭabāʿīʿ*), has been used essentially in philosophical, scientific and astronomical literature, and covered a variety of meanings, including ‘nature’; the essential qualities or characteristics by which something is recognized; a particular type of thing; the complex of emotional and intellectual attributes that determine a person; a causal agent creating and controlling things in the universe. In the entry on *ṭabīʿa*, Pingree and Nomanul Haq noted: 1) that to this term should also be added the “functional equivalents *ṭibāʿ* and *ṭabʿ*, a term of Islamic science, philosophy and theology”, and 2) that “in a large number of cases these definitions betray Aristotelian origins”.<sup>4</sup> As far as the natural world is concerned, there was no real Arabic equivalent in the period under review. The expression *ʿālam al-ṭabīʿa* is used nowadays as a translation from English to refer to the natural physical world including a variety of things such as plants, animals, and landscapes etc.

Throughout its history and particularly in the pre-modern period, Islamic civilisation has developed a number of lines of thought concerning both nature as a philosophical, theological and scientific concept and nature as a physical reality looking at the natural world in all its components and manifestations.<sup>5</sup>

4 Pingree and Nomanul Haq, “*Ṭabīʿa*”, p. 25. The entry focuses on the appropriation of the Aristotelian Greek term and its transmission in the Islamic tradition; its use in Islamic theology (*ʿilm al-kalām*); the theory of *ṭabāʿīʿ* in alchemical literature; and the speculations on the *ṭabīʿa* of heavenly bodies in astronomy.

5 A history of the idea of nature that encompasses the different meanings it has come to have in the history of Islamic civilisation does not exist. In this connection, a comparative reading with the history of Western thought may be useful. For example, Vitali, *Storia dell’idea di natura*, outlines a kind of periodization of the idea of nature with transitions from the ancient world to present day and distinguishes various historical stages characterised by different conceptions: an idea of nature as “living (system)” would have characterised the ancient world; an idea of nature as “book” the Middle Ages; an idea of nature as “machine” the modern period.

On the one hand, nature has been the subject of continuous philosophical and scientific speculations. Starting with the Arabic translation of Aristotle's writings, a complex line of thought on the meaning of nature developed and witnessed the emergence of very different positions through writings that influenced a large number of scholars (not exclusively related to the philosophical sphere) and have permeated many genres including *adab* literature.<sup>6</sup> Theologians, too, have long reflected on the meaning of nature, the relationship between Creator and Creation, the nature of creatures and many other related topics.

On the other hand, nature was the object of an equally continuous observation of the reality. Over the centuries, various Islamic sciences concerned the natural world. They vary according to the focus they have, the methodologies they adopt and the approaches they deploy. In the *Encyclopaedia of the History of Science* edited by the historian of science Roshdi Rashed, the sciences that concern the natural world come after those related to astronomy, mathematics, theory of physics, experimental method, and approximate knowledge. Following this approach, the so-called life sciences, which involve the scientific study of life in all its forms (principally plants, animals, human beings), involve several sciences, including medicine in its various traditions, theory and practice, botany, agronomy, zoology, zoography, and veterinary medicine.<sup>7</sup>

In his overview of the natural sciences, Howard Turner includes all the sciences – and consequently the types of writing – that aim to investigate different aspects of the natural world, comprising those concerning “good environmental behaviour especially relevant to survival” in the vast territories between the Atlantic and Indian Oceans inhabited by Muslims.<sup>8</sup> Accordingly, to the above list of life sciences, he adds some technical sciences concerning the management of the flora, the fauna and especially the waters of these lands, such as hydraulics.

In the studies of the history of science in Islamic civilisation, which clearly also concerns the history of the life sciences or natural sciences, it is possible

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6 There is an extensive bibliography on the topic. I refer to Lammer, “Defining nature: from Aristotle to Philoponus to Avicenna”, for an overview of the historical development of this debate within Islamic philosophy and the related bibliography.

7 The *Encyclopedia of the History of Arabic Science* edited by Roshdi Rashed has been published as part of the *Enciclopedia delle scienze* as a monographic volume addressing the history of science in the *Civiltà islamica*. The two versions differ and do not contain the same contributions. The Italian edition has, for example, a different thematisation of the history of the sciences, including a last section devoted to the life sciences which was partly missing in the previous edition.

8 Turner, “Natural Sciences”, in: *Science in Medieval Islam*, pp. 162–188.

to trace a rough periodisation. During the early centuries, particularly between the 8th/2nd and 9th/3rd centuries, in various fields of knowledge Muslims inherited philosophical, scientific, technical notions from previous or surrounding, coeval, traditions. These notions encountered the Qur'an and the emerging Islamic tradition (*ḥadīth*), merged and harmonised with each other and with the Qur'anic data, and converged in creating the Islamic culture.<sup>9</sup> These various traditions are generally recognised to be the pre-Islamic Arab tradition, whose influence is felt in the lexicographers of the first centuries of Islam; the ancient Greek, Greek-Alexandrian, Byzantine scientific and philosophical tradition, in particular represented by Aristotle<sup>10</sup> and the medical tradition; the Persian and Indian traditions, producing their most representative results in later times.

The area (from the Indian Ocean to the Atlantic Ocean) and the period of time (from 2nd/8th to 9th/15th centuries) taken into analysis in these studies generally provides a coherence on a cultural level. From a macro-historical perspective, it witnesses the rise and fall of the major dynasties (Umayyads, Abbasids, Mamluks) with a prevalent, but not exclusive, circulation of texts in Arabic with regard to the fields investigated. When going into more detail, in these centuries a number of local, including non-Arab, dynasties controlled specific regions of the Muslim world for longer or shorter periods of time. If, on the one hand, the interplay between macro and micro level of history does not concern the cultural level too much – since, all things considered, it maintains its own coherence thanks to a series of cultural and educational institutions – it must certainly have had an impact on experiencing and perceiving nature. This takes place when it comes to the management of the environment or of the natural resources of certain regions or, even more specifically, to the different environmental and climate habits of people inhabiting in one or the other region.

In recent times, several researchers, notably Justin Stearns, have attempted to revise this periodisation by giving instead more attention to the ways in which such knowledge was transmitted in subsequent centuries, the intertwining of different spheres (philosophical, theological, scientific) in the knowledge production process, and the role played by *madrasas* in the transmission, but also dissemination, of the natural sciences even in peripheral areas of the

9 Carusi, *Lo zafferano e il geco. Le scienze della vita nella società islamica del medioevo*, chap. "Le fonti e la storia", proposes a similar periodization with regard to zoology.

10 There is an extensive bibliography on this subject. On the reception of the concept of nature as formulated by Aristotle in the Arabic philosophical tradition, I merely refer to Lammer, "Defining Nature: from Aristotle to Philoponus to Avicenna", and all bibliography cited therein.

Islamic world.<sup>11</sup> This type of study is situated within the intellectual history of the pre-modern Islamic world and considers not strictly scientific works – such as those written by the seventeenth-century Moroccan polymath al-Ḥasan al-Yūsī (d. 1102/1691) – as an integral part of a broader cultural history in which science, philosophy, theology but also literature have coexisted in the intellectual lives of many different scholars.

Especially in the wake of a broader attention to the natural environment in the contemporary world, scholars of Muslim history have also begun to question the environmental history of the cultural area of the world they are interested in and, in some cases, some attempted to outline an environmental history relating to certain historical periods or delimited areas. This type of study has particularly focused on climate and natural resources following a number of research lines that have touched on a variety of issues depending on the methodological perspective, the period and the region examined.

As far as the Mamluk period is concerned, the main topics that Mamlukists addressed so far were: “the adaptation of local communities to changing environmental conditions, – this is at the center of a growing body of archaeological literature – the environmental impact of state policies, the social impact of environmental disasters, the legal framework of urban water systems, economic studies of imperial water systems, indigenous agriculture practice, *ṭarḥ* and the moral economy, urban soundscapes, and feeding the city”.<sup>12</sup> Particular attention was paid to the landscape as it emerges from the information contained in historical and geographical works of the period.<sup>13</sup>

As for the Ottoman period, Alan Mikhail described a social and environmental history of Egypt in the period between 1675 and 1820 in three essays with different focuses: the first focusing more on waters and their management; the second on animals; the third combining the two perspectives and outlining what he defines in terms of the “empire as an ecosystem”.<sup>14</sup>

At the current state of research, a history of the natural world that concerns whatever has been elaborated in Arabic is lacking. On the other hand, it is also

11 Stearns, “Writing the History of the Natural Sciences in the Pre-Modern Muslim World”; Stearns, *Revealed Sciences*.

12 For an up-to-date state of the art of this type of research related to the Mamluk period, see Walker, “Introduction: The Physical World as a Social World”, the quotation refers to p. 14.

13 On this, see the sources and the bibliography discussed by Frenkel, “An Introduction to the Environmental History of the Mamlūk Sultanate”. Surveys of the landscape also covered earlier periods. See in particular Latiri, “Qu'est-ce que le paysage dans la culture arabo-musulmane classique?”; Latiri, “La géographie arabe et le concept de paysage”.

14 Mikhail, *Nature and Empire in Ottoman Egypt*; Mikhail, *The Animal in Ottoman Egypt*; Mikhail, *Under Osman's Tree*.

evident that “Natural History, conceived broadly to cover all quests for systematic understanding of natural objects – plants, animals and minerals – is vast in scope, both temporal and global”.<sup>15</sup> This statement, opening the collective volume *Worlds of Natural History* that includes various case studies on the natural world in the West, also seems to be appropriate to deal with a natural history in the Islamic civilization whose very borders, as we have seen, are difficult to draw, but which, without doubt, developed countless ideas, observations, representations of nature at its different stages.

## 1.2 *Textual Issues*

Along with more general terminological and methodological issues, it is also important to address those related to the types of text dealing with the natural world when investigating this kind of research topic. Information, descriptions, representations, allusions to nature are, as a matter of fact, found in a variety of works and writings embracing in all probability all genres of the textual culture in Arabic: Qur’an and religious literature,<sup>16</sup> works of theology, philosophical treatises, scientific essays, but also poetry and literary prose works. Certainly, numerous works that do not necessarily fall under the aforementioned life sciences or natural sciences have been used to spread the most diverse ideas of nature even at a more popular level.

With regard to literary production, references to nature are as ubiquitous in poetry as in prose from every era and region. Chapters dedicated to the natural world can be found in a variety of texts of literary prose or *adab* literature, in many cases preventing the drawing of boundaries between genres and, above all, between strictly scientific and uniquely literary dimensions. A few examples can illustrate the richness and, at the same time, the complexity of the Arabic literary tradition even when referring to the natural world.

The *Kitāb al-Hayawān* by al-Ġāḥiẓ (d. 255/868), one of the most important authors of Arabic prose, represents, next to the writings of Aristotle, the source par excellence of all later works on zoology. However, it is not strictly a zoological text. As Eisenstein emphasises, “the purpose of al-Ġāḥiẓ is not to study animal species, but, in accordance with the theological Mu‘tazilite doctrine, to arrive at a rational demonstration of the existence of God, and, precisely, to demonstrate the existence of the Creator from Creation, by emphasising the wisdom of a God who created nothing useless, since even dangerous or

15 Jardine and Spary, “Worlds of history”, in: Curry-Jardine-Secord-Spary (eds.), *Worlds of Natural History*, p. 3.

16 Hints on the spread of the idea of nature in Islam (from the Qur’an to related religious sciences) can be found in Meddeb, “Le sentiment de la nature in Islam”.

ferocious animals have their own *raison d'être* insofar as they test human beings".<sup>17</sup> Hence, al-Ġāhiz does not write a treatise on natural science but an unsystematic anthology that includes almost 400 known and unknown animal species.

In another seminal work of the Abbasid period we also find chapters on animals or plants. In the *ʿUyūn al-aḥbār* by Ibn Qutayba (d. 276/889), who was one of the most prominent Sunni scholars, there is a long chapter devoted to animals mixing anecdotes (*aḥbār*) with more scientific insights into their natures (*ṭabāʿi*), benefits (*manāfi*), and properties (*ḥawāṣṣ*).<sup>18</sup> Two other important *adab* anthologies standing at the extremities of the period under consideration – the *Kitāb al-ʿIqd al-farīd* by the Andalusian literati and poet Ibn ʿAbd al-Rabbih (d. 328/940) and *al-Mustaṭraf fī kull fann mustaṭraf* by al-Ibšihī (d. 850/1446) – contain chapters on the natural world that, again, mix the serious and the facetious, the scientific and the literary. And more, in the *Kitāb al-Imtāʿ wa-l-muʿānasa*, the renowned man of letters al-Tawḥīdī (d. 414/1023) provides several notions on animals that are not found in other sources, such as certain zoological groupings of animals on the basis of specific characteristics in common (for instance, the number of teeth or the ability to take on speed). This work is ostensibly an account of forty learned gatherings (*maǧālis*) that took place between the author and a prominent bureaucrat.

Along with anthologies and *adab* works, encyclopaedias should also be mentioned among the texts that have contributed most to the dissemination of knowledge about the natural world even in literary circles. The encyclopaedical works flourished especially, but not exclusively, in the Mamluk period and offer in a systematic form a wealth of material of interest for the natural world. The works supplying the most systematic and rich overview are the *Nihāyat al-arab fī funūn al-adab* by al-Nuwayrī (d. 733/1333), the *Masālik al-abṣār fī mamālik al-amṣār* by Ibn Faḍl Allāh al-ʿUmarī (d. 749/1349),<sup>19</sup> and the *Ṣubḥ al-aṣḥā fī šināʿat al-inṣāʿ* by al-Qalqaṣandī (d. 821/1418).<sup>20</sup> These three works include thematic sections or entire books on each of the realms that

17 Eisenstein, "Zoologia, Zoografia e Medicina Veterinaria", in Rashed (ed.), *La civiltà islamica*, p. 860. The translation from Italian is mine.

18 For an overview of knowledge about the natural world in the works of Ibn Qutayba, see Bellino, "Developing a Knowledge System Based on *adab*: Birds Fluttering from Ibn Qutayba's *Adab al-Kātib* to the *ʿUyūn al-Aḥbār*".

19 For in-depth analysis of the section on plants, see Bellino, "Rappresentazioni del regno vegetale nell'enciclopedia mamelucca *Masālik al-abṣār* di Ibn Faḍl Allāh al-ʿUmarī (m. 1384)".

20 Ducène, "Les encyclopédies et les sciences naturelles dans le monde arabe médiéval (XI<sup>e</sup>–XIV<sup>e</sup> siècle)", labelled this group of works as veritable encyclopaedias of the natural sciences.



shape the natural world (animals, plants, minerals) providing us with a very complex view of the very notion of nature as developed in the bureaucratic milieu of the secretaries (*kuttāb*) during the Mamluk period.<sup>21</sup>

Along with encyclopaedias, cosmographies should also be mentioned. One of the works that provides by far the most interesting view of the natural world is the *Kitāb 'Aġā'ib al-maḥlūqāt* by al-Qazwīnī (d. 682/1283). The aim of the work is to offer a detailed, and at the same time abridged, overview of all the knowledge of the cosmos and the natural world, including humankind.<sup>22</sup> Similarly to the encyclopaedical works, but using a more concise language and format, al-Qazwīnī mixes scientific observations in the fields of zoology, botany, zoography, mineralogy, meteorology with literary anecdotes, elements of folklore, superstitions, *mirabilia* (*'aġā'ib* and *ġarā'ib*) as well as references to religious concepts in the introductory descriptions of the various sections of the work. Alongside the prominence of the lexicographical and practical aspects, in this work we also find a strong interest in the odd and curious details. The wide diffusion of the *'Aġā'ib al-maḥlūqāt* in its various translations and formats (mainly illustrated) makes it undoubtedly one of the privileged works for understanding the natural world in the pre-modern period.

The aforementioned works are examples taken from prose production. But in what other genres did ideas or representations of the natural world circulate? Which texts have been more porous for talking about nature? Was there interplaying between prose and poetry on this theme? And furthermore, which topics speaking of the natural world have been most affected? Does the representation of nature in literature (prose or poetry) refer to reality or distort it? What insights can we draw from these texts that are useful for a history of the natural world?

## 2 Portraying the Natural World in the Arabic Textual Culture between the 2nd/8th and 9th/15th Centuries

This monographic issue of *Quaderni di Studi Arabi* collects twelve case studies devoted to specific aspects of the natural world as they emerge from the investigation of works from different genres written between the 2nd/8th and

21 On the dissemination of encyclopaedias in Arabic in the Ottoman period along with ideas related to the natural world contained therein, see Bellino, "Arabic Encyclopaedias and Encyclopaedism in the Ottoman Period: Forms, Functions and Intersections between *Adab* and Modernity",

22 For a detailed discussion of this work as an encyclopaedia of natural history, see von Hees, Syrinx, "Al-Qazwīnī' *'Aġā'ib al-maḥlūqāt*: an encyclopaedia of natural history?."

9th/15th centuries.<sup>23</sup> The works explored are all written in Arabic and, depending on recipients and periods, circulated in an array of religious, cultural and social milieus. Especially when set against the backdrop of longer and more complex textual traditions that connect them to the late antique period, they turn out to be veritable repositories of ideas relating to nature inherited from different traditions (Greek, Christian, Persian, Arabian, but also Buddhist), elaborated within Arab/ic and Islamic culture, and then spread over the centuries following often very complex lines of transmission within the Islamic/ate context. In many cases, these texts can be seen as intricate networks of sources in which knowledge of the natural world (whether or not combined with philosophical entailments, practical use, or technical knowledge) can be applied for various purposes and in a variety of social circumstances.

In terms of genre, the works on which the colleagues who participated in this special issue focused can be grouped in three major types: poetry, *adab* prose, philosophy and science. The differences between their diverse genres undoubtedly implies different thematic elaborations and stylistic formulations of each genre in dealing with the natural world. Further differences can emerge more visibly by zooming in on individual authors, works, times and places taken into account.

### 2.1 *The Natural World and Arabic Poetry*

The section of this dossier collecting articles on works of poetry or poetics relating in some way to the natural world is the largest and probably the richest for the insights it provides. The five contributions by Hekmet Dirbas, Ilenia Licitra, Cristina La Rosa, Gianluca Saitta, Syrinx von Hees cover a vast span of time ranging from the pre-Islamic to the Mamluk period and an equally vast geographical area running from the Arabian Peninsula to Sicily and al-Andalus. They deal with different types of poetry incorporating descriptions of nature that had different functions depending on the contexts in which they were written and the target audiences to whom they were addressed.<sup>24</sup>

In its traditional pre-Islamic formulation, the *qaṣīda* features segments and themes explicitly referring either to the natural environment where the poets lived and the animals that inhabited it. Although this thematic issue does not include any contribution entirely devoted to pre-Islamic poetry, the *Bā'iyya*

23 I would like to thank those colleagues who, for various reasons, decided not to publish their contribution, but who nonetheless engaged in a stimulating reflection on the subject, thereby actively contributing to improving and delineating the basic considerations expressed in this introduction.

24 Schoeler, "Nature, in classical poetry", outlines themes and motifs most common in classical poetry in which descriptions of nature (in the widest sense) are found.

of Dū al-Rumma (d. 117/735–36) stands as the major representative of the archaic *qaṣīda* in the Umayyad period. In “From Lostness to Salvation: Nature in Dū al-Rumma’s Desert Journey”, Hekmat Dirbas demonstrates that nature – mainly represented by the desert – plays a decisive role.

What nature is it exactly? As Dirbas points out, it “should not be seen as a mere physical object or an expression of environment in the modern sense; rather, it represents a rich rhetorical and allegorical device that speaks to his existential experience”. Compared to the pre-Islamic tradition, Dū al-Rumma’s composition is innovative in the way the poet incorporates three animal panels – respectively referring to the onager, the oryx bull and the ostrich – in the desert journey section (*raḥīl*) as well as in the way he links them to the landscape description.<sup>25</sup> Through the journey into the desert, the poet’s perception of the landscape changes: in the initial part of the *Bā’iyya*, the vast desert represents an unknown destiny and a space of loss; in the second part, it is transformed into a watery place and a space of consolation. Despite this, the journey remains without destination and during it the animals play a complex function which is not limited to accompanying the poet’s wandering.

Over the centuries, the description (*waṣf*) of nature, and in particular of a nature that is no longer just desert or wilderness, becomes the subject of entire compositions. In contrast to the pre-Islamic period, in which the purpose of the *waṣf* section is to recall stereotypical emotional situations or to respond to specific interests of the poet, during the Abbasid period the *waṣf* revealed a more intimate connection with the described subject. For this purpose, Arab poets develop various sub-genres of descriptive poetry in which they focus on individual features or species of the natural world: *zahriyyāt* or *nawariyyāt* (poems describing flowers), *rawdīyyāt* (garden poems), *rabi’iyyāt* (poems dedicated to the vision of nature during the spring time), *talǧīyyāt* (poems describing the snow), *mā’iyyāt* (poems describing waters).

In “The Natural world in the Siculo-Arabic *waṣf* poetry”, Ilenia Licitra provides an overview in some of these genres as they appear in one of the most interesting regional poetical repertoires of the classical period. Therein, the feeling of nature (*Naturgefühl*) – or “the response to nature” as Grunebaum called it in his seminal contribution on the natural world in Arabic poetry<sup>26</sup> –

25 The section on desert journey is of utmost importance for the pre-Islamic *qaṣīda*. Scholars such as Stetkevych, Bauer, Montgomery, Jacobi, Miller, Papoutsakis have given divergent interpretations of its function and significance in classical poetry. Dirbas referred to the most important positions in this debate, which also touch on the different meaning to be attributed to the landscape framework and the role or the significance of the various wild animals in such landscape.

26 Von Grunebaum, “The Response to Nature Arabic Poetry”.

comes to concern a variety of motifs and imagines and affects all the senses. Through the analysis of a number of compositions by Ibn Ḥamdīs (d. 527/1133), al-Ballanūbī (second half of the 5th/11th century) and other poets active in Sicily between the end of the 4th/10th century and the first half of the 5th/11th century, Licitra shows the way these poets involved the principal motifs of the descriptive genre – gardens, meadows, fruits, flowers, landscapes, atmospheric phenomena – but, sometimes, proposed a “hermetic” portrayal of the subject, described not according to direct perception but rather through its codified relationship with a traditional system of highly symbolised motifs and imagines.

Licitra remarks that the four generations of Siculo-Arabic poets under investigation “obviously corresponded to four generations of listeners/readers and the way in which they captured the natural environment precisely reflected the literary leaning and its full capability to understand and appreciate the rhetorical language”. The motifs and images on the nature they scattered in their *dīwāns* change over time without apparently altering the (Sicilian?) landscape background in which their poems are set. However, for historical reasons many poets are forced to leave the island – from Sicily to Egypt, Maghreb or Al-Andalus – and thus the (Siculo-Arabic?) cultural environment to which they refer changes or is replaced by other landscapes.

In “The Order of Fruits in Comparison. Nature Poetry in al-Ṣafadī’s (d. 764/1363) *Work on Similes*”, Syrinx von Hees reflects on the stylistic device of the comparison (*tašbīh*) involving elements of the natural world as developed during the Mamluk period. In particular, she focuses on *al-Kašf wa-l-tanbīh ‘alā l-waṣf wa-l-tašbīh* (The Revelation and Instruction on Poetic Description and Comparison), a work on similes written by the Mamluk literary figure and scholar al-Ṣafadī (d. 764/1363).

Von Hees points out that most of the examples al-Ṣafadī brings in the 65 sections composing the work are taken from nature: celestial bodies and natural phenomena, individual flowers, different kinds of fruits, garden in general, plants, grain, greens, eggplant, sweets, food, water bubbles, baths, twigs, song-birds, water birds. She also observes that in the Mamluk period the attitude towards nature is much less romanticised compared to the Abbasid period probably due to the dissemination of encyclopaedias. According to von Hees, “because of these popular approaches using nature as an ordering principle, nature as a theme, and with it collections of many different items from nature, also became more central in the field of literature describing things by way of comparisons”. This also explains the numerous examples given by al-Ṣafadī concerning many kinds of fruit that are also found in everyday life. The shift from court poetry to a kind of bourgeois poetry results in a change of

aesthetics from representation to participation with a greater focus on everyday life, including fruits.

On the other hand, poetry also sheds light on another feature. The natural world is both the subject of description and the object of comparison with the subject described. In “Saturn in Opposition: Stars and Natural Elements in Ibn Sahl al-Išbīlī’s Poetry”, Cristina La Rosa focuses on the use of images related to the natural world in Ibn Sahl al-Išbīlī’s (d. 660/1261) *Dīwān*. A significant part of the production of this poet, born in Sevilla and living between Al-Andalus and Tunisia, included allusions to the natural landscapes and tropes related to nature. The use of natural images is particularly significant in his love and praise poetry, part of which is dedicated to a man called Mūsā (*mūsāwīyyāt*), evoking the beauty of the earth or certain weather conditions. In the *muwaššahat Yā ḥayāt al-naḥs* (Oh life of the Soul), Ibn Sahl uses images related to the planets and the stars by further expanding the connection between man and the cosmos. Nature rarely participates in the poet’s feelings and moods, but is rather a pretext to praise the moral and physical qualities of a beloved or patron. This approach, according to La Rosa, brings Ibn Sahl’s poetry in line with Arab-Andalusian poetry. In this repertoire, nature has a great lyrical and symbolic value, which in a few cases provides practical and concrete information on the natural world experienced by the poet.

In “Les représentations de la nature dans le panégyrique d’époque rassoulide (626–858/1229–1454): étude de poèmes choisis d’Ibn al-Muqārī (m. 837/1434)”, Gianluca Saitta deals with a series of *madiḥ* from the *Dīwān* of the poet Ibn al-Muqārī who lived in Yemen during the Rasulid era. In his repertoire, the evocation of images of nature is highly appreciated as an expression of the virtues of the praised (*mamdūḥ*). The representations of the Yemenite landscape are so important that in certain compositions they constitute an introductory and transitional sequence in the body of the poem and have a specific function insofar as natural elements are associated with the virtues of the dedicatee. In the verses, the eulogy to the dedicatee also includes the praise of his palaces and gardens. Saitta links the use of such images and figures also, but not exclusively, to the coeval Yemenite prose production of prose debates, for example the *munāzarāt bayna al-buldān* and *al-nabātāt* (debates between countries and plants).

## 2.2 *The Natural World and adab Prose*

The section on *adab* literature of this dossier includes three contributions respectively by Ignacio Sánchez, Meyssa Ben Saad and Kaouthar Chebbi that highlight the complexity of themes and motifs concerning the natural world when exploring major *adab* works such as Ibn al-Muqaffa’ (d. 139/757)’s *Kalīla wa-Dimna*, al-Ġāhiz (m. 246/868)’s *Kitāb al-Ḥayawān*, Ibn Qutayba

(d. 276/889)'s *Adab al-kātib* and other reference prose works from the Mamluk period. Similar to the one on poetry, this section deals with a literary production that crosses a wide time span and different geographical areas as well as various literary genres.

The collection of framed stories entitled *Kalīla wa-Dimna*, which has been recently defined as an “unruly classic”, stands at the crossroads of various genres – animal fables, wisdom literature, mirror for princes, imaginative literature, fiction – and, probably given its very nature, throughout its transmission it has incorporated notions that have travelled across different traditions. The topic chosen by Sánchez touches on notions related to embryology and gestation which, as well as others, have been passed on and adapted throughout the development of the collection from Buddhist Indian culture through Zoroastrian or Manichaean Sassanian circles into Islamic realm.

In “The Fortunes of the “Baby in the Womb”: Embryology and Asceticism in *Kalīla and Dimna*, Buddhist sutras, and Islamic Sermons”, Sánchez traces the dissemination of the “baby on the womb” motif. As far as its origin is concerned, the collation of the chapter on Burzoy's life with the *Garbhāvakraṅtisūtra* proves that the description of the embryo's development in the *Kalīla wa-Dimna* originates from a recension of the Buddhist sutra, or from an intermediate source conveying these same passages, perhaps transmitted through Manichaean literature. According to Sánchez, the most plausible hypothesis is that this motif would have entered the collection thanks to a direct translation into Pahlavi from the Sanskrit source since the most outstanding feature of the reception of the Buddhist sutra in the *Kalīla wa-Dimna* is the association of gestation and renunciation of the world.

On the other hand, the transmission of the “baby on the womb” motif into medical literature – e.g. *Firdaws al-ḥikma* by the physician al-Ṭabarī (d. between 246/860 and 256/870) – leads to a reconsideration of the preponderance of Greek medical paradigms in the study of Islamic concepts of nature, giving instead more attention to ideas that may have come from other traditions and other channels, as evidenced by the embryological notions circulating in the pre-Islamic Middle East and arrived via the Eastern Silk Road milieu. The further circulation of the motif in homiletic and hortatory literature suggests an influence, direct or indirect, of the *Kalīla wa-Dimna* on another cluster of Arabic works disseminating in various religious and intellectual circles. The description of the embryo was, for example, used as a narrative resource that enjoyed some popularity among Shi'ite scholars, who adapted this motif for different rhetorical purposes.

On the one hand, Sánchez points to an optimistic reinterpretation of the “baby in the womb” motif, which occurs for example in the *Rasā'il* of the Iḥwān

al-Şafā' and the *ḥadīths* collected by Ibn Bābawayh (d. 380/991). Besides, other works assume the thematic connection of gestation and renunciation of the world “especially if the suffering of the embryo in the womb is employed as an allegory of the life in this world and God’s creation of the natural order”. The sermon attributed to ‘Alī b. Abī Ṭālib in al-Şarīf al-Radī (d. 406/1015)’s *Nahġ al-balāġa* is exemplary to the extent that it addresses the creation of man as an allegory, in terms reminiscent of the biography of Burzoy, by evoking the darkness of the womb and the folds of the uterus’ layers and thus echoing the “darkness and constraint” used in the *Kalīla and Dimna*.

Following in the footsteps of the historian of sciences Jacques Roger, who considered medieval (western) zoology as an intellectual “ecosystem” consisting of three pivots (*historia, ratio, experientia*), Meyssa Ben Saad proposes to investigate another masterpiece of the Arabic literature – the *Kitāb al-Ḥayawān* of al-Ġāḥiẓ – through a reading of the text that is both scientific and philological and especially considering this work as a major source of the so-called “rational” zoology. This kind of approach leads to enhance al-Ġāḥiẓ’s naturalistic approach and reflect on the role of *adab* in his scientific argumentation, thus repositioning this work within the history of science and reassessing its influence on later naturalist knowledge.

Ben Saad’s article “*L’adab au service de l’ilm. Le discours naturaliste d’al-Ġāḥiẓ (m. 255/868) entre culture orale, sources livresques et observations personnelles*” is divided into two parts that focus on al-Ġāḥiẓ’s elaboration of a specific zoological writing in the *Kitāb al-Ḥayawān* and the role of *adab* in his argumentative rhetoric. She identifies three spheres in which this type of writing stands out. The first concerns al-Ġāḥiẓ’s interpretation of the diversity of the living beings and his desire to classify them by explaining, among other things, hybridisation and similarity between species. The second relates to spontaneous generation, which al-Ġāḥiẓ claims does not concern all animals. In support of his argument, he both relies on his own observation and on reasoning (often syllogism) that refers to the knowledge of ancient authorities such as Aristotle. The third concerns precisely his relationship with “the authorities of knowledge”, namely Aristotle, the lexicographers and the Bedouin Arabs.

Each of these spheres involves the adoption and/or the development of a specialised vocabulary and the use of certain topics or arguments. This is where *adab* comes into play, that is when al-Ġāḥiẓ uses it as a tool of reason both in argumentation and demonstration. Indeed, according to Ben Saad, the *Kitāb al-Ḥayawān* intersects a “naturalist” or even biologist approach with descriptive connotations in his attempt to sketch out a general classification project with a more systematic one when it comes to detailed classification. Along these lines of argument, Ben Saad claims that *adab* is not opposed to

*ilm* and also on the basis of these elements the *Kitāb al-Ḥayawān* penned an important chapter in the history of the natural sciences.

As far as Arabic prose is concerned, in “Connaissance sur la nature à l’usage des secrétaires (*kuttāb*) au Moyen Âge islamique” Kaouthar Chebbi adds a further type of writing employed by secretaries (*kuttāb*) that displays the importance of knowledge on nature in the administrative, diplomatic and political spheres. Although living in different historical periods, Ibn Qutayba, al-Nuwayrī, al-Qalqašandī wrote works that offer exhaustive compendia of knowledge including that on the natural world: animals, plants, minerals, but also notions of meteorology and astronomy. The analysis of the different sections in which such a knowledge is summarised allows Chebbi to highlight the specificities of each work, the use of the same or different sources, and the particularities of the writing style of individual authors.

In a different way, both the *Adab al-kātib* and the *Uyūn al-aḥbār* provide a valuable knowledge of the natural world. Whereas in the former work Ibn Qutayba offers a systematic overview divided into specialised fields, in the latter he has a less didactic approach that nevertheless tends to thematise different topics by clustering them in specific sections. For example, in the book of natures and praiseworthy traits of character (*Kitāb al-ṭabā’i’ wa-l-aḥlāq al-maḍmūma*) of the *Uyūn al-aḥbār*, Ibn Qutayba gathers information organising them into thematic chapters or dividing them by animal species; differently, in the book on food (*Kitāb al-ṭa’ām*), he describes the therapeutic and pharmacological use of certain plants.

In their shared encyclopaedic efforts to embrace every field of knowledge, the *Nihāyat al-arab fī funūn al-adab* by al-Nuwayrī, the *Masālik al-abṣār fī mamālik al-amṣār* by Ibn Faḍl Allāh al-‘Umarī and the *Ṣubḥ al-aṣṣā fī šinā’at al-inšā’* by al-Qalqašandī include extensive sections on the three kingdoms of nature gathering information on animals, plants and minerals as well as on meteorology and astronomy that could be used for the study of natural sciences in the Mamluk period. In the choice of certain themes and sections, Chebbi displays the complex system of intra-textual references that these works have, which are at the same time situated in a long tradition paying special attention to the knowledge of the natural world but also concerned with providing up-to-date information. In this dual role of compilers of previous information and recipients of new data, *kuttāb* play a crucial function not only in the administration and among the cultural élite of the period but also in the dissemination of a sector-based knowledge such as that on the natural world.



### 2.3 *The Natural World and Insights into Philosophy and Sciences*

The section of contributions on philosophy and sciences examines works that belong to different genres and offer different insights into the concept of nature circulating in the Abbasid and Mamluk periods. Unlike the previous sections in which the authors deal with the natural world in its various manifestations, in this one nature is the object of investigation. The Arabic word used in this type of texts for nature – *ṭabīʿa* – has a variety of meanings: it refers to (a supposed) independent creative power, but it is also used in the sense of universe as it is or natural properties or even instinct. In the different meanings nature takes on, one can distinguish the various philosophical currents to which these writings belong and the various textual cultures to which they belong.

In “Nature in Ǧibrīl b. Nūḥ al-Anbārī’s *Kitāb al-iʿtibār fī al-malakūt*”, Wim Raven focuses on a short Christian treatise written about 830 AD that is a collection of teleological proofs of God’s existence. It is mostly about nature, since in nature both God’s existence and his management of his creation become manifest. Actually, the *Kitāb al-iʿtibār fī al-malakūt* stands in a long classical tradition that goes back to Classical Antiquity (referring to Aristotle, Xenophon, Cicero, Pliny and Galen) and to the Fathers of the Church (the Physiologus, Theodoret, Basil, Jacob of Edessa), and more in general the Hexaëmeron literature. In his article, Raven also provides a reconstruction of the background against which this text was written and circulated as well as details on another text attributed to pseudo-Ǧāḥiẓ that would represent an Islamised “adaptation” of *al-Iʿtibār* widely spread among both Sunnites and Shiʿites over the centuries.

The *Iʿtibār* consists of a preface, followed by “arguments from design” in the Universe, the Earth, plants, animals, human beings; and a philosophical, or rather theological, essay at the end. In order to support his argument, Ǧibrīl explicitly quotes from Aristotle, a “book on animals” also by Aristotle, and “books on medicine” that apparently go back to physicians from the school of Galen. Although composed by a Christian author, this treatise differs from the works of the Fathers of the Church by having a limited number of references to Genesis and relying mostly on ancient physiologists (*aṣḥāb al-ṭabāʿi*) frequently mentioned in the transmission chains.

The nature discussed in this treatise has an essentially philosophical nature. Nature is closely related to the creation (*al-ḥalq*) and, Ǧibrīl argues, creation is perfect insofar as it concerns the overall design of any living being that exists on earth and in the cosmos (*al-maḥlūqāt*), including all those inhabiting the natural world. One of the most wonderful characteristics of nature is abundance, which is manifest as much in the dimension of the infinitely large as

in the scale of the infinitely small. In this regard, all the arguments provided serve to demonstrate God's majesty as creator (*al-ḥāliq*). Whatever He created is useful in all possible ways. With the aim of strengthening the rhetoric of his philosophical argumentation, Ġibrīl uses many similes echoing the natural world, the artisanal dimension of the Creator's work, and the everyday life in which one can observe the magnificence of His creation. In his intentions, the author wrote this treatise to provide arguments against the Materialists, Manicheans, and Nihilists.

Debates over the existence or not of nature as a principle of movement during the 3rd/9th century can be understood as revolving around the implications of the concept of creation. In "The Paradox of Creation. Theology of (De)nature and Physics of Worship in the 3rd/9th Century *Kalām* and *Falsafa*", Guillaume de Vaulx d'Arcy resumes the main arguments of the different views of theologians and philosophers on nature and physics of worship. On the one hand, the denial of nature among theologians was implied by their stressing on the dependency of creatures to their Creator, and resulted in occasionalism. If this history is well-known, the thinking of a denier of nature like the speculative theologian Šāliḥ Qubba should not only be interpreted as a preliminary step of occasionalism, since his reduction of the properties of created beings is huger than causality. According to De Vaulx d'Arcy, "occasionalism is just one particular and spectacular side of the reform that occurred in the theory of causality during the 3rd/9th century", since the refusal of the action of nature was more general. In this regard, he resumes the various ideas circulating among Mu'tazilites such as 'Abd al-Ġabbār (d. 415/1025) and Ibn Ḥā'it̄ (middle of the 3rd/9th century).

On the other hand, the affirmation of nature in the first *falsafa*, namely Kindianism, may be understood in light of a second property of the concept of creation: the necessary independence of the created world from his Creator. It results in an original answer to the question: what is the cause of natural changes? According to al-Kindī (d. 256/873), his pupil Aḥmad b. al-Ṭayyib al-Saraḥsī (d. 286/899) and the doctrine developed in the *Rasā'il* of the Iḥwān al-Šafā', the world is a universal worshiper who prostrates before God willingly. Facing this divine solipsism, the Kindian school developed an Islamic version of the theory of the *macrozoion* in which all events of the world are attributed to the soul of the world acting through nature understood as a faculty of the universal soul. De Vaulx d'Arcy claims that the theory of the denial of natural properties in favour of God's power of action endangered soteriology as well as the doctrine of naturalists (*tabī'yyūn*) did by asserting the materiality of the soul.

Philippe Provençal offers an interpretation of “The chapter on birds in the Ikhwān al-Ṣafā’” which moves away from the philosophical debate described above and rather attempts to frame such notions on the knowledge of nature within the development of a natural history already circulating in earlier authors. The chapter on birds forms part of the eighth *risāla* in the second section of the *Rasā’il* of the Iḥwān al-Ṣafā’ about “the corporeal and natural sciences” or rather “the natural bodies” (*al-ǧismiyyāt al-ṭabī’iyyāt*). This section consists of 17 epistles and their contents represent the powerful influence of Greek and Hellenistic science and philosophy in the classical Arab world.

Provençal opens his article by discussing Iḥwān al-Ṣafā’’s definition of zoology, which is the seventh of the natural sciences and concerns the knowledge of all living beings on earth. The fact that this definition is fundamentally based upon an approach where empirical knowledge following the Aristotelian tradition plays a fundamental role emerges from the chapter on birds since it resembles to a large extent the treating of birds in Aristotle’s zoology. However, the chapter by the Iḥwān al-Ṣafā’ also contains details on bird behaviour and other traits from their biology that stem from observations made in the field that can be compared with the knowledge of modern ornithologists as Provençal himself does. Indeed, his new translation of the chapter aims to provide information on ornithological knowledge by identifying all the species mentioned in the text and supplying further information about bird biology relating to the species discussed.

In the conclusions, Provençal places the circulation of this knowledge alongside works that provide equally important information on the natural world and zoology in particular such as al-Ġāḥiẓ’s *Kitāb al-Ḥayawān*, ‘Abd al-Laṭīf al-Baġdādī’s (d. 629/1231) *Kitāb al-Ifāda wa-l-’itibār fī l-umūr al-mušāhada wa-l-ḥawādīṭ al-mu’āyana bi-arḍ Miṣr*, and Šams al-Dīn Muḥammad al-Dimašqī’s (d. 727/1327) *Nuḥbat al-dahr fī ‘aǧā’ib al-barr wa-l-baḥr*.

Nature not only concerns existing and visible created things but also its hidden laws. A particular group of such procedures that prescribe fumigations with dry, incense-like substances circulated in the Arabic mediaeval tradition, probably translated from Greek and eventually received by the Latin Mediaeval tradition.<sup>27</sup> Plato’s pseudo-epigraphic authorial banner which circulated under the title of *Kitāb al-Nawāmīs li-Aflāṭun* provides an authoritative

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27 On the relationship between science and the secrets of nature, I recommend reading Hadot, *Il velo di Iside*, in particular the chapters (pp. 99–115) dedicated to the unveiling of the secrets through mechanicals and magical techniques from Antiquity to the Renaissance.

narrative of transmission that presents these materials in connection with the most prestigious ancient Greek knowledge. This work became a way to label a certain form of “natural magic” (*sīmā*) that involves the manipulation of natural substances to obtain mesmerizing special effects. In any case, in Arabic these particular (secret) “laws of nature” were called *nawāmīs*.<sup>28</sup>

In “Hallucinations and Smoke Screens: The Pseudo-Platonic ‘Laws of Nature’ (*Nawāmīs*) and Their Transmission”, Lucia Raggetti explores the transmission of these erratic blocks of text from a *longue durée* perspective, analysing some specific textual clues disseminated along the tradition, first in the Pseudo-Platonic fragment in MS Paris BnF 2577 titled *Kitāb al-Nawāmīs* and then in the third chapter of Abū l-Qāsim al-‘Irāqī’s *Kitāb ‘Uyūn al-ḥaqā’iq wa-īdāḥ al-ṭarā’iq*.

The former short manuscript excerpt follows the *Kitāb al-Ustūṭās*, a treatise on astral magic and talismans (*nīranǧāt*) attributed to Hermes and contains three different procedures to prepare and use particular substances meant for fumigation. Raggetti explains the procedures for its preparation and considers the application of the *nawāmīs* by a performer as part of the execution of a wondrous piece of entertainment in front of the public. On the other hand, the *Kitāb ‘Uyūn al-ḥaqā’iq* written in the 13th century by the alchemist al-‘Irāqī testifies to the reuse of such pseudo-Platonic references in a handbook that “is a curious combination of sleight of hand, natural magic, and various forms of technical knowledge”. Again, Raggetti explains the much more complex procedures given by al-‘Irāqī in the third chapter on fumigation substances and manner of their operation. The previous text block is still identifiable centuries later but is updated and modified according to the usages of the time. The enrichment of the procedures also shows the complexity of the accompanying performance as it is now intended for a specific social gathering (*maǧlis*) presented as a setting for some of these fumigations.

Besides, Raggetti tracks down some themes found in the *‘Uyūn al-ḥaqā’iq* in early *Manāfi* literature – for instance al-Iskandarī’s *Kitāb al-Ḥīyal al-bābiliyya fī l-ḥizāna al-kāmiliyya* and al-Ġawbarī’s *Kitāb al-Muḥtar fī kašf al-asrār* – observing in conclusion that al-‘Irāqī’s work “appears to be part of a complex and intricate network of sources, in which the same aspects of technical knowledge about nature could be applied for many different purposes and in a variety of textual and social contexts”. Basically, this technical knowledge consists in mastering the combination of natural ingredients (minerals, plants,

28 A very detailed presentation of the natural and secret sciences (with the relative differences between the two domains) can be found in Ullmann, *Die Natur- und Geheimwissenschaften im Islam*.

and animals) in order to obtain effects that will appear supernatural to the ordinary onlooker. Then, the image of nature this set of texts return us is of a nature whose elements are connected by a complex web of relations, invisible threads that can be pulled by those who master them.

### 3 The Idea of Nature and the Representation of the Natural World that Discloses this Special Issue

The twelve contributions in this issue touch on different faces of the natural world and only together can contribute to shaping an idea of nature in the period under review.

None of the works considered in this issue is exclusively and entirely dedicated to the natural world. Nevertheless, the two articles by Meyssa Ben Saad on al-Ġāhiz's *Kitāb al-Ḥayawān* and Kaouthar Chebbi on Abbasid and Mamluk encyclopaedical compilations written for secretaries (*kuttāb*) reflect on type of texts that have the ambition of providing universal models. Therein, the understanding of the various realms of nature (in its articulations of animals, plants, minerals) is embedded within a complex system of knowledge that concerns time and space, but also touches on the significance of the human beings in history and society, and ultimately their relationship with their environment. The belonging of these works to different genres (*adab* works on the one hand and encyclopaedias on the other) as well as their different audiences (*udabā'* and *kuttāb*) makes them particularly relevant to the general understanding of the circulation of ideas about nature for wider audiences and outside theological and philosophical circles.

In connection with the latter, the articles by Wim Raven and Guillaume de Vault d'Arcy offer insights into the philosophy of nature which surfaces from the circulation of such works in different religious (Sunnite, Shi'ite, but also Mu'tazilite or Christian) circles between the 2nd/8th and 4th/10th centuries. The interplay between different ideas of nature disseminated by and between philosophers or theologians refracts echoes of much more complex debates concerning the very nature of God and His creation. The article by Lucia Raggetti outlines an opposite perspective since it concerns the laws of nature that can be manipulated for magical purposes.

In a general view of the universe, the heavens deserve a special place. Cristina La Rosa draws out images of stars and natural elements in the *dīwān* by the Andalusian al-Īsbīlī that reframe the ultimate sense of man in relation to the creation. However, when looking at the earth and earthly life, this sense can be lost. The motif of the baby in the womb analysed by Ignacio Sánchez

shows both the multiplicity of conceptions in relation to the embryo, gestation and conception circulating in Islamic civilization and the relativity of perspectives in relation to the fragility of human life. According to Hekmet Dirbas, also the poem of Dū al-Rumma, his solitary journey through the desert and his encounters with wild animals, underlines the transience of human life on earth. The relationship between man and nature, which basically touches all genres and texts, becomes particularly close and intense in poetry.

Meysa Ben Saad's reflections move towards the history of natural sciences and the role of al-Ġāḥiẓ in the development of a true naturalist discourse. He regards the natural world and reflects on the sense of creation through the lens of the animals. Similarly, Philippe Provençal focuses on the chapter on birds in one of the most important philosophical encyclopaedias written by the Iḥwān al-Ṣafā'. Observing a genus and all its species allows for similar reflections in a form of cataloguing that is more and more detailed.

The articles by Ilenia Licitra, Gianluca Saitta, Syrinx von Hees concern plants and the various ways in which they are both portrayed and hinted at in different poetic (Siculo-Arabic, Yemeni, Levantine) repertoires. In all three cases, the mention and possibly the description of specific plants, flowers or fruits allows their location in the environmental landscape in which the poem is supposed to have been composed. The complexity of these references in poetry shows that they are not ornamental background elements, but, on the contrary, part of a wider (cultural, social, but also naturalistic and ecological) environment that plays an important role in the composition.

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